CLAYTON QUARRY
RECLAMATION PLAN AMENDMENT

DRAFT ENVIRONMENTAL IMPACT REPORT

VOLUME II: APPENDICES

State Clearinghouse No. 2020020323



FEBRUARY | 2022

Lead Agency
Contra Costa County, Department of Conservation and Development

BENCHMARK RESOURCES

CLAYTON QUARRY
RECLAMATION PLAN AMENDMENT

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FEBRUARY | 2022

Lead Agency
Contra Costa County, Department of Conservation and Development
30 Muir Rd., Martinez, CA 94553

Prepared By:
Benchmark Resources
2515 East Bidwell Street, Folsom, CA 95630

TABLE OF CONTENTS

VOLUME II: APPENDICES

Appendix A NOP and Initial Study
Appendix A-1 Notice of Preparation
Appendix A-2 Comments on the Notice of Preparation
Appendix A-3 Scoping Meeting Comments
Appendix A-4 Initial Study
Appendix A-5 NOC of the Notice of Preparation
Appendix A-6 NOP Distribution Lists

Appendix B Proposed Reclamation Plan Amendment
Appendix B-1 Proposed Reclamation Plan Amendment (document)
Appendix B-2 Revegetation Plan

Appendix C Visual Simulations

Appendix D Air Quality, GHG, and Health Risk Assessment
Appendix D-1 Air Quality and Greenhouse Gases Report
Appendix D-2 Public Health Risk Assessment
Appendix D-3 1983 Reclamation Plan Backfill Emissions

Appendix E Biological Resources Reports
Appendix E-1 Biological Resources Assessment
Appendix E-2 Arborist Report
Appendix E-3 Clean Water Act Jurisdictional Delineation

Appendix F Geotechnical Evaluations for Revised Reclamation Plan

Appendix G Hydrology and Water Quality Reports
Appendix G-1 Hydrology and Water Quality Evaluation Report
Appendix G-2 Drainage Plan
Appendix G-3 Adaptive Management Program
Appendix G-4 Quarry Lake Water Quality Analysis
Appendix G-5 DA71A Drainage Area Runoff Estimates
Appendix G-6 Quarry Road Runoff Management

Appendix H Draft Mitigation Monitoring and Reporting Program

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APPENDIX A

NOP AND INITIAL STUDY

APPENDIX A-1
NOTICE OF PREPARATION

Lead Agency:
Department of Conservation and Development

30 Muir Road
Martinez, CA 94553

Phone:1-855-323-2626

Contra Costa County

John Kopchik
Director

Aruna Bhat
Deputy Director

Jason Crapo
Deputy Director

Maureen Toms
Deputy Director

Kelli Zenn
Business Operations Manager

February 14, 2020

NOTICE OF PREPARATION / NOTICE OF SCOPING MEETING
FOR A DRAFT ENVIRONMENTAL IMPACT REPORT
ON THE PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

TO: RESPONSIBLE AND TRUSTEE AGENCIES, AND OTHERWISE INTERESTED AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

The Contra Costa County Department of Conservation & Development (DCD) has received CEMEX Construction Materials Pacific, LLC's (CEMEX's) application for a Reclamation Plan Amendment through the adoption of a revised Reclamation Plan (the "Revised Reclamation Plan") for the Clayton Quarry (the "project"), which requires amendments to its current land use, drainage, and encroachment entitlements (**County File Number: LP15-2030/31**) to allow for current state reclamation standards to be achieved during reclamation and updated grading and drainage plans. DCD is the lead agency for preparation of the Environmental Impact Report (EIR) for this project and is issuing this Notice of Preparation pursuant to Section 15082 of the CEQA Guidelines.

PROJECT DESCRIPTION

The applicant, CEMEX (2365 Iron Point Road, Suite 120 Folsom, CA 95630, (916) 521-0222), is requesting approval of a Revised Reclamation Plan, which includes the following components:

- Reclamation over an anticipated period of 50 years to a post-mining land use of open space;
- Reduction of the surface mining disturbance footprint that leaves the east rim of the quarry intact, providing a visual buffer between the quarry and viewsheds to the east;
- Permanent overburden fill areas;

- Final grading contours reflecting a maximum depth of excavation at elevation 110 feet mean sea level with finish slope angles that achieve adequate factors of safety;
- A final drainage plan that provides for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow that conveys stormwater to natural drainage courses and human-made drainage facilities;
- Revegetation of the quarry east rim, overburden fill areas, and processing plant site to a combination of chaparral and grassland habitats that feature California native seed mixes;
- Elimination of requirements to backfill, grade, and compact the quarry floor and benches, given that the planned open space end use will provide for a future quarry lake;
- Clarification of pre-1976 (pre–California Surface Mining and Reclamation Act (SMARA)) disturbance areas, including any areas disturbed outside the boundaries of the 1983 Reclamation Plan; and
- Achievement of current State reclamation standards during reclamation.

In addition, and in response to stakeholder input, CEMEX has incorporated into the Revised Reclamation Plan a new screening berm (between the existing processing plant site and residential communities to the north) and an alternate driveway for accessing the site farther north along Mitchell Canyon Road.

PROJECT LOCATION

The project site is located at 515 Mitchell Canyon Road, on the east side of Mount Zion, approximately one-half mile south of the city of Clayton in an unincorporated portion of the County. See attached Figure 1, "Vicinity Map." Surface mining disturbances are planned on approximately 167 acres of two parcels (Assessor's Parcel Numbers 112-020-007 and 112-020-013) totaling approximately 335 acres, the remainder of which would be left undisturbed or reserved for other uses allowed under existing zoning, in unincorporated western Contra Costa County, see Figure 2, "Reclamation Plan Overview."

Latitude/Longitude: 37° 55' 15.90"/121°56 46.53"

ANTICIPATED IMPACTS

Pursuant to CEQA Guidelines Section 15060(d), DCD will not prepare an Initial Study before beginning work on the EIR. Based on knowledge of the project site and nearby uses, we anticipate that the project may result in potentially significant impacts in the following CEQA topic areas:

- Aesthetics: Reclaiming the project site to open space with a quarry lake with a controlled outflow will alter the aesthetics of a site that is currently planned for high-density residential, business park, or grazing land.
- Air Quality and Greenhouse Gas Emissions: Reclamation-related activities would cause an increase in emissions of criteria pollutants and greenhouse gases.
- Biological Resources: Reclamation-related activities may result in impacts to a variety of protected plant and animal species and their habitats.
- Geology and Soils: Reclamation-related activities may result in impacts to soil conditions and slope stability at the project site.
- Hydrology and Water Quality: The proposed altered drainage plan and end use as an open pit lake may result in impacts to hydrology and water quality.
- Noise: Ambient noise levels may increase during reclamation-related activities.
- Land Use and Planning: Reclaiming the project site to open space would alter the land use designations of a site that is currently planned for high-density residential, business park, or grazing land.

PUBLIC COMMENTS

All responsible and trustee agencies, and interested agencies, organizations, and individuals are invited to submit comments that address environmental concerns resulting from the implementation of the proposed project.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but no later than 30 days after receipt of this letter. Correspondence must be received at the following address by 5:00 p.m. on Monday, March 16, 2020:

Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road
Martinez, California 94553
Attention: Francisco Avila

The County File Number stated above should be included in all correspondence.

SCOPING MEETING

A scoping meeting will be held on **Monday, March 16, 2020, at 3:30 p.m.,** at 30 Muir Road, Martinez, California. At this meeting, interested agencies, organizations, and

individuals may submit oral and written comments pertaining to environmental concerns related to the proposed project.

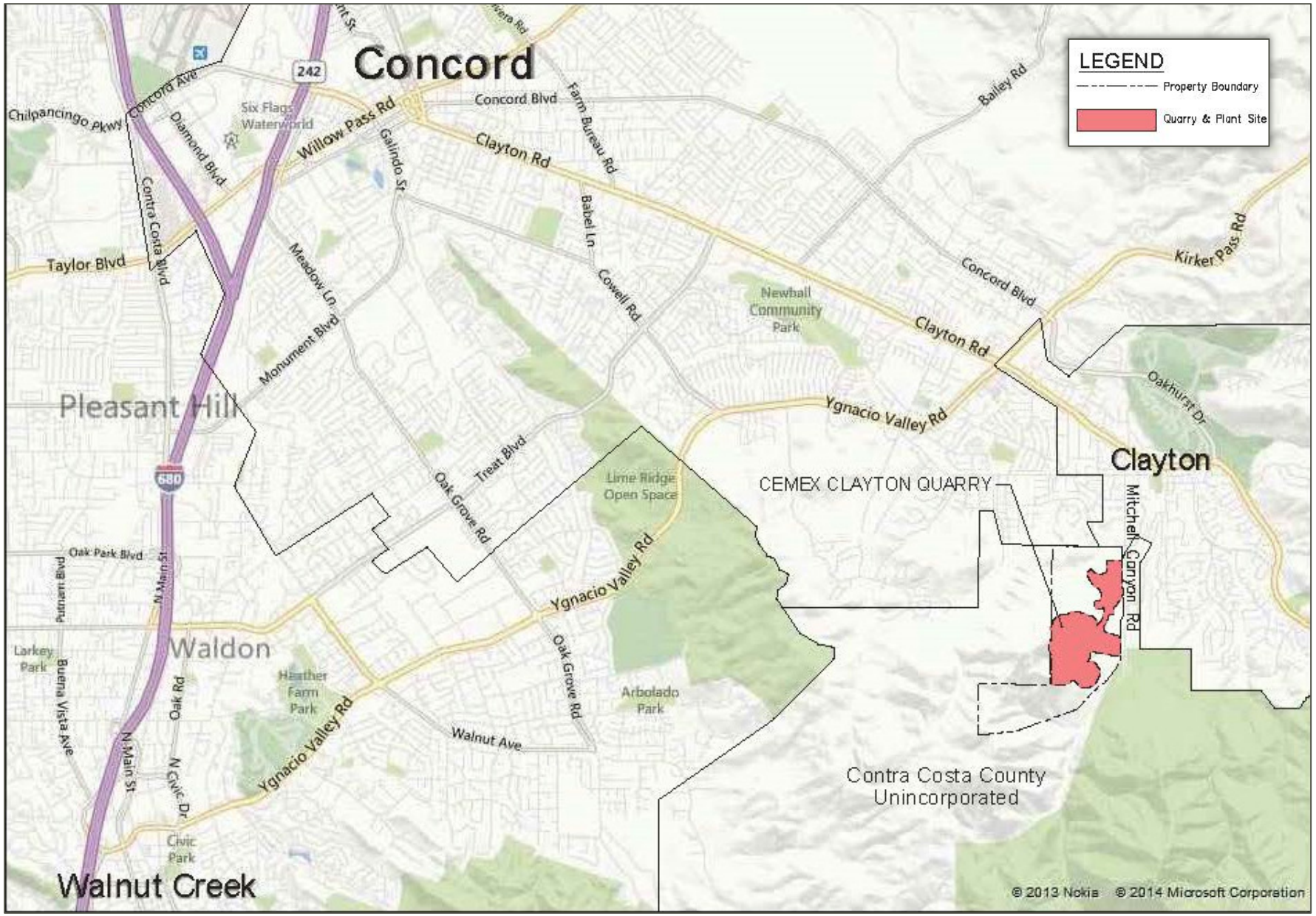
SUPPORTING DOCUMENTS

The Reclamation Plan Amendment application and supporting documents are available for review at the Department of Conservation & Development, Community Development Division. If you wish to obtain a copy of any documents related to this project, please contact me at (925) 674-7801 or Francisco.Avila@dcd.cccounty.us.

Signature: _____

Francisco Avila, Senior Planner
Contra Costa County
Department of Conservation & Development

Att: Figure 1, "Vicinity Map"
Figure 2, "Reclamation Plan Overview"
Figure 3, "Reclamation Plan"



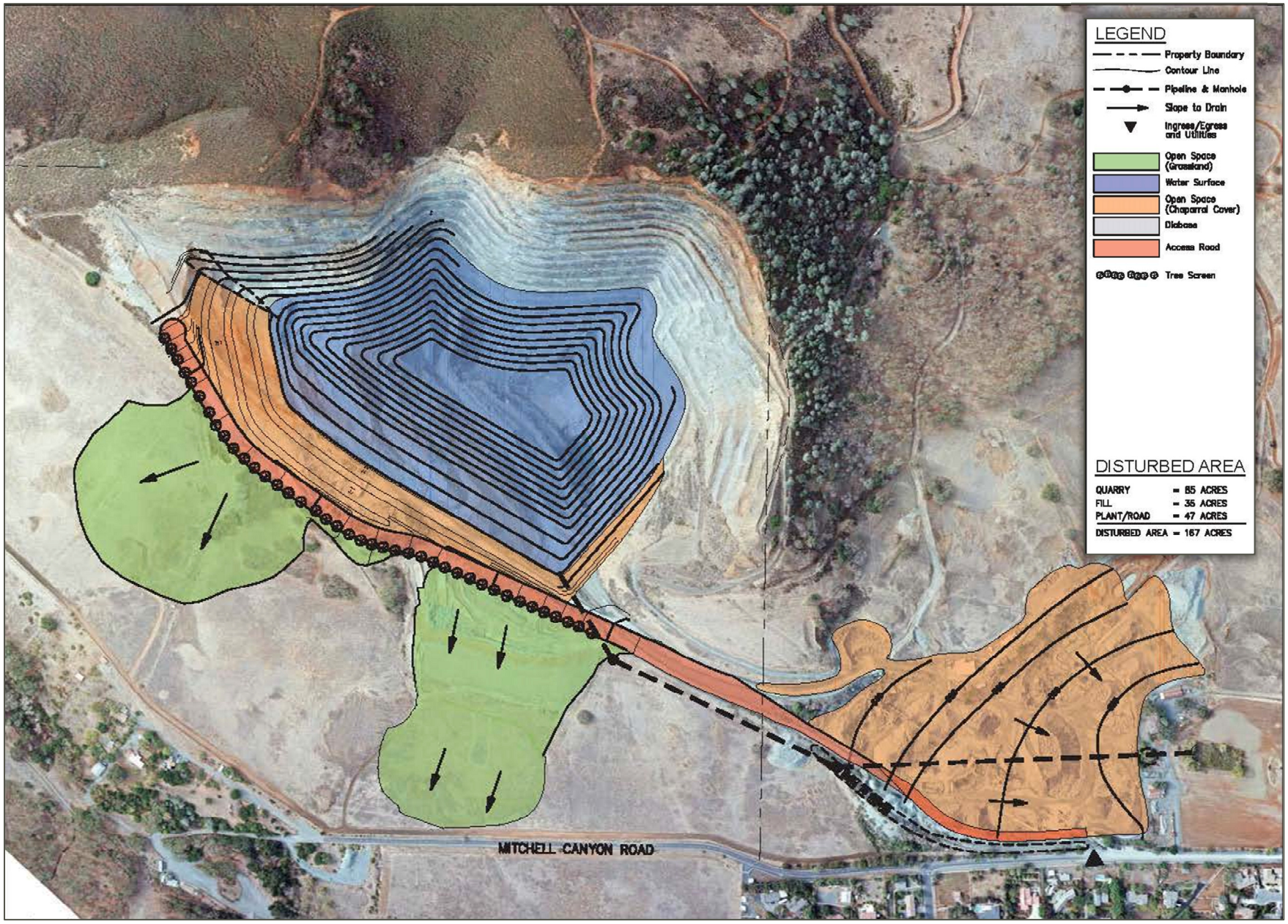
SOURCE: Clayton Quarry Reclamation Plan Amendment Project Application Package (June 2017)

NOTES: This image is not printed to scale.

Vicinity Map

CLAYTON QUARRY RECLAMATION PLAN AMENDMENT DEIR NOP

Figure 1



SOURCE: Clayton Quarry Reclamation Plan Amendment Project Application Package (June 2017)
NOTES: This image is not printed to scale.

Reclamation Plan Overview
CLAYTON QUARRY RECLAMATION PLAN AMENDMENT DEIR NOP
Figure 2

CEMEX
APN 122-010-016
(101 AC)

RECLAMATION PLAN BOUNDARY
MATCHES PROPERTY LINE, NO SETBACK

CEMEX OWNS
ADJACENT PROPERTY

EAST RIM ACCESS ROAD

HAUL ROAD
(TO REMAIN FOR ACCESS)

CEMEX
APN 122-020-007
(154 AC)

CEMEX
APN 122-020-013
(181 AC)

OUTLET
INV.
735

OUTLET STRUCTURE PLAN VIEW
SHEET 12

GATE

MANHOLE
INV. 729

BUILDINGS
TO REMAIN

MANHOLE
INV. 630

EX. BERM TO REMAIN

OUTFLOW INV. 555

SITE ACCESS ROAD
(ALTERNATE)

MITCHELL CANYON ROAD

22 15
23 14

LEGEND

- PROPERTY BOUNDARY
- RECLAMATION PLAN BOUNDARY
- FINAL ELEVATIONS
- SLOPE BANK
- PIPELINE & MANHOLE
- ACCESS/FIRE ROAD (TO REMAIN)
- FENCELINE (NEW & EXISTING)
- DETENTION PONDS
- DRAINAGE
- INGRESS/EGRESS
- OVERBURDEN FILL
- CULVERTS (EX.)
- SCREENING BERM

RECLAMATION SPECIAL NOTES

1. Remove all stockpiles, equipment, structures, buildings, foundations, and utilities, except buildings shown to remain for use in agricultural property management. Grade disturbed areas to drain to ponds. Place topsoil/growth media as needed, hydroseed area, and return land to open space.
2. Future Pit lake will be maintained by Cemex or their assignees.
3. Pre-SMARA disturbance.
4. Overburden fill placed in pit. (optional)
5. Haul roads to remain for Maintenance and Emergency access road.
6. Contra Costa County Water District

GENERAL NOTES

1. Final elevations dependant upon amount of reserves found in the field, ability to access the material, and the extent of mining.
2. Work shall conform to Chapter 88-11, Surface Mining and Reclamation, of Contra Costa County code; the project conditions of approval; Stormwater Pollution Prevention Plan (SWPPP); OSHA; MSHA; and other applicable local, state, and feredal regulations.
3. All fire/access roads to remain (typical). Plant tree screen along eastside of East Rim Access Road.
4. Reclamation End Use:
   Open Space = 167 Acres
   Quarry Lake Water Surface (Ultimate) Elev. 735 msl =32 Acres

Grid

Scale: 1" = 200' Contour Interval: 10'

200 0 200 400 600 FEET

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

RECLAMATION PLAN

CLAYTON QUARRY
CEMEX

CONTRA COSTA COUNTY CALIFORNIA

SCALE:	AS SHOWN
DATE:	MAY 2017
DESIGN BY:	KDS/DAR
DRAWN BY:	DAR
CHECKED BY:	KDS

REV.	DATE	DESCRIPTION	BY

SHEET NUMBER
10
OF 13 SHEETS

JOB NUMBER
164.00

APPENDIX A-2
COMMENTS ON THE NOTICE OF PREPARATION

CONTRA COSTA
COUNTY

2020 MAR 16 P 4:04

DEPARTMENT OF
CONSERVATION
AND DEVELOPMENT

CITY OF CLAYTON

Founded 1857 • Incorporated 1964

Community
Development (925) 673-7340

Engineering (925) 969-8181

6000 Heritage Trail • Clayton, California 94517
Telephone (925) 673-7300 • FAX (925) 672-4917

City Council
Julie Pierce, *Mayor*
Jeff Wan, *Vice Mayor*
Tuija I. Catalano, *Councilmember*
Jim Diaz, *Councilmember*
Carl C.W. Wolfe, *Councilmember*

March 16, 2020

Contra Costa County
Department of Conservation and Development
Community Development Division
Attn: Francisco Avila, Senior Planner
30 Muir Road
Martinez, CA 94553

Email: Francisco.Avila@dcd.cccounty.us

RE: Land Use Permit and Reclamation Plan Amendment Requests for Clayton Quarry (LP15-2030 & LP15-2031) – 515 Mitchell Canyon Drive, Clayton; Response to Notice of Preparation of an Environmental Impact Report

Dear Mr. Avila:

Thank you for the opportunity to submit comments in response to the Department of Conservation and Development's Notice of Preparation of an Environmental Impact Report (EIR) for the proposed amendments to the land use, drainage and encroachment entitlements and Reclamation Plan for the Clayton Quarry located at 515 Mitchell Canyon Drive in unincorporated Contra Costa County (County File Number LP15-2030/31).

The subject 181-acre site is not located within the City of Clayton municipal boundary nor within the voter-approved Urban Limit Line, but it is within the City of Clayton's Sphere of Influence (SOI). The City of Clayton has the comment authority of a responsible agency for projects within its SOI and that consist of actions that would have a direct effect on City conditions. The City's General Plan identifies quarry uses as one of the four categories identified in the unincorporated section of the SOI.

The City of Clayton previously submitted letters in August 2015, July 2017, and September 2018, in response to the County's request for comments on the permit

amendment requests associated with the Clayton Quarry. This letter is particularly responsive to the request for comments on the scope of the EIR to be prepared for the project in accordance with the California Environmental Quality Act (CEQA), though the City requests that County staff also consider the comments made in those prior comment letters with regard to the merits of the permit amendment requests and necessary findings for consideration of the project by County decision-making bodies.

As stated in a previous letter, the City has concerns regarding the amendment of the Reclamation Plan to no longer backfill the quarry pit with soil and alternatively have it fill with water to reach an end use as a lake. A quarry lake would preclude any viable usage of the property for many decades due to the steep slopes and instability of the benches around the quarry pit, making the land and the lake virtually unusable and in conflict with the intent of characterizing the quarry as reclaimed within a reasonable timeframe following the cessation of mining operations.

As indicated in previous correspondence, the City of Clayton envisions and supports the quarry area returning to a condition as close to natural as possible through revegetation and grading, and resulting in natural contours in areas affected by the mining operation. The aesthetic analysis in the EIR should include photosimulations or renderings of the views of the quarry from public rights-of-way and local trails in the City of Clayton, in near-term (one- and five-year), mid-term (10- and 25-year), and long-term (40- and 50-year) horizons. With the full reclamation effort projected to last an estimated 50 years, residents of properties proximate to the quarry would be subject to modified views for extended periods of time. The EIR should evaluate whether mitigation is necessary on a phased or intermediate basis to ensure that naturally-appearing views are established throughout the implementation of the revised Reclamation Plan, rather than just at the end of the Reclamation Plan. City staff is available to offer input on the selection of the visual vantage points to be used in the photosimulations.

The hope and goal from the City's perspective would be that, consistent with the City's General Plan, implementation of the Reclamation Plan would result in an overall minimal aesthetic impact, as though the quarry use never occurred. The City believes this can be achieved through terraforming the hillside in a manner that looks natural, as well as revegetating the area quickly and with appropriate densities of native species.

The Notice of Preparation indicates that the proposed Reclamation Plan includes a drainage plan that provides for the quarry pit to fill slowly with water with a controlled outflow that conveys stormwater to natural and human-made drainage facilities. The City of Clayton requests that the EIR analysis consider the potential downstream impacts to these drainage facilities, including habitat modification or bank de-stabilization, as a result of increased duration of flows, or an explanation of how the project would be implemented to avoid such hydrological impacts. The City also requests that the EIR evaluate potential ecosystem impacts as a result of the creation of a body of standing water over an extended period of time. More specifically, the City requests analysis of whether: 1) the additional flows or standing water could alter

existing habitat for native or sensitive species or the ecosystem on which those species rely; and 2) whether the project has the potential to attract or introduce new species or vectors to the area that could negatively affect humans or native or protected plant and animal species in the vicinity of the project site.

The City has previously expressed concerns regarding potential tree removal associated with the project. In the biological analysis of the EIR, the City requests further quantification of the trees to be removed and their size and species. Visual analysis of the tree removal, as well as any potential tree replacement, should also be considered in the aesthetic and visual analysis of the project. Additionally, anticipated volumes of traffic along the proposed alternate driveway from Mitchell Canyon, along with related potential vehicle noise and construction impacts on sensitive receptors, should be elaborated upon in the environmental analysis.

Public Notification Request

The City of Clayton wants to re-iterate its preference for the owners of real property within the area to be treated as stakeholders and notified throughout the public outreach, environmental and hearing processes. Previously, changes to the quarry have occurred without notification to the property owners, which created undue strain on the City of Clayton and resulted in City staff responding to numerous inquiries on projects that were outside of the City's jurisdiction. Therefore, the City of Clayton requests that the County use a larger radius than the typical 300 feet, to ensure that residents on Mitchell Canyon Road and the surrounding neighborhood are notified throughout the permit review process. Further, the City of Clayton requests continued inclusion on all public outreach and notifications associated with this project.

If you have any questions or wish discuss these comments further, please contact the City of Clayton Community Development Department at (925) 673-7300.

Sincerely,

Dana Ayers

Interim Community Development Director

cc: Ikani Taumoepeau, City Manager
Laura Hoffmeister, Assistant to the City Manager

Francisco Avila

From: Ayers, Dana <DAyers@trccompanies.com>
Sent: Monday, March 16, 2020 4:58 PM
To: Francisco Avila
Cc: Laura Hoffmeister; Ikani Taumoepeau
Subject: City of Clayton Comments on CEMEX NOP
Attachments: City of Clayton_Comments on CEMEX NOP_031620.pdf

Please find attached a comment letter from the City of Clayton in response to the Notice of Preparation of an EIR for the Clayton Quarry Reclamation Plan amendment (LP15-2030/31).

Thank you for the opportunity to comment.

Dana Ayers
Interim Community Development Director
City of Clayton
dayers@ci.clayton.ca.us

California
Department of Conservation
Division of Mine Reclamation

Gavin Newsom, Governor
David Shabazian, Director

March 12, 2020

Mr. Francisco Avila
Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road
Martinez, CA 94553

Copy sent via email: francisco.avila@dcd.cccounty.us

SUBJECT: County File Number LP15-2030/31
CEMEX Clayton Quarry Reclamation Plan Amendment (RPA); Notice of Preparation (NOP)/Notice of Scoping Meeting for a Draft Environmental Impact Report (EIR) (SCH # 2020020323)

Dear Mr. Avila:

Thank you for including the Department of Conservation's Division of Mine Reclamation (Division) in the environmental review process for the Clayton Quarry RPA NOP for the Draft EIR. The project as described in the NOP proposes to update the Clayton Quarry approved reclamation plan through the adoption of an RPA which requires revision to its current land use, drainage, and encroachment entitlements to allow for current state reclamation standards to be achieved during reclamation and upgraded grading and drainage plans. Additionally, a new screen berm and alternate driveway for accessing the site along Mitchell Canyon Road was included.

The Division has review responsibilities associated with lead agency implementation of the Surface Mining and Reclamation Act of 1975 (SMARA; Public Resources Code [PRC] Section 2710 et seq.). SMARA provides a comprehensive surface mining and reclamation policy to assure that adverse environmental impacts are minimized, and mined lands are reclaimed. The Division's primary focus is on existing surface mining operations and the return of those mined lands to a usable and safe condition while giving consideration to environmental and recreational values; however, the Division also addresses issues related to abandoned (pre-1976) legacy mines.

The Division has reviewed the subject NOP pursuant to the California Environmental Quality Act (CEQA) and State CEQA Guidelines and offers no comments on those documents at this time.

Please include the Division on the distribution list for this project and send the Division any subsequent project documents (e.g., hearing notices or supplemental environmental documents), as well as a copy of the certified final Environmental

Impact Report, to the address below, attention to Carol E. Atkins, Division of Mine Reclamation.

If you have any questions, please contact either of us at (916) 323-9198.

Sincerely,

Carol E. Atkins, Manager
Environmental Services Unit

Ian Stevenson, Manager
Engineering and Geology Unit

cc (sent by email):
State Clearinghouse (state.clearinghouse@opr.ca.gov)

Department of Conservation, Office of Legislative and Regulatory Affairs
(OLRA@conservation.ca.gov)

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

March 16, 2020

Mr. Francisco Avila
Contra Costa County
Department of Conservation and Development
Community Development Division
30 Muir Road
Martinez, CA 94553

Subject: Clayton Quarry Reclamation Plan Amendment, Notice of Preparation of a Draft Environmental Impact Report, SCH #2020020323, Contra Costa County

Dear Mr. Avila:

The California Department of Fish and Wildlife (CDFW) has reviewed the Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) prepared by the Contra Costa County Department of Conservation and Development (DCD) for the proposed Clayton Quarry Reclamation Plan Amendment (Project) located in unincorporated Contra Costa County.

CDFW is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA) §15386 for commenting on projects that could impact fish, plant and wildlife resources. CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as permits issued under the California Endangered Species Act (CESA), the Native Plant Protection Act, the Lake and Streambed Alteration (LSA) Program and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife trust resources. Pursuant to our jurisdiction, CDFW has the following concerns, comments, and recommendations regarding the Project.

PROJECT DESCRIPTION AND LOCATION

The proposed Project area is located at 515 Mitchell Canyon Road, on the east side of Mount Zion, approximately one-half mile south of the City of Clayton. The Project consists of reclamation activities over a 50-year time period, including grading, revegetation, and the creation of a quarry lake.

The CEQA Guidelines (§§15124 and 15378) require that the draft EIR incorporate a full Project description, including reasonably foreseeable future phases of the Project, and require that it contain sufficient information to evaluate and review the Project's environmental impact. Please include a complete description of the Project components listed below.

- Footprint area of permanent features and temporarily impacted areas, such as staging areas and access routes
- Plans for any proposed buildings or structures, ground disturbing activities, fencing, paving, stationary machinery, landscaping, and stormwater systems

- Operational features, including level of anticipated human presence (describe seasonal or daily peaks in activity, if relevant), artificial lighting/light reflection, noise, traffic generation, and other features
- Construction schedule, activities, equipment types and crew sizes

Additionally, the EIR should specify if CDFW is anticipated to be a Responsible Agency that is expected to use the EIR in its decision making for the Project [CEQA Guidelines, § 15124, subd. (d)(1)(A)].

ENVIRONMENTAL SETTING

The Project is located in undeveloped grasslands and currently developed areas including a quarry, building structures, and roads. The EIR should provide sufficient information regarding the environmental setting necessary to understand the Project's, and its alternative's (if applicable), potentially significant impacts on the environment (CEQA Guidelines, §§ 15125 and 15360).

CDFW recommends that the EIR provide baseline habitat assessments for special-status fish, wildlife, and plant species potentially affected by the Project including but not limited to the species with the designations listed below.

- Threatened, endangered, rare, candidate, or fully protected under state law
- Threatened or endangered under federal law
- California Rare Plant Rank (CRPR) 1 through 4 (http://www.cnps.org/cnps/rareplants/ranking.php)
- California Species of Special Concern (https://www.wildlife.ca.gov/Conservation/SSC/)
- Local or regional rare plants or animals identified in a local or regional plan or policy
- Rare, threatened, or endangered pursuant to CEQA Guidelines section 15380

Special-status species documented to occur, or with the potential to occur, on or near the Project area include, *but are not limited to*, those listed in the table below.

Common Name	Scientific Name	Status	Rare Plant Rank
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT, ST	1B.2
Brewer's western flax	*Hesperolinon breweri*		
California red-legged frog	*Rana draytonii*	FT, SSC	
California tiger salamander	*Ambystoma californiense*	FT, ST	
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*		1B.1
Coast horned lizard	*Phrynosoma blainvillii*	SSC	
Diablo helianthella	*Helianthella castanea*		1B.2
Golden eagle	*Aquila chrysaetos*	SFP	
Hall's bushmallow	*Malacothamnus hallii*		1B.2

Loggerhead shrike	*Lanius ludovicianus*	SSC	
Mt. Diablo fairy-lantern	*Calochortus pulchellus*		1B.2
Pallid bat	*Antrozous pallidus*	SSC	
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	SSC	
Slender silver moss	*Anomobryum julaceum*		4.2
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC	
Western bumble bee	*Bombus occidentalis*	CE	
Western burrowing owl	*Athene cunicularia*	SSC	1B.2
White-tailed kite	*Elanus leucurus*	FP	

FE = federally listed as endangered under ESA; FT = federally listed as threaten under ESA; SE = state listed as endangered under CESA; ST = state listed as threatened under CESA; SFP = state fully protected under Fish and Game Code; SSC = state species of special concern; CE= candidate for state listing as endangered

Habitat assessments and species baseline information should include information from multiple sources; for example, recent and historical aerial imagery and survey data, field reconnaissance surveys, scientific literature and reports, and findings from databases such as California Natural Diversity Database (CNDDB). The CNDDB is a "positive occurrence" database containing records of species and natural communities that have been observed and documented. Absence of data in such sources does not indicate that the species is absent from the Project area or vicinity. Based on the data and information from the habitat assessment and surveys, the EIR can adequately assess which special-status species are likely to occur in the Project area or vicinity.

COMMENTS

Comment 1: State Fully Protected Species

State fully protected species, including golden eagle and white-tailed kite, may occur within the Project area. CDFW has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code §§ 3511, 4700, 5050, and 5515. Take, as defined by Fish and Game Code § 86 is to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill", of any fully protected species is prohibited and CDFW cannot authorize their incidental take. Without appropriate mitigation measures, Project activities conducted within occupied territories have the potential to significantly impact these species.

Without appropriate avoidance and minimization measures for fully protected species, potentially significant impacts associated with Project activities may include, but are not limited to inadvertent entrapment, reduced reproductive success, reduced health and vigor, nest abandonment, loss of nest trees, and/or loss of foraging habitat that would reduce nesting success (loss or reduced health or vigor of eggs or young), and direct mortality.

To avoid impacts to fully protected species, CDFW recommends that a qualified biologist conduct species-specific surveys (using standard protocol or methodology, if available) of the Project site before Project implementation. If Project activities will take place when fully protected species are active or are breeding, CDFW recommends that additional pre-activity surveys for active nests or individuals be conducted by a qualified biologist no more than five (5) days prior to the start of Project activities.

In the event a fully protected species is found within or adjacent to the Project site, CDFW recommends that a qualified wildlife biologist develops an appropriate no-disturbance buffer to be implemented. The qualified wildlife biologist should also be on-site during all Project activities to ensure that the fully protect species is not being disturbed by Project activities.

Comment 2: Alameda Whipsnake
The Project site directly abuts suitable Alameda whipsnake core and dispersal habitat. Due to the potential presence of this listed species and the potential for Project-related take, including relocation out of harm's way, CDFW advises that the Project proponent obtain a CESA Permit (pursuant to Fish and Game Code Section 2080 et seq.) in advance of Project implementation. Issuance of a CESA Permit is subject to CEQA documentation; therefore, the CEQA document should specify impacts, mitigation measures, and fully describe a mitigation, monitoring and reporting program. If the proposed Project will impact any CESA-listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit. More information on the CESA permitting process can be found on the CDFW website at https://www.wildlife.ca.gov/Conservation/CESA.

Comment 3: California Tiger Salamander
The Project site is within the range of California tiger salamander (CTS). CTS spend the majority of their lives underground, taking shelter in small mammal burrows in grasslands. Data indicate that CTS can disperse as far as 1.3 miles (2.2 km) from breeding ponds to upland terrestrial habitat, and routinely disperse greater than 0.62 miles (1 km). CDFW recommends that a qualified biologist conduct a habitat assessment following the "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" which may be found online at https://wildlife.ca.gov/Conservation/Survey-Protocols. If California tiger salamanders or suitable habitat are identified on-site, CDFW advises that the Project proponent obtain a CESA Permit (pursuant to Fish and Game Code Section 2080 et seq.) in advance of Project implementation. Issuance of a CESA Permit is subject to CEQA documentation; therefore, the CEQA document should specify impacts, mitigation measures, and fully describe a mitigation, monitoring and reporting program. If the proposed Project will impact any CESA-listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit. More information on the CESA permitting process can be found on the CDFW website at https://www.wildlife.ca.gov/Conservation/CESA.

Comment 4: Western Burrowing Owl
CDFW recommends that Project area be surveyed for western burrowing owls following the methodology described in Appendix D: Breeding and Non-breeding Season Surveys of the

CDFW Staff Report on Burrowing Owl Mitigation (Staff Report), which is available online at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843.

In accordance with the Staff Report, a minimum of four survey visits should be conducted within 500 feet of the Project area during the owl breeding season which is typically between February 1 and August 31. A minimum of three survey visits, at least three weeks apart, should be conducted during the peak nesting period, which is between April 15 and July 15, with at least one visit after June 15. Pre-construction surveys should be conducted no-less-than 14 days prior to the start of construction activities with a final survey conducted within 24 hours prior to ground disturbance.

To offset loss of foraging habitat, CDFW recommends that the Project proponent should be required to purchase and protect in perpetuity compensatory mitigation lands at a minimum of a 1:1 mitigation ratio as a condition of Project approval. If active burrows or winter roosts are found on-site and take cannot be avoided, the mitigation ratio should be increased to a minimum of 3:1 (mitigation: loss). The long-term demographic consequences of exclusion techniques have not been thoroughly evaluated, and the survival rate of evicted or excluded owls is unknown. All possible avoidance and minimization measures should be considered before temporary or permanent exclusion and closure of burrows is implemented in order to avoid "take".

Comment 5: Special-Status Plants

CDFW recommends that the Project area be surveyed for special-status plants by a qualified botanist following the "Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities," which can be found online at https://wildlife.ca.gov/Conservation/Survey-Protocols. This protocol, which is intended to maximize detectability, includes identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. In the absence of protocol-level surveys being performed, additional surveys may be necessary.

If a state-listed or state Rare[1] plant is identified during botanical surveys, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, acquisition of take authorization through an Incidental Take Permit (ITP) issued by CDFW pursuant to Fish and Game Code Sections 2081(b) and/or Section 1900 et seq is necessary to comply with Fish and Game Code CESA and the Native Plant Protection Act.

Comment 6: Nesting Birds

If ground-disturbing or vegetation-disturbing activities occur during the breeding season (February through early-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Code sections.

[1] In this context, "Rare" means listed under the California Native Plant Protection Act.

To evaluate Project-related impacts on nesting birds, CDFW recommends that a qualified wildlife biologist conduct pre-activity surveys for active nests no more than five (5) days prior to the start of ground or vegetation disturbance to maximize the probability that nests that could potentially be impacted are detected. CDFW also recommends that surveys cover a sufficient area around the Project site to identify nests and determine their status. A sufficient area means any area potentially affected by the Project. Prior to initiation of Project activities, CDFW recommends that a qualified biologist conduct a survey to establish a behavioral baseline of all identified nests. Once Project activities begins, CDFW recommends having a qualified biologist continuously monitor nests to detect behavioral changes resulting from the Project. If behavioral changes occur, CDFW recommends halting the work causing that change and consulting with CDFW for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so, such as when the Project site would be concealed from a nest site by topography. CDFW recommends that a qualified wildlife biologist determine any necessary buffer variances, in consultation with CDFW, in order to protect nesting birds based on existing site conditions.

REGULATORY REQUIREMENTS

California Endangered Species Act
Please be advised that a CESA Permit must be obtained if the Project has the potential to result in "take" of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA Permit is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species [CEQA section 21001(c), 21083, and CEQA Guidelines section 15380, 15064, 15065]. Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code section 2080.

Lake and Streambed Alteration Program
Notification is required, pursuant to CDFW's LSA Program (Fish and Game Code section 1600 et. seq.) for any Project-related activities that will substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work

within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW, as a Responsible Agency under CEQA, will consider the CEQA document for the Project. CDFW may not execute the final LSA Agreement until it has complied with CEQA (Public Resources Code section 21000 et seq.) as the responsible agency.

FILING FEES

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code section 711.4; Pub. Resources Code, section 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

Thank you for the opportunity to comment on the Project's NOP. If you have any questions regarding this letter, please contact Ms. Jennifer Rippert, Environmental Scientist, at (707) 428-2069 or jennifer.rippert@wildlife.ca.gov; or Ms. Melissa Farinha, Senior Environmental Scientist (Supervisory), at (707) 944-5579 or melissa.farinha@wildlife.ca.gov.

Sincerely,

Gregg Erickson

Gregg Erickson
Regional Manager
Bay Delta Region

cc: State Clearinghouse #2020020323

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February 18, 2020

Francisco Avila
Department of Conservation and Development
30 Muir Road
Martinez, CA 94553

Re: 2020020323, CEMEX Clayton Quarry Reclamation Plan Amendment Project, Contra Costa County

Dear Mr. Avila:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

a. A brief description of the project.

b. The lead agency contact information.

c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).

d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

a. Alternatives to the project.

b. Recommended mitigation measures.

c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

a. Type of environmental review necessary.

b. Significance of the tribal cultural resources.

c. Significance of the project's impacts on tribal cultural resources.

d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

a. Whether the proposed project has a significant impact on an identified tribal cultural resource.

b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,



Nancy Gonzalez-Lopez
Staff Services Analyst

cc: State Clearinghouse

Francisco Avila

From: Pat Brogan <pbroganmason@gmail.com>
Sent: Thursday, March 05, 2020 10:04 AM
To: Francisco Avila; Jim Mason; Diana Cornish; krislavezzoli@prodigy.net
Subject: Proposed Cemex petition for Clayton Quarry

Francisco:
In reading through the petition that Cemex has filed, we are expressing a few concerns.
As family owners of the lot/house immediately adjacent to the quarry at 15 Herriman Court for 55 years, we have adapted to the noise and dust as well as we can.

In the past year, there have been major changes happening in the quarry without us knowing what is going on from Cemex. Specifically, there has been an extensive addition of lights that are on all night long and shine in our bedroom. I have complained to the quarry directly and was told that these were all new and efforts would be made to put them on timers. I can count over 10 bright lights that are new.

We have a seasonal stream in our back yard that includes providing water to a 100+-year-old oak tree (half on our property and half the quarry's property) that we have heard has been "dammed up" but don't know the status. The oak tree has branches on the ground on their side and is not serviced.

There is a tremendous amount of new construction going on much closer to our house than ever before which is noisy and visible from our yard. It also coats our house and solar panels with so much dust. The field behind us that is owned by the quarry has been leased out for years and maintained (cut to prevent fire danger) by former quarry manager George, and we have heard that was rescinded. So who will cut the tall grass/fire hazard?

We are not in favor of adding an entrance that would go behind our house.

The idea of a "lake" seems absurd as there is no perpetual water source that would keep it wet. Is that an excuse to not fill the lake? They certainly have access to fill materials.

Pat Brogan 408065606145
Jim Mason 2094803049

March 10, 2020

Bill and Kelly Burmeister
144 Widmar Place
Clayton, CA 94517

Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road
Martinez, CA 94553

Attention: Francisco Avila
Subject: File Number: LP15-2030/31

Dear Mr. Avila:

We are writing with regard to Cemex's Clayton Quarry reclamation plan. Our main objection to the plan is with regard to their plan to construct an "alternate driveway for accessing the site farther north along Mitchell Canyon Road."

This "alternate driveway" will:

- Interfere with residents entering/exiting their streets on Widmar Ct. and Herriman.
- Increase dust from exiting trucks and trucks traveling down this driveway to the exit.
- Trucks backing up on Mitchell Canyon Road closer to residents.
- Increase noise from breaking/accelerating at the ingress/egress.
- Decrease property values.
- Increase air pollution from idling trucks.
- Move Diablo Downs' problem (current driveway) to Clayton residents (proposed driveway). The current driveway was there when they built Diablo Downs. You would be just creating another problem by constructing an alternate driveway closer to us.
- Bring a quarry operation into a residential neighborhood. It is already too close.

This was attempted 20 years ago and due to residents objections, the road was removed. I don't know who the "stakeholders" are that they refer to in the letter, but our neighborhoods, Widmar Place, Widmar Court, Herriman Way and Herriman Court are all opposed to a driveway north of where it is now. The current driveway is across from one street. The proposed driveway would intersect with multiple streets. Adding an additional roadway for trucks is problematic.

Sincerely,

Bill and Kelly Burmeister

Francisco Avila

From:	Melinda Moore <melindammoore@yahoo.com>
Sent:	Wednesday, March 11, 2020 12:36 PM
To:	Todd.Nixon@cemex.com; jwan@ci.clayton.ca.us; tcatalano@ci.clayton.ca.us; jdiaz@ci.clayton.ca.us; cwolf@ci.clayton.ca.us; Laura Hoffmeister; msikela@ci.clayton.ca.us; Francisco Avila
Cc:	Kris Lavezzoli; marko@rivercitycomm.com
Subject:	CEMEX Reclamation Plan Amendment

Dear Senior Planner Avila and Clayton City Council Members,

I am writing the CCC Department of Conservation and Development and the Clayton City Council to advise you that I am opposed to the PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT.

We purchased our family home in 1964 at 137 Widmar Place, Clayton, California. My family and I have been living in the shadows of the Clayton Quarry for the past 56 years. I now find myself with a huge file box full of documents pertaining to the Muchio Estate and the Clayton Quarry. I am reading many of the same concerns over and over again throughout the years. Besides the usual problems with dust, noise, air pollution, trucks, etc., I am once again reading about the proposed ingress road in the buffer zone right next to our houses (that by the way has already been installed and removed because the quarry put it in without permission) and **the mining down into the ground and leaving a behind a huge quarry pit in the earth for eternity is beyond belief!**

The City of Clayton boosts of it's many walking and hiking trails, the beauty of Mt. Diablo State Park. Now CEMEX Clayton Quarry wants to leave a huge open quarry pit behind when they finish mining? What kind of Reclamation Plan is that sides cheap and inconsiderate? Have you ever looked down on the quarries from Mt. Diablo? What an scare on the earth! Now CEMEX wants to dig down into the earth, when will they ever finish mining? How about the Pine Hollow and Clayton Quarry continue mining across to remove Mt. Zion, back fill the and level the ground as promised in the 1983 Reclamation Plan? How about leaving open space for future our generations to enjoy?

My husband and I along with many of our Mitchell Canyon Neighbors plan to attend the March 16, 2020 scoping meeting. I plan to voice my opposition and continued concerns about the operations at the CEMEX Clayton Quarry.
I will also hand deliver another copy my written letter of opposition to the proposed amendment at that time.

Melinda Molloy Moore
137 Widmar Place
Clayton, CA 94517
melindammoore@yahoo.com

Francisco Avila

From: dana heinz <jddreamhouse@sbcglobal.net>
Sent: Monday, March 16, 2020 2:56 PM
To: Francisco Avila
Subject: LP15-2030/31

Hello,
We're sending in our comments regarding LP15-2030/31 instead of attending the scoping meeting that is supposed to be held today.
This is due to both the presidential and county recommendations to limit gatherings that have been set forth due to the Coronavirus.

As stakeholders, we're opposed to the CEMEX quarry stating that stakeholders support an alternative access road right outside of Widmar Court. Our neighbors have opposed this, most recently in October of 2018 with CEMEX directly and a past history many years ago. We oppose this because it makes no sense to move quarry operations closer to more residents, right to the city/county line. There are also health concerns as well as the creation of a dangerous intersection in a residential neighborhood, closer to an elementary school zone also makes zero sense.

We also oppose the reclamation plan to leave the quarry as an open pit when mining is done.

In a brochure received from the CEMEX quarry they've falsely stated that they will just have high density housing if the new, proposed reclamation plan fails. This is a threat and seems ludicrous that CEMEX is threatening this.

Please submit this email as our part of the public comments due today by 5pm. We will attend future meetings when they occur, should gathering recommendations change.

Sincerely,
Jerry & Dana Heinz
120 Widmar Place
Clayton, CA 94517

Francisco Avila

From:	wstj8@aol.com
Sent:	Sunday, March 15, 2020 5:48 PM
To:	Francisco Avila
Cc:	krislavezzoli@prodigy.net; bren71657bren71657@sbcglobal.net; dianajcornishdianajcornish@gmail.com; dojofrogfacedojofrogface@gmail.com; fiesty_kfiesty_k@comcast.net; jamesmasonjamesmason@yahoo.com; jay_duran32jay_duran32@yahoo.com; jddreamhousejddreamhouse@sbcglobal.net; jsullivanjsullivan@bigge.com; kellykelly@rpmfg.com; korenscanlankorenscanlan@ymail.com; lesgrey10lesgrey10@gmail.com; lvesneskilvesneski@gmail.com; malathianmalathian@msn.com; melindammooremelindammoore@yahoo.com; noshoesmomnoshoesmom@aol.com; paola.oviedo.03paola.oviedo.03@gmail.com; pbroganmasonpbroganmason@gmail.com; sarahsullivan523sarahsullivan523 @gmail.com; sqdealsqdeal@msn.com; tclinzeytclinzey@aol.com; tgernhardt1tgernhardt1@comcast.net; walterwalter@claytonvalleymechanical.com; wstj8wstj8@aol.com
Subject:	Clayton Quarry Proposed Project

March 14, 2020

Dear inspector Francisco Avila: :

Re: February 14, 2020 - NOTICE OF PREPARATION/NOTICE OF SCOPING MEETING FOR A DRAFT ENVIRONMENT IMPACT REPORT ON THE PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

I opposed Clayton Quarry/CEMEX's new projects because they are in violation of the codes and laws.

Due to the time restriction, this letter is very brief and incomplete. I will address the projects with details that will have a high degree of negative impact on their proposals. We are also the stake holders/residents and should be afforded sufficient time to express our concerns, etc. In addition their web site which addresses this proposed project is misleading and incorrect. The quarry/CEMEX has not been good neighbors and they are not holding up their end of the agreement. The alternative new driveway and road will create new Nuisance and will greatly impact the adjacent neighboring homes negatively. Please review Nuisance law **below.**

Back in 1995, **without** a required permit, the owner built a new road. After neighbors found out and objected to it, City official ordered them to remove the road.

Back in 1995, my neighbor Attorney Don Kovasic and I submitted letters opposing their road construction. Attorney Don Kovasic summarized the facts and laws in his well written letter in 1995.

Now they intend to build a new road and other constructions.

The current codes and laws are more stringent than in 1995 and the nuisance that they created has been worsened.

Please review the current applicable codes and laws and also the documents that Attorney Don Kovasic and I submitted in 1995.

My neighbors and I request that the City agencies should deny their proposals for new constructions.

Thank you.

Respectfully submitted,

Edgar Brincat
112 Willmar Place
Clayton, CA 94517

-------**Below**--------
Nuisance
Civil Code section 3479
"Anything which is injurious to health, including, but not limited to, the illegal sale of controlled substances, or is indecent or offensive to the senses, or an obstruction to the **free use of property**, so as to interfere with the **comfortable enjoyment of life or** property, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway, is a nuisance."
(Amended by Stats. 1996, Ch. 658, Sec. 1. Effective January 1, 1997.)

Francisco Avila

From: austin kelly <dojofrogface@gmail.com>
Sent: Monday, March 16, 2020 2:57 PM
To: Francisco Avila
Subject: Re: Clayton Quarry Plan Amendment Application

Francisco, I am 68 years old and per the latest Coronavirus guidelines need to isolate at home to avoid infection. I will not attend today's meeting. I think the latest guidelines recommend cancellation of all gatherings of 10 people or more. For this reason I believe that today's scoping meeting should postponed and furthermore if the meeting is held its validity will be in question. As I stated before I am opposed to the alternate driveway as are my neighbors.

Sent from my iPhone

> On Mar 16, 2020, at 8:11 AM, Francisco Avila <francisco.avila@dcd.cccounty.us> wrote:
>
> Good Morning,
>
> The scoping meeting is still scheduled for today. The meeting is at 3:30 so I expect attendance to be minimal as it is the only item on that agenda.
>
> If you have any questions, please feel free to ask.
>
> Regards
>
> -----Original Message-----
> From: austin kelly <dojofrogface@gmail.com>
> Sent: Sunday, March 15, 2020 2:40 PM
> To: Francisco Avila <Francisco.Avila@dcd.cccounty.us>
> Subject: Re: Clayton Quarry Plan Amendment Application
>
> Francisco, is the scoping still scheduled for tomorrow in light of the Coronavirus risk?
>
> Sent from my iPhone
>
>> On Feb 24, 2020, at 12:55 PM, Francisco Avila <francisco.avila@dcd.cccounty.us> wrote:
>>
>> Hello,
>>
>> Below are links to the application package and supporting documentation.
>>
>> I will be sure to include your opposition to the alternate driveway to the record.
>>
>> If you have any further questions as you proceed with reviewing of the information provided, please feel free to ask.
>>
>> Regards
>>
>>
>> Link to June 2017 Application:
https://gcc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.dropbox.com%2Fsh%2F2hqcenvc21rubtz%

2FAADfmgJc9-Jazi-
r9ujpkJ0ba%3Fdl%3D0&data=02%7C01%7Cfrancisco.avila%40dcd.cccounty.us%7C202a7031a60c46342e2608d7c9f4e57d%7C76c13a07612f4e06a2f4783d69dc4cdb%7C0%7C0%7C637199929128905838&sdata=okSnFof1QJUc92Fi6ugFf7aCpw0rOGMM4US1p%2FCG8aU%3D&reserved=0
>>
>> Link to August 2018 Application Supplement:
https://gcc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.dropbox.com%2Fs%2Fgwwb0ygmk3s0n7n%2FClayton%2520Quarry%2520Application%2520Supplement%2520%25288.21.18%2520Final%2529.zip%3Fdl%3D0&data=02%7C01%7Cfrancisco.avila%40dcd.cccounty.us%7C202a7031a60c46342e2608d7c9f4e57d%7C76c13a07612f4e06a2f4783d69dc4cdb%7C0%7C0%7C637199929128905838&sdata=hkaTnkJLu0qGawUJjG8a2AJOR2Dxufj8HW5F8CX6ByA%3D&reserved=0
>>
>>
>> Link to February 2019 Application Supplement No. 2:
https://gcc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.dropbox.com%2Fs%2F5ybw51d5jzj6dym%2FClayton%2520Quarry%2520Application%2520Supplement%2520No%25202%2520%2528Compass%25202.21.19%2529%2520with%2520Attachments.pdf%3Fdl%3D0&data=02%7C01%7Cfrancisco.avila%40dcd.cccounty.us%7C202a7031a60c46342e2608d7c9f4e57d%7C76c13a07612f4e06a2f4783d69dc4cdb%7C0%7C0%7C637199929128905838&sdata=hRlQtbK5Q7QD7v9Ewj4rY32X84IL1s7wm%2B8zZ6xR9Ks%3D&reserved=0
>>
>>
>> -----Original Message-----
>> From: austin kelly <dojofrogface@gmail.com>
>> Sent: Monday, February 24, 2020 12:52 PM
>> To: Francisco Avila <Francisco.Avila@dcd.cccounty.us>
>> Subject: Clayton Quarry Plan Amendment Application
>>
>>
>> Hi, this is Austin Kelly, 9 Widmar Court. Please send me the application package and supporting documents. For the record, as stakeholder I oppose an alternate driveway.
>> Sent from my iPhone

We are opposed to the insertion of the following wording in the Proposed Clayton Quarry Reclamation Plan:

In addition, and in response to stakeholder input, CEMEX has incorporated into the Revised Reclamation Plan a new screening berm (between the existing processing plant site and residential communities to the north) and an alternate driveway for accessing the site farther north along Mitchell Canyon Road.

The current quarry ingress/egress is situated ¼ mile south of the neighborhoods of Widmar Place, Widmar Court and Herriman Court/Drive. All of these properties were built after the establishment of the ingress/egress and heading north from it the agricultural field has served as a buffer between them and quarry operations.

We are opposed for the following reasons:

1. Allowing an alternate driveway would essentially be letting CEMEX operate in a residential neighborhood.
2. CEMEX does not provide the rationale for an alternate driveway.
3. Increased noise pollution directly in neighborhoods from both trucks down shifting and airbrakes before they enter the ingress.
4. Drastic increase in truck noise overall as while they simply roll past the houses now they would now be on the alternate driveway.
5. Increased particulate pollution directly in neighborhoods from proximity to dust and diesel.
6. The backing up of trucks along Mitchell Canyon as they slow down making it impossible for residents on Herriman Court to exit their court.
7. Widmar Court and Widmar Place residents would have to pull out directly in front of oncoming trucks while trying to exit right onto Mitchell Canyon creating a dangerous intersection.
8. The destruction of natural habitat of both plant and animal species.
9. The absolute Devaluation of our home prices.
10. Possibility of other quarry activities being allowed within this alternate driveway.
11. Possibility of increased production resulting in more disruption.

	Name	Street
	Kris Lavrzol	Widmar Ct.
	Dana Heinz	Widmar Pl.
	Jerry Heinz	Widmar Pl.
	~~Al~~	Widmar Pl.
	Paola Marticorera	Widmar Pl.
2	Kelly & Bill Burmeister	Widmar Pl
2	CHRIS + KATHRYN LINZEY	WIDMAR PL.
	WALTER MOORE	WIDMAR PL
	Melinda Moore	Widmar Place
	Linda Dickinson	Widmar Place
	Dave Dickinson	Widmar Place
	~~Barbara~~	Widmar Place
	John Mahlock	Widmar Place
		(Widmar Ct) Amber Duran
		(Widmar Ct) Jason Duran
	RICK VESNESKI	WIDMAR COURT
	LINDA VESNESKI	WIDMAR COURT
	Brandy Byers	Widmar Ct.
	Bob Byers	Widmar Ct
	KOREN SCANLAN	Widmar Ct
	RYAN McNAMARA	Widmar Ct
	AUSTIN KELLY	WIDMAR CT
	LESLIE FAGREY	~~Fle~~
	Michele Stranko	Fleming Ct
	Bryan Stranko	Fleming Ct
	Julia Stranko	Fleming Ct
	Emma Stranko	Fleming Ct
	Ruby Stran	Fleming

Name	Street
Kerry Baker	Lydia Lane
Aaron Baker	Lydia Lane
Carson Baker	Lydia Lane
Cassidy Baker	Lydia Lane
Lloyd Riehl	Herriman Ct
Rhianna Riehl	Herriman Ct
Karen Nichols	Herriman Ct
Kelsie Plant	Herriman Ct
[illegible]	HERRIMAN CT
[illegible]	Herriman Ct
Fiona Comis	
Gabriela Wallace	Herriman Ct
Terri Thomas	Herriman Ct.
Azadeh Rahimdel	Herriman Dr.
[illegible]	136 Widmar Pl
Sarah Addison	136 Widmar Place
Edgar Brincat	112 WIDMAR PL.
Justin Lavezzeli	Widmer Ct
Kathleen Lavezzeli	Widmar Court

William R Rodriguez

From: mslaura <mslaura@earthlink.net>
Sent: Monday, October 08, 2018 11:12 AM
To: John Brennecke
Cc: William R Rodriguez; Gary Willis; TallyHoBob@aol.com
Subject: Re: NEIGHBORHOOD QUARRY MEETINGS: MINUTES 9/30/2018 AND 10/4/2018

Perfect thank you!

Sent via the Samsung Galaxy S7, an AT&T 4G LTE smartphone

-------- Original message --------
From: John Brennecke <john.brennecke@gmail.com>
Date: 10/8/18 10:46 AM (GMT-08:00)
To: "<mslaura@earthlink.net>" <mslaura@earthlink.net>
Cc: William R Rodriguez <bsrland@comcast.net>, Gary Willis <g.willis@comcast.net>, TallyHoBob@aol.com
Subject: Re: NEIGHBORHOOD QUARRY MEETINGS: MINUTES 9/30/2018 AND 10/4/2018

Hi Laura,

Just a couple of changes:

1) The first meeting date was August 30th, not September 30th.
2) Add to end of second meeting minutes: "Debbie and Jon agreed to provide residents with a written statement detailing the changes they have made and intend to make."

Thanks for handling this, Laura!

John

On Sun, Oct 7, 2018 at 10:36 PM Laura Tow <mslaura@earthlink.net> wrote:

Please read over these minutes from our most recent meeting (they follow the minutes from the first meeting) – "reply all" with any suggested changes. Right now these are draft minutes! ... Thank you! Laura

The minutes of our most recent meeting follow these minutes from the initial meeting ... please see below.

FIRST QUARRY MEETING WITH RESIDENTS – SEPTEMBER 30, 2018, 3 pm

Home of Bill and Sandy Rodriguez; Bill Rodriguez chaired the meeting

Approximately 25-30 residents in attendance, including many who have lived here 30-40 years.
Residents' primary concern, and the impetus for having this meeting, are issues with dust from the quarry

Representing the quarry:
--Debbie Haldeman, Resource Development Manager
1 year in this position, 3-4 years with Cemex
--Jonathan Johnstone, Plant Manager (and Civil Engineer)
New hire since May 2018; with Cemex one year; employed in the mining industry since 2008
--Marco Milkotin, independent contractor (engineer?)
working on assisting Cemex with obtaining new permits in progress

The quarry representatives provided several hand-outs including copies of the original 1983 reclamation permit. We briefly discussed their current proposed reclamation plan amendment. The huge hole which will remain when the quarry closes, was to be filled with dirt, which would require hundreds and hundreds of truckloads, with resulting adverse environmental impact. The are requesting that the hole be left as is, to ultimately fill with water. (Their use permit allows the quarry to operate until 2150.)

DUST. Dust impact has dramatically increased over the past 1-2 years. Cars parked outside residences show visible dust after 24 hours, our solar panels get choked with dust, pool filters constantly need changing, and there is constant dust/grit/slurry on Mitchell Canyon Road near quarry entrance/exit, which also is our only route to access our homes.

Dust comes from the massive gravel stockpiles, loading practices, truck wheels ... we commonly see huge plumes of dust hovering and drifting over our homes.

Does the quarry monitor air quality? No, however Bay Area Air Quality Control Board does regularly come and check air quality, and per Jonathan, they sign in when they come. When did they last come? He is not aware of them being on the premises since he started here, i.e. since May 1, 2018. *He will check on this.*

What about installing dust monitoring devices on our neighborhood's property boundaries? *They will check.*

When there are dynamite blasts, we understood someone is to show up at one or more locations in/near our home development (including on Bill Rodriguez' property), to measure dust. Per Bill, no one has been present for the the most recent three dynamite blasts. *They will check.*

Prior to the current large stockpiles of gravel close to the public road and opposite the entrance to our home development, there was a silo/hopper/conveyor system which generated far far less dust into the neighborhood. What happened to it, why the change? Answer: the machinery wore out and was determined to be too costly to repair. Jonathan says most other quarries now have stockpiles however most quarries and/or stockpiles are much further from residential areas. Jonathan says there is a quarry in Aromas with an operating silo/hopper/conveyor system but he has not yet seen it.

Why are the stockpiles so close to the public road and our residential development? They have increased in size over the past 1-2 years -- currently they are over 30' high and within 30-40' from our homes. Debbie says location is demined by their permits. Can stockpiles be set back any further? *She will check.* Can stockpiles be watered more? They are misted but cannot be soaked due to impact on the material. Can they be misted more, particularly when there is wind? (Whose job is it to pay attention to daily/hourly wind levels and make changes accordingly?) *She and Jonathan will check.* Can the union employees on shift be more attentive to wind and dust conditions and be encouraged to alert management so immediate adjustments can be made?

Mitchell Canyon Road: unceasing dust in the dry months; mud and slurry in the wet months. The road in front of the quarry, and extending a substantial distance towards Pine Hollow Road, is perpetually ugly and awful. Street sweeper does little and sometimes makes things worse. What about tire/wheel washers? *They will check.* What about trucks driving a loop in the alfalfa field to clean wheels, prior to exiting on Mitchell Canyon Road? What can be done to keep the road clean of dust and slurry?

Quarry entrance looks lousy. What visual improvements can be made? Landscaping improvements? Trucks are not stopping. Residents report having been run off the road. Additional stop signs need to be installed, as well as mirrors.

Quarry representatives proposed returning with information and proposals in 90 days. We said that was totally unacceptable. We have a long history of experiencing indifference and inaction from prior quarry representatives; we want proof of a change. Quarry representatives then proposed 60 days; we said from our perspective 30 days would be reasonable and acceptable. Quarry representatives agreed to return to our group in 30 days.

We were told that under a new company wide policy, complaints phoned or emailed in, are entered into a permanent computerized data base. The quarry's direct line is 925-672-4900; Jonathan's personal cell/text line is 408-318-9093. Emails are: jonathans.johnstone@cemex.com and deborahg.haldeman@cemex.com.

Meeting adjourned at 4:30 pm.

Minutes by Laura Tow

SECOND QUARRY MEETING WITH RESIDENTS – <u>OCTOBER 4, 2018</u>, 3:30 pm

Home of Bill and Sandy Rodriguez; Bill Rodriguez chaired the meeting
Approximately 15-20 residents in attendance, including many who have lived here 30-40 years.

Representing the quarry were the same three individuals who were present at the first meeting (see above), plus Rosa Fibla, environmental manager, employed by Cemex for three years.

Residents had expected one or more higher level managers would also be present and were very disappointed at their absence. Jon and Debbie assured residents that Jon had been given decision making authority including a budget available to be spent on making needed changes. (Residents were not told the size of that budget.) Jon stated that he had had conversations with his boss, Mr. Pat Pieton (employed by Cemex since 2/2018), and with Pat's boss, Alan Maio (employed by Cemex since 9/2017). Both these managers are

based in Folsom CA. Residents commented on the extraordinary turnover in the company, eg in regards to both these high level managers as well as the plant manager; no explanations were offered other than the high cost of living in California.

Since our last meeting, Jon described specific changes and progress made:

(1) The gravel stockpile closest to Mitchell Canyon Road and our homes has been reduced substantially in height and volume. A sprinkler system has been added, automatically coming on eight times per day (every three hours, 24/7), for 15 minutes each time. It is hoped this will at least in part reduce the amount of dust.

(2) Calcium chloride, a dust suppressant, has been laid down on all roads within the quarry property. This has totaled 15,000 gallons of material. It will be applied twice yearly.

(3) Another street sweeper has been made available.

(4) A consultant is working on entry landscaping plans, adding trees, foliage and hardscape, to make the entry more attractive.

(5) They are actively exploring how/where to add tire/wheel washers.

(6) Under consideration is the creation of a north/south paved road through the west side of the agricultural field, which would be an exit only road for all trucks; two wheel-washers would be placed along this road. Trucks would re-enter Mitchell Canyon Road close to the north Cemex boundary. The intention would be for the trucks to exit carrying a minimum of gravel/dust/slurry onto the public road. This proposal would involve applying for an alteration of current permitted agricultural use, and could take a year or more.

(7) In response to residents' universal experience of vastly greater dust impact to our neighborhood since the silo/hopper/conveyor system was discontinued, Jon is investigating the possibility of rehabilitating that system.

Additional investigations are being made regarding where stockpiles are permitted on the property, and where they might be relocated.

In regards to our complaints about air quality particularly when windy, and when dynamiting, residents learned that BAAQCB (Bay Area Air Quality Control Board) is required to come by only annually (!), is only required to do a visual inspection (!), and makes this inspection on Cemex property, not outside its property boundaries. It appears there is no requirement for a quarry located immediately adjacent to a residential neighborhood, to have its air quality monitored in order to protect those neighborhood residents.

Residents would like the quarry to hire a third party, an independent monitor rather than someone in-house, to check air quality at various points within our residential development, at least monthly, particularly during windy periods and when dynamiting occurs – and make the monitoring results available to the neighborhood via our HOA Board. We may also as individuals feel it necessary to contact BAAQCB directly with our air quality complaints.

Residents continued to voice complaints regarding the extraordinary levels of dust, and quick accumulation of dust, on all surfaces on our sites: cars, patios, decks, roofs, etc. Children are having breathing problems which have been medically proven to be caused by the increased dust in our neighborhood.

Debbie offered the possibility of providing us with free car wash vouchers; she will check on this. They would be appreciated.

(Side note: Trucks are prohibited from turning left onto Pine Hollow Road. Residents are encouraged to complain to the main Cemex number, noted above, if they see any truck doing so.)

Residents requested another meeting in 30 days. Debbie was not agreeable to this. Debbie said she would keep us updated about progress, via contact with Bill Rodriguez, Board President. Although residents expressed appreciation for the actions taken in the past month, Cemex' lack of willingness to continue to meet with us as a group, in 30 or even 60 days, to provide us all firsthand with updates, was upsetting and dissatisfying for many of those present, and did not aid in establishing trust in their good intentions.

Meeting adjourned at 4:45.

Minutes by Laura Tow

Walter & Melinda Molloy Moore
137 Widmar Place
Clayton, CA 94517
925.672.0930
melindammoore@yahoo.com

March 15, 2020

Department of Conservation & Development
Community Development Division
Attn: Francisco Avila, Senior Planner
30 Muir Road
Martinez, CA 94553

Re: File Number: LP15-2030/31 - 2/14/2020 CEMEX Clayton Quarry Reclamation Plan Amendment

Dear Senior Planner Avila,

We are writing you to oppose the PROPOSED CEMEX CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

- New Driveway - Once again the quarry wants to put back the ingress road that it had to remove in 1985 because they built the driveway without permission. This ingress road would be another entrance to the quarry located on Mitchell Canyon Road right next to our houses on Widmar Ct/Dr and Herriman Ct/Dr. This road would be north of the quarry located on the current field in front of the old Murchio farm house and buffer zone/open space between the Clayton Mitchell Canyon Estates and the Clayton Quarry. The proposed ingress road allow trucks a staging area to congregate and idle while waiting to load aggregate. This proposed new road would would bring more noise, dust and air pollution even closer to our homes than the original entrance and Exit does farther south on Mithchell Canyon Road. We are NOT IN FAVOR OF ANOTHER QUARRY ROAD CLOSER TO OUR HOMES NOW OR ANY TIME IN THE FUTURE.

- Leaving Behind an Open Pit Mine - The new proposed plans are to pit mine down into the earth and leave a huge quarry pit that may fill up with storm water in 100 years! To eliminate prior reclamation requirements to back fill and level the land when the quarry is finished mining. We are not interested in having such a hazard in our backyard. We want the land back filled as stated in Lone Star's original

reclamation plan to provide open space or perhaps become part of Mt. Diablo State Park. WE ARE NOT IN FAVOR OF AN ABANDONED QUARRY PIT.

- Road Dust - The Clayton Quarry recently put in a truck wheel wash in anticipation of these meetings. The wheel wash is not mandatory and falls short of addressing our many complaints about dust.The quarry refused to water the loaded trucks as Lone Star used to do as regular practice. CEMEX has an old and inefficient street sweeper that does not always using water that simply takes the dust from Mitchell Canyon Road and brings it down into our streets. The street sweeper not using water, is usually followed by huge cloud of dust as it travels through our neighborhoods. WE ARE TIRED OF THE CONTINUED DUST & THE QUARRY DOING NOTHING ABOUT IT.

- Quarry Dust, Stock Piles of Rock & Quarry Roads - The quarry claims they water the stock piles and roads, yet clouds of dust regularly continue to billow out and over into our neighborhoods, houses and lungs. WE ARE TIRED OF THE CONTINUED DUST & THE QUARRY DOING NOTHING ABOUT IT.

The quarry claims to be good neighbors, but we find these claims to be false. The situation with the quarry is actually getting worse rather than better. They claim to support the community, but they do very little the help our community. This proposed reclamation plan amendment is all about their profits. Their actions have very little to do with being a good neighbor or showing any goodwill toward us, the environment or what they propose to leave behind for future generations once they discontinue mining.

Sincerley,

Walter H. Moore
Melinda Molloy Moore

Walter H. Moore
Melinda Molloy Moore

Attachment Letter: 4 pages
March 10, 1995 Permit Complienac Review RMC- Lonstar Clayton Quarry, From CCCounty Community Devlopment Department, Senior Planner Robert H. Drake, to Widmar Place Residents, Edgar Brincat and Don Kovasic

Walter & Melinda Molloy Moore
137 Widmar Place
Clayton, CA 94517
925.672.0930
melindammoore@yahoo.com

March 15, 2020

Department of Conservation & Development
Community Development Division
Attn: Francisco Avila, Senior Planner
30 Muir Road
Martinez, CA 94553

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The quarry claims to be good neighbors, but we find these claims to be false. The situation with the quarry is actually getting worse rather than better. They claim to support the community, but they do very little the help our community. This proposed reclamation plan amendment is all about their profits. Their actions have very little to do with being a good neighbor or showing any goodwill toward us, the environment or what they propose to leave behind for future generations once they discontinue mining.

Sincerley,

Walter H. Moore
Melinda Molloy Moore

Attachment Letter: 4 pages
March 10, 1995 Permit Complienac Review RMC- Lonstar Clayton Quarry, From CCCounty Community Devlopment Department, Senior Planner Robert H. Drake, to Widmar Place Residents, Edgar Brincat and Don Kovasic

Community
Development
Department
County Administration Building
651 Pine Street
4th Floor, North Wing
Martinez, California 94553-0095

Phone: (510) 646-2091

Contra
Costa
County

Harvey E. Bragdon
Director of Community Developmen

March 10, 1995

Don Kovacic
120 Widmar Place
Clayton, CA 94517

Edgar Brincat
112 Widmar Place
Clayton, CA 94517

Dear Messieurs Kovacic and Brincat:

Re: Permit Compliance Review
RMC-Lonestar Clayton Quarry

This is in response to the letters from Mr. Brincat dated August 10 and November 6, 1994, and letters from Mr. Kovacic of July 14 and September 16. 1994 to this office and to the October 31, 1994 letter to Supervisor DeSaulnier concerning a review of the two land use permits for this site: 363-67 (quarry permit) and 2054-81 (reclamation plan).

In reviewing the status of permit compliance for this operation. the following activities have been conducted:

- Staff has visited the site on several occasions including July 16 and December 7, 1994, and February 14, 1995 to examine conditions at the site and surrounding environs.

- Staff has reviewed the operation in several meetings with the Quarry Operator.

- Community Development Department has coordinated a review involving several County agencies with oversight responsibilities for the two permits. Comments from various County agencies are attached. Comments have also been received from the City of Clayton. Further, staff has discussed the operation with the Bay Area Air Quality Management District; the District has statutory permit responsibilities concerning visible emissions (dust control) for the operation.

- The Operator has provided staff with permit-related documents that had been missing from the Department files.

- Finally, staff has completed a review of the two permit files as to documentation relating to permit compliance.

As a result of this investigation, staff has completed a review of each condition of approval for both permits (attached). We have concluded that the quarry operation is in compliance with the approved permits. At the same time, we are asking the Operator to immediately initiate several steps to enhance dust control measures of the operation (see attached letter).

We would be happy to meet with you to review the project files on the quarry. Please call me to set an appointment.

Removal of Access Road

We have noted that the access road that had been built with a driveway connection near Widmar Court has been substantially removed by the Operator such that the road would no longer be functional. The wire fence has been restored and trees have been planted along what had been the driveway entrance from Mitchell Canyon Road. This modification eliminates the previous permit violation which we had cited in our earlier correspondence.

Replacement Reclamation Plan Permit Documents

The approved Reclamation Plan provides for approximately 20 documents describing the approved reclamation activity. A few of these documents were missing from our files. (Insofar as our files are used by staff and the public, file documents are occasionally misplaced.) At our request, the Operator provided staff with a set of the missing permit documents. The replacement documents are listed below.

- 1982 Landscape Planting (Reclamation) Plan

- Final Contour Maps: Phases 1A, B & C.

Request for Implementation of Additional Dust Control Measures

Even though the project is in substantial compliance with the permit requirement for control of dust, staff has requested the Operator to institute several measures that are intended to enhance existing dust controls from quarry activity. Attached is our letter dated March 8, 1995 to the Operator requesting reactivation of the spray equipment used to water the loads

of haul vehicles leaving the site. We have also requested provision of paving/graveling improvements for on-site vehicle maneuvering areas.

Operator Action to Control Siltation along Mitchell Canyon Road

To control siltation along Mitchell Canyon Road, the Operator has placed several small rock pilings within the drainage ditches. The Operator has indicated that the pilings are intended to serve as miniature check dams to collect silt in a manner that would minimize effects to adjoining properties. He also indicated that these improvements had been reviewed with City staff and that the ditches will be regularly maintained while the dams are in place.

County Monitoring of the Quarry

The Community Development Department is conducting annual reviews and inspections of the quarry for compliance with the Reclamation Plan and to satisfy the requirements of the Surface Mining and Reclamation Act. This practice seems to have provided sufficient oversight for the operation. The Building Inspection Department has also indicated that it is capable of instituting more frequent inspections of the operation if necessary.

Should you wish to discuss this further, please feel free to call me at 646-2091.

Sincerely,

ROBERT H. DRAKE
Senior Planner

Att. Review of RMC-Lonestar Clayton Quarry Land Use Permits
3/10/95 Letter to RMC-Lonestar

cc: Board of Supervisors, Districts I, II, III, IV, V.
RMC-Lonestar, John Rubiales
Ed Shaffer, Norris & Norris
Public Works Department
Bob Faraone
Stan Matsumoto
John Capozzo
Building Inspection Dept., Ron Killough
Health Services Dept., Env. Health Div., George Nakamura

City of Clayton
Randy Hatch
Rick Agrisani
Bay Area Air Quality Management District, Permit Services Division,
Robert Wilmarth
Darwin Myers, Darwin Myers Associates
File #2054-81

2054-81d.ltr
RD

Francisco Avila

From: Justin Le <Justin.Le@OPR.CA.GOV>
Sent: Thursday, April 16, 2020 3:17 PM
To: Francisco Avila
Subject: SCH Number 2020020323

The State Clearinghouse would like to inform you that our office will be transitioning from providing a hard copy of acknowledging the close of review period on your project to electronic mail system.

Please visit: https://ceqanet.opr.ca.gov/2020020323/2 for full details about your project and if any state agencies submitted comments by close of review period (note: any state agencies in **bold**, submitted comments and are available).

This email acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please email the State Clearinghouse at state.clearinghouse@opr.ca.gov for any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Justin Le | Student Assistant
Governor's Office of Planning and Research
State Clearinghouse Unit
1400 10th Street, Room 113
Sacramento, CA 95814
(916) 445-0613

CITY OF CLAYTON
Founded 1857 . . . Incorporated 1964

COMMUNITY DEVELOPMENT (925) 673-7340
ENGINEERING (925) 969-8181

6000 HERITAGE TRAIL • CLAYTON, CALIFORNIA 94517-1250
TELEPHONE (925) 673-7300 FAX (925) 672-4917

City Council
JULIE PIERCE, *MAYOR*
JEFF WAN, *VICE MAYOR*
TUIJA CATALANO, *COUNCILMEMBER*
JIM DIAZ, *COUNCILMEMBER*
CARL C.W. WOLFE, *COUNCILMEMBER*

Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road Martinez, California 94553
Attention: Francisco Avila

April 14, 2020

RE: NOP for a Draft EIR on the proposed CEMEX Clayton Quarry Reclamation Plan Amendment
County File No.: LP15-2030/31

Dear Mr. Francisco Avila,

Please accept this City Council letter from the City of Clayton in response and comment on the Notice of Preparation (NOP) prepared by Contra Costa County (Lead Agency) for the application for an amendment to the CEMEX Quarry Reclamation Plan as submitted by the applicant of record and on file. This letter is one of three that you should have received from the City as a collective front. This document supplements the letter submitted by Dana Ayers, Interim Community Development Director on March 16, 2020, which is supported by City Council's letter submitted on April 14, 2020.

The understood scope of work includes an amendment of the already approved Reclamation Plan. The amendment would remove the filling in the quarry pit and allow for future developments of varying types, including housing, commercial, and industrial land uses. The amendment would include allowing the quarry pit to remain and be utilized as a collection basin for storm water and water shed runoff and removes any future development of the land except for natural open space and/or conservation land. IN addition, the amendment also changes the timeline of the reclamation to an earlier date.

This City Council letter serves to respond with comments the "NOP" by the "Lead Agency". The City of Clayton is requesting that the City of Clayton be recognized as an "interested party" and "stakeholder" in the "lead Agency" process. The City of Clayton has a vested right and interest in the environmental assessment and mitigation that is to be conducted by the "Lead Agency". The environmental impacts have a direct and indirect affect the City of Clayton.

The City of Clayton is requesting the following in response and comment to the "NOP":

- The Scope of Work to be revised to fully capture what is being applied for. The current scope of work is vague and does not fully capture or identify the proposed changes or alterations. In addition the scope of work does not fully capture or identify the how an amendment will or will not change the operations of the quarry as permitted. If there are changes to the operations of the quarry as permitted, that must be included and identified and analyzed as a part of the environmental assessment.
- The Scope of Work needs to include a full description of the amendment to the Reclamation Plan. The description needs to include the already approved and the proposed in a descriptive narrative and chart.

- The Scope of Work needs to include the proposed landscaping. The proposed landscaping is not an amendment to the Reclamation Plan, rather this is a property change that needs to be included in the scope of work and fully analyzed.
- The Scope of Work needs to include alternative access points (entrance and exits) that include the possible removal of the existing structures. Any proposed access points are to fully described and analyzed.
- The Scope of Work needs to include any possible removal of any structures. Any possible removal of structures needs to be fully describes and analyzed, include any potential historic analysis.
- The Scope of Work needs to include the operating mitigation measures that are or will be implemented. This includes, but not limited to: PM 10, PM5, PM2, and any other dust control mitigation measures; water quality mitigation measures; internal traffic circulation; light control; and any other mitigation controls to be implemented. The mitigation measures/controls can have environmental impacts that need to be included with a full description and analysis.
- The Scope of Work needs to include the development of alternatives with full analysis. The scope of work needs to include a narrative of the exploration of alternatives and that each alternative is to be analyzed.

The City of Clayton requests that the responses/comments provided above to the "Lead Agency" be included in the "NOP" as a part of the Scope of Work for the Draft Environmental Impact Report ("DEIR"). In addition, the record shall be made clear that the City Clayton is an "Interested Party" and "Stakeholder".

Should the "Lead Agency" not include the City of Clayton responses/comments, then as a "Stakeholder" and "Interested Party", a request and requirement for an extension of 45 days for responses/comments for the "NOP". This would allow the "Lead Agency" to respond and time for the City of Clayton to respond/comment to the "Lead Agency" response. If the "Lead Agency" accepts and incorporates these responses/comments into the Scope of Work for the "NOP", then no extension will be needed at this time.

The City of Clayton encourages the applicant (CEMEX) to engage in community meetings to help explain and answer concerns and comments from the citizens of Clayton. The City of Clayton encourages the "Lead Agency" to facilitate these meetings within Clayton boundaries in coordination with City staff.

The City of Clayton thanks Contra Costa County for the opportunity to respond/comment to the "NOP". The City of Clayton looks forward to the response/comments being incorporated into the Scope of Work or the 45 day extension.

Respectfully,

Matthew Feske

/s/ Mathew Feske
Community Development Director
City of Clayton

Francisco Avila

From: Matthew Feske <mfeske@ci.clayton.ca.us>
Sent: Tuesday, April 14, 2020 4:25 PM
To: Francisco Avila
Cc: Ikani Taumoepeau
Subject: Clayton City Council Letter Response to the Notice of Preparation - 04-14-2020
Attachments: CC Letter - NOP (04-14-2020).pdf

Good afternoon Francisco,

I hope all is well.

Please find attached a response letter from Clayton City Council in regard to the Notice of Preparation. Please let me know if there are any questions.

Thank you in advance.

Stay safe and well.

Thank you.

Have a great day

Matthew Feske

Community Development Director
City of Clayton | 6000 Heritage Trail | Clayton, CA 94517
Tel: (925) 673-7300 | Direct: (925) 673-7343 | Fax: (925) 672-4917
E-Mail: mfeske@ci.clayton.ca.us

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Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road Martinez, California 94553
Attention: Francisco Avila

April 14, 2020

RE: NOP for a Draft EIR on the proposed CEMEX Clayton Quarry Reclamation Plan Amendment
County File No.: LP15-2030/31

Dear Mr. Avila,

Please accept this letter from the Clayton City Council on behalf of Clayton residents on the NOP for the CEMEX Quarry Reclamation Plan Amendment. This letter supplements, and is in addition to, the letter that was already submitted by Dana Ayers - Interim Community Development Director on March 16, 2020, and Mathew Feske - Community Development Director on April 14, 2020, the City Council echoes the comments provided by our staff.

The proposed amendment of the Reclamation Plan that would eliminate the backfill of the quarry pit and instead allow the pit to eventually become a stormwater lake is a change that results in very different timeline and outcome for the quarry reclamation. The City Council requests that the evaluation of project alternatives include the original backfill of the quarry pit and/or that the backfilling of the pit be analyzed as a project variant, providing the County the necessary information to evaluate the relative benefits and cons of the two approaches and the ability to adopt an environmentally superior option.

Please include a thorough project description as part of the DEIR, which should clarify whether any changes are proposed to the operation of the quarry prior to the reclamation, and if yes, what those changes are and whether any such operational changes trigger any different reclamation needs and/or more significant environmental impacts. The project description should include a detailed explanation of changes proposed to any buildings and structures on the quarry site.

The project description should also explain in detail the changes to the ingress road to the quarry. The proposed ingress would appear to bring the quarry operations closer to the nearby residential homes and thus could result in noise, dust, air quality and traffic circulation impacts to the project vicinity, including the nearby residential homes, all of which should be evaluated.

The DEIR should comment on whether the quarry is currently in compliance with BAAQMD's Regulation 6 (Particulate Matter), Rule 6 (Prohibition of Trackout) that became effective August 1, 2018 (or alternatively whether the quarry is grandfathered from these regulations), and more specifically Rule 6-6-301 regarding prohibition of trackout onto paved roadways.

The DEIR should also include a vetted list of project objectives so that the public is able to understand the requested amendment, including e.g. the reason for the proposed quarry pit lake request in lieu of the original plan to backfill the pit.

Among other analysis, the DEIR should evaluate noise, lighting and air quality impacts caused by the proposed project, particularly to the nearby sensitive uses (i.e. residential homes in close proximity to the site). For project alternatives, we would suggest that the alternatives evaluate an option that returns the quarry site to its natural state as quickly as possible, providing adequate information on the estimated timeline of any construction activities related to the reclamation. For informational purposes we would like the DEIR to address whether a nearby creek was recently dammed, whether such damming was done in accordance with existing permits, and what, if any, environmental impacts the damming has had on the site baseline.

Lastly, we urge the applicant to work closely with nearby residential neighbors, and to provide timely and adequate information as well as opportunities for the neighbors to be heard. To the extent that any changes are also proposed to the existing quarry operations, we ask that that the City of Clayton and the nearby neighbors be informed, and we hope that CEMEX considers any ways in which it can minimize the impacts caused by the existing operations to the nearby residents. Clayton residents would appreciate a community meeting in Clayton, perhaps after the publication of the draft EIR, regarding the proposed project and reclamation changes.

Sincerely,

Julie Pierce

Julie Pierce
Mayor

Francisco Avila

From:	wstj8@aol.com
Sent:	Saturday, April 04, 2020 4:20 PM
To:	Francisco Avila
Cc:	wstj8@aol.com
Subject:	Re: February 14, 2020 NOTICE OF PREPARATION/NOTICE OF SCOPING MEETING FOR A DRAFT ENVIRONMENT IMPACT REPORT ON THE PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

Francisco.Avila@dcd.cccounty.us

April 4, 2020
Dear Senior Planner Francisco Avila:
Re: February 14, 2020
NOTICE OF PREPARATION/NOTICE OF SCOPING MEETING
FOR A DRAFT ENVIRONMENT IMPACT REPORT
ON THE PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

I opposed the new projects because they are in violation the codes and laws. Here is something to keep in mind and consider, the quarry personal claim they are good neighbors but they won't tell us how many people asked them to relocate the existing road which is the reason they said that they want to relocate the road, it does not make a difference how many people are opposing the relocation of the existing road and that in fact the neighbors opposed the relocation many years ago and defeated the proposal.
Part of their requirements to operate is they were required to plant a row of trees along Mitchell Canyon Road for the homes that their back yards butt Mitchell Canyon Road in order to help control some of the dust, etc., however when the trees were attacked by some bug which slowly started killing the trees (now there all dead and gone) the quarry personal did not try and save the trees and have not did one once of effort to replace the trees, to this date. There are other requirements that they are required to do but have done nothing.
Then there is that huge sign at the intersection of Mitchell Canyon Road and Widmar Court which states: AGRICULTURAL SOIL AMENDMENT which it says they are growing these Crops to help provide Nutrients to the Plant Root System. The only problem is they haven't planted any crops in the field for many years.

One more item I would like to point out, from the list that goes on and on.
Their Reclamation Plan, I'm only going to address one item from that list for now, which is their comparison of the item titled:
Backfill

Current Plan (Lone Star) Requires quarry pit to be backfill with **17 million cubic yards of earth** and hundreds of on-site truck loads over about three years, resulting in over 11,000 tons of greenhouse gas emissions.
Proposed Plan (CEMEX) A quarry lake will be established as storm water accumulates over **100 year-period**.

What drives this operation is the almighty dollar, I did a Google Search for the cost of soil and this is what I found:
https://www.google.com/search?ei=UQCIXoKZB-6_0PEP6sGhgAQ&q=cost+of+one+cubic+yard+of+dirt&oq=cost+of+one+cubic+yard+of+dirt&gs_lcp=CgZwc3ktYWIQAzIGCAAQFhAeMgYIABAWEB4yBggAEBYQHjIGCAAQFhAeMgYIABAWEB4yBggAEBYQHjIGCAAQFhAeMgYIABAWEB4yBggAEBYQHjIGCAAQFhAeOgQIABBHOggIABAWEAoQHjoFCAAQzQI6AggASgkIFxIFMTItNzRKCQgYEgUxMi0xMFDrJFjsNGCfN2gAcAJ4AIABX4gB8QSSAQE4mAEAoAEBqgEHZ3dzLXdpeg&sclient=psy-ab&ved=0ahUKEwjChde2683oAhXuHzQIHepgCEAQ4dUDCAs&uact=5
Topsoil **costs** $12 to $55 per **cubic yard**. Fill **dirt** ranges from $7 to $12 per **cubic yard**. Sand typically falls between $15 and $40 per **cubic yard**. **Prices** include delivery.Jan 28, 2019

OK $7. To $12 . per cubic yard, since they are in the business lets says they can get earth for a $1. Per cubic yard, that means it will cost them $17,000,000. Just for the earth in order to fill the hole that they all readymade and got paid for. Let's say they get the soil for $.50 per cubic yard, that's still $8,500,000. Yea I'd want Mother Nature to fill that hole also.
Now when they finally close the quarry who knows what attitude the new owners or the current owners will take and how it will negatively impact the neighbors and the city itself. It's all kind of iffy but one thing is for sure the current owner and the previous owners are not good neighbors.

I will provide much more information in the near future.
Please oppose CEMEX proposal for reasons above they are in violation of the codes and they will create new Nuisance (see **Nuisance Law** below). I make my original letter dated March 14, 2020 opposing the quarry's new projects addressed to Senior Planner Francisco Avila part of this new letter of opposition.
Thank you.
Respectfully submitted,
Edgar Brincat
112 Willmar Place
Clayton, CA 94517

-------**Below**--------

ORIGINAL LETTER OPPOSING THE QUARRY'S NEW PROJECTS:

March 14, 2020
Dear Senior Planner Francisco Avila:
Re: February 14, 2020
NOTICE OF PREPARATION/NOTICE OF SCOPING MEETING
FOR A DRAFT ENVIRONMENT IMPACT REPORT
ON THE PROPOSED CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

I opposed the new projects because they are in violation the codes and laws.

Due to the time restriction, this letter is very brief and incomplete. I will specially address the proposed new alternative driveway and road project and send you a much more detailed letter addressing several factors which will have a high degree of impact on their proposals. We are also the stake holders/residents and should be afforded sufficient time to express our concerns, etc. In addition their web site which addresses this proposed project is misleading and incorrect. The quarry/CEMEX has not been good neighbors and they are not holding up their end of the agreement. The alternative driveway and road will create new Nuisance and will greatly negatively impact the adjacent neighboring homes. Please review Nuisance law **below.**

Back in 1995, **without** a required permit, the owner built a new road. After neighbors found out and objected to it, City official ordered them to remove the road.

Now they intend to build a new road and other constructions.

Back in 1995, Attorney Don Kovasic and I submitted letters opposing their road construction.

Attorney Don Kovasic summarized the facts and laws in his well written letter in 1995.

The current codes and laws are more stringent than in 1995 and the nuisance that they created has been worsened.

Please review the current applicable codes and laws and also the documents that Attorney Don Kovasic and I submitted in 1995.

My neighbors and I request that the City agencies should deny their proposals for new constructions.

Thank you.
Respectfully submitted,
Edgar Brincat
112 Willmar Place
Clayton, CA 94517

-------**Below**--------
Nuisance
Civil Code section 3479
"Anything which is injurious to health, including, but not limited to, the illegal sale of controlled substances, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or

property, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway, is a nuisance."
(Amended by Stats. 1996, Ch. 658, Sec. 1. Effective January 1, 1997.)

Francisco Avila

From: james mason <jamesmason@yahoo.com>
Sent: Wednesday, April 15, 2020 3:12 PM
To: Francisco Avila
Cc: Melinda Moore
Subject: CEMEX Quarry Plan

Francisco,

Just to cover as a follow-up to my testimony at the 3/16/20 hearing on the Cemex plant.

In particular when we and our friends from New York moved to Clayton, we planned and purchased lots on Herriman Ct. and Widmar PL. in the spring of 1965. In both cases we designed and had homes built. Ours on 15 Herriman Ct. Our co-workers on 145 Widmar Pl. It was our clear understanding at the time that the land north of the quarry and the quarry itself were to be deeded to the state park. Currently the land north of the quarry has bened farmed. This provides a buffer for the neighbors. It is there that the quarry is proposing a new access road. Clearly we are opposed to that for the many reasons others have noted.

It also represents a fire buffer because the hay would be harvested before the height of the fire season. It is our understanding that the quarry has recently terminated the farming lease on the property. It is our understanding that for farm land the county requires a fire break around the edges of the property. Currently as of 4/15/2020 there is not the typical fire break because the land is fallow vs being planted with hay. This is a particular concern of ours. We have just been denied our fire insurance for our home with our long time carrier.

We would like the reclamation of the quarry to stay with the existing plan to refill any pits and return the land to something simulating original land contours. We do not want a pit left on the property. It seems that the application is to substantially increase the depth of the final pit the quarry leaves. Leaving the pit open would typically increase the likely earth avalanches on to Mitchell Canyon road. Or into the pit, If filled with water that sudden rush would potentially take out our existing homes on Herriman Ct. Along with the new proposed homes on the adjacent parcels.

Jim Mason
15 Herriman Ct.
Clayton Ca. 94517
Sent from Mail for Windows 10

Francisco Avila

From: Kelly Burmeister <Kelly@rpmfg.com>
Sent: Wednesday, April 15, 2020 7:32 PM
To: Francisco Avila
Subject: CEMEX Proposed Reclamation Plan
Attachments: County 2.docx

Attached are my comments on the reclamation plan.

Sent from Mail for Windows 10

April 15, 2020

Kelly Burmeister
144 Widmar Pl
Clayton, CA 94517

Francisco Avila
Contra Costa County
Department of Conservation & Development
Community Development Division

RE: Cemex Clayton Quarry Reclamation Plan Amendment. County File Number: LP15-2030/31

Dear Francisco Alvila:

The following are my points regarding the amendment:

- Alternate Driveway: After the previous scoping meeting, Steve Grace, Director Aggregate Resources & Environmental Services, indicated that they were no longer considering the alternate driveway as shown on the map attached to the reclamation plan amendment. But, they were going to use the driveway for the farmhouse as an additional exit. He said it was to alleviate dust from Mitchell Canyon Road. This is unacceptable! It will not alleviate dust. It will just move it further north. This is closer to Clayton homes and will negatively affect our property values. There should be no new driveways for trucks to enter/exit the quarry.

- Expanded footprint: Mr. Grace also stated that they were going to tear down the farmhouse and barn. This will expand their footprint and bring operations closer to our homes. We are against using this agricultural area in the quarry operations. They've already expanded the stockpile area behind the farmhouse a great deal. I was told years ago by quarry management that this stockpile was temporary. This, of course, was a lie meant to keep us quiet. We are against expanding the quarry footprint towards clayton homes.

- Reclamation of the Quarry pit: It is inconceivable that Cemex wants to do away with a major part of the current reclamation plan and leave an open quarry pit to maybe fill up with water in 100 years. Cemex says that after reclamation, the existing zoning is for high density housing or business park. Who would allow these projects next to a dangerous open pit mine? Of course it would have to be open space. The inspection report says that the use after reclamation will be agricultural. Their claim that their amended reclamation plan is superior because it would leave it as "open space" is just PR. If they can't adhere to the current plan to backfill and compact the pit, they should discontinue mining. Their proposal is dangerous.

- Dust: Quarry management says that they've installed a wheel wash. That would be a good thing if it's being used. I haven't witnessed it. Dust has always been a big problem on my property and the quarry has always said they're doing their best to alleviate it. It should be required that

trucks use the wheel wash, water down or cover loads. Stockpiles and quarry roads should be watered down and dust inhibitor put down. These aren't suggestions they are part of their permit to operate. There should be no dust coming from that quarry.

These are the main concerns with this amendment to the reclamation plan. I thank you for your consideration.

Sincerely,

Kelly Burmeister
kelly@rpmfg.com

APPENDIX A-3
SCOPING MEETING COMMENTS

March 16, 2020

Zoning Administrator's meeting: Scoping Session

Item 2a.

Melinda Moore: I live at 137 Widmar Place in Clayton, CA. My family bought the home originally in 1964. I'm a 56 year resident of Clayton, Ca. I am very familiar with the quarry and its seems my family has been involved in of the quarry meetings over the years and the reclamation of amendments. As once again, we are opposed to the driveway being moved north, its still in this amendment. I am going to go ahead and speak to it however, we've been shown that it may move closer to the barn there on Mitchell Canyon. They did try to put the quarry road in one time in 85 and they had to take the quarry *** road back out because the quarry put it in without permission. So they've been trying to put another road to the quarry for several years now, with or without permission. And I'm opposed to that. I am also opposed to pit mining. I've always been told and people in the original neighborhood that the Kaiser quarry on one side and the Lonestar quarry on the other side were together, going to mine across and completely take down Mt. Zion and eventually it would be gone. Now, it looks like they are leaving the scarred benches on the Zion and they are mining down into the earth. I'm opposed to that and I'm also opposed to a pit being left there that in approximately 100 years storm water may fill the pit. I think it's a hazard. I listen to the helicopters every weekend, pulling and plucking off of Mt. Diablo and I can not fathom how much of a safety hazard a large quarry it would be in our neighborhood. I'm also opposed to the dust, there has been dust forever. Some quarry owners have tried to mitigate the dust better than others. I think Cemex on a regular basis has not been the best neighbor. They recently put in the wheel wash, and I do not believe its mandatory for the trucks. Some of the trucks may use it. I think most do not. They have not been watering the loads out of the quarry. They say that they are good neighbor by sending a street sweeper through the neighborhood that does not usually use water to clean the street, instead takes the dust from the quarry and from Mitchell Canyon Road, takes it down into our neighborhoods and spreads it all over the streets. They also do not water the stock piles as they say they are doing. And the quarry roads, as well. Those are some of the issues that I have with this reclamation plan. I would like to see the back fill in the quarry pit. And it filled and level when they leave. I'd also like the land to be donated to the state park, Mt. Diablo Park. Thank you.

Kelly Burmeister: Hi, I'm Kelly Burmeister, I live at 144 Widmar Place. We are opposed to the additional quarry road. We see no reason to move it. Even a little bit closer to our neighborhood. They have a fine quarry entrance now. It's been there forever. The neighbors knew that it was there when they moved in. And I don't see any reason to bring it closer to our homes. Your not solving any problems. Its basically what we are opposed to. I realize they said they are only going to move it to the barn area now. And that happens to be pretty close to our house. So I really don't think it should be there. And as far as the dust goes, yeah they have a wheel wash. But do the trucks actually use it? I've never seen them wet down their loads. I think they should have to wet down their loads before they come out and keep the dust out of our neighborhoods. That's basically my complaint.

Bill Burmeister: Hi, I'm Bill Burmeister. I live at 144 Widmar Place. As my wife just said, our opposing the road in the past Melinda had mentioned that their was a road that they attempted to move the road. And change the entrance. And that intersected with our street with our court and would and it was a half a house away from Harriman, as well it was removed, actually they put it the road in at one point then they had to remove because it was not permitted. We were under the impression that was the same location, they are telling us its not. I'd like to see a little bit more about that. I still am oppose to the move at this point, I don't see its going to benefit anybody but the person farthest away from the entrance now. And it impacts many on our street. If they were, if they'd like to entertain this, and we could meet with them. They have already offered to do that, that's fine. We will talk to them about that. but there are some other issues that going on that have never been able to address as the dust and the stock pile that they keep encroaching into the agricultural land, the farm house land that we are concerned about. Those keep creeping closer and closer to our house as well. So we'd like that area around the pond and between Harriman and the farm house road somehow designated as a buffer area. Or a safe space between our neighborhoods and the quarry stock piles. Those are the issues that I have. I'd like to see those addressed.

ZA: Mr. Burmeister: you mentioned they were willing to meet with you. Have you exchanged information so that could happen? Or contact?

Bill Burmeister: We have not exchanged information, but we have spoken to.

ZA: I'll make sure they you receive a card or something.

Melinda: They have the reclamation plan on the for the quarry on their webpage, so if you read all the quarry facts and they ask for neighborhood input, when you click the button to give your input, it doesn't work. Thank you.

William Rodriquez: William Rodriguez, 740 Tally Ho Court. I will give you some minutes that we've had, we have had meeting with them a year ago. We've had meetings it our neighbors. Some actually with meeting with their quarry. In regards to some of the concerns that we had. Have had and will continue to have. And some of the concerns we've had all these concerns that are on the documents there. We've had 2 meetings but they decided not to have any more meetings with us. We had people from Widmar Court and surrounding neighbors that live in the area. And this is the quarry's been, I'm the president of the homeowner's association, which is 25 houses that are right adjacent to the quarry. This is a continued agenda item that we have in regards to issues that we have with the quarry, the dust, the track out, locations of their stock piles, typical of mining. The mining operation that we have concern with good practices are if we are the good practices. I've been on line and if you go on good practice mining in regards to their trucks, first thing they do is they show warehouse loading trucks to keep the dust down with a big loader and there is stockpiles that come, its kind of arcade the way they do the mining and loading of the trucks, they have no conveyer. The quarry's now have a conveyers which eliminate a lot of trucks that go up and down from the pit to the stock piles. But mainly our concern are the dust and the blasting that we feel. Especially my house and my two neighboring houses, neighbors. On my phone, if im home, I can tell you my house shakes when they blast. Is it alright if I share you some because I put it down on my phone when I write it down when it happens. November 11, blast 10:30 shook the house and there my nephew was there at the time when it happened. This goes on throughout the blast, 11:04, 11:51, 11:25 11:20, 9:30, so I'm there and I feel these blast and they've put seismic readers on our property and adjoining property. I've never seen any report of those blasts

moderating. The results of those readings. That's mainly the issue that I have. I saw a little bit of the and wondering if they will be blasting deeper, is that going to effect us even more. And I don't know if those questions can be answered.

ZA: no this is not a back and forth dialogue. This is for you to tell me what your concerns are not an opportunity to analyze.

William Rodriquez: the blasting, the track out from the dust. The noise from the quarry and their crusher that runs, the way they have the crusher set up. There is a lot of vibration noise, mainly ambulant noise from them. Those are the main concerns that I have at this time.

Andy **** 719 Tally Ho Court. Just hear to voice some of the same similar concerns also as a parent and a member of the Diablo Downs Homeowners Association. Not only aesthetics, the de-valuing of property that the quarry effects all of our houses. Also the health concerns for children and the environment. We've had to go through the air filtration for not only myself but for other people to deal with the dust that has been drastically effect breathing air in our property. Along with the lack of solar production on our home that have not produced the guaranteed that the company as assured us that when their experts come out to look at the property, that they are directed directly to the dust clouds coming over to the quarry, so those three right there have drastically effect us financially and the health of our kids and members of our HOA community that we are concerned about. Not only apart of from the dirtying up from our cars as they drive down every single day from the washout and the dust from the road, to moving the exit may address some of those. But their current practices right now are what we are most concerned about. We wished that those would be addressed before anything else of further is taken in consideration. Thank you.

Jim Mason: I live at 15 Harriman Court. We are an original property owner from 1965 so I thought for a little historic perspective to talk about what we were assured when we bough the property there and what that was, well there were 2 key items, one eventually when the quarry was finished doing their work that the land was supposedly already deeded to the State Park system. So it would eventually become part of Mt. Diablo State. It was our understanding when we purchased a lot there. And the other piece had to do with a roadway that runs up the spine of Mt. Zion that they would not encroach to the north of that. They've gotten close over the years. Just a key **** on the big recent item, recently added a lot of new lights so we can talk to the quarry about putting them on timers or sensors because they are bright enough we have to put curtains on our house. They are on the far side of the field. To the north of the plant. Anyway, that's the primary issues there that I'd like to make sure that the original things that we signed up for just let us astray at the time for 55 years later still wrestling with this. That's my input.

William Rodriquez: I've lived there 30 years. So I've seen it go from, it's gotten worse in the past 7 years. This is kind of like one more straw, we are good neighbors, they've been good neighbors to us, I can't

complain with that. it's a constant, finally the straw that's broke the camel's back. You just get tired of this continually, we tried to deal with it, them directly.

ZA: can you explain, you said they were good neighbors……

William Rodriquez: Good neighbors if we have an arena, they come down and water our arena, they've done things like that. Neighborly things. This case is what my nephew Andy had said is that now we have the dust issue with the kids, and also in regards to the property value. I think our property value have been effected. If you go everywhere else, ours are continually hit harder, I think. And due to the quarry's and the dust. Because we disclosed the quarry dust and we have to disclose the quarry dust. When I bought there, I knew the quarry was there. I'm in the business, I'm an appraiser and I'm also do land development. I know the process and you just go through life and you just and have things that bothering you and you try to deal with them. And all of us have lived our lives and finally it's, we've it a wall with this. They've tried to do certain things to help but I don't think they are doing enough at this point. And it's open up for us an opportunity for us to express what we need and what we feel we deserve, dust, I don't think any dust should go on to our properties at all from them. Zero. And I don't know what tolerable amount is. I don't think we should get any of the dust blowing over from the quarry. Or their processing. So this is the part that we are finally able to come here at this point, I wish we could have done something earlier with them but I think before we go forward now before they do what they want to do, we want to know we want to get the right answers and our concerns.

Jim Mason: They have recorded 100 mph winds there. So we do have a funnel effect there through that canyon. Not only do they have the normal wind in the bay area, specifically at that location there tends to be a lot of wind. And that aggravates all of it.

APPENDIX A-4
INITIAL STUDY

CEQA ENVIRONMENTAL CHECKLIST FORM

1.	**Project Title:**	Clayton Quarry Reclamation Plan Amendment County Files: CDLP15-2030/31)
2.	**Lead Agency Name and Address:**	Contra Costa County Department of Conservation and Development, Community Development Division 30 Muir Road, Martinez, CA 94553
3.	**Contact Person and Phone Number:**	Francisco Avila, Principal Planner (925) 655-2866
4.	**Project Location:**	515 Mitchell Canyon Road, Clayton, CA 94517, Assessor's Parcel Numbers: 122-020-007 and 122-020-013
5.	**Project Sponsor's Name and Address:**	CEMEX Construction Materials Pacific, LLC's (Applicant) 2365 Iron Point Road, Suite 120, Folsom, CA 95630
6.	**General Plan Designation:**	The subject property is located within an Agricultural Lands General Plan Land Use designation.
7.	**Zoning:**	The subject property is located within a General Agricultural District (A-2).

8. Description of Project:

The applicant, CEMEX, is requesting approval of a Revised Reclamation Plan, which includes the following components:

- Reclamation over an anticipated period of 47 years to a post-mining land use of open space;
- Reduction of the surface mining disturbance footprint that leaves the east rim of the quarry intact, providing visual buffer between the quarry and view sheds to the east;
- Permanent overburden fill areas;
- Final grading contours reflecting a maximum depth of excavation at elevation 110 feet above mean sea level (msl) with finish slope angles that achieve adequate factors of safety;
- A final drainage plan that provides for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow that conveys stormwater to natural drainage courses and man-made drainage facilities;
- Removal of facilities, structures and equipment associated with mining;
- Revegetation of the quarry east rim, overburden fill areas, and processing plant site to a combination of chaparral and grassland habitats that feature California native seed mixes;
- Elimination of requirements to backfill, grade, and compact the quarry floor and benches, given that the planned open space end use would provide for a future quarry lake;
- Clarification of pre-Surface Mining and Reclamation Act (SMARA) (1976) disturbance areas, including any areas disturbed outside the boundaries of the approved reclamation plan;
- Removal of 79 out of 123 existing trees, to be replaced with 400 foothill pine trees that would form a tree screen along the quarry east rim;
- Compliance with current State reclamation standards to be achieved during reclamation; and
- A new screening berm (between the existing processing plant site and residential communities to the north).

The final land uses proposed under the revised reclamation plan are shown on Figure 1, "Proposed Reclamation Plan Overview."

9. Surrounding Land Uses and Setting:

The project site consists of approximately 335 acres situated at 515 Mitchell Canyon Road, on the east side of Mount Zion, approximately one-half mile south of the City of Clayton in an unincorporated portion of the County (see Figure 2, "Regional Location," and Figure 3, "Site Location"). Land uses adjacent to the project site include other mining operations (west), open space areas (south and east), recreational facilities (south and southeast), and residential development (north and northeast). The Assessor's Parcel Numbers (APN) for the property are 122-020-007 and 122-020-013. The project site is mainly comprised of mining and processing facilities associated with CEMEX's operation. The northern portion of the site (within APN 122-020-007) contains the plant site, sites of pre-SMARA mining disturbance (no mining since 1975), a storm water detention pond operated by Contra Costa County Water District, and an open field. CEMEX's current mining operations are being conducted in a quarry pit within APN 122-020-013. This area also contains a haul road to the quarry site and the overburden fill area. Additional uses include processing activities, retention/detention basins, stockpiles, administrative offices, truck scale, and other facilities related to mining and processing.

10. Other public agencies whose approval is required (e.g., permits, financing, approval, or participation agreement:

- California Department of Conservation, Division of Mine Reclamation (review of revised reclamation plan and related financial assurance);
- San Francisco Bay Regional Water Quality Control Board (Section 401 certification and/or waters of the State permit);
- California Department of Fish and Wildlife (Section 1600 Lake and Streambed Alteration Agreement and possibly a California Endangered Species Act permit);
- U.S. Fish and Wildlife Service (Section 7 consultation; incidental take statement); and
- U.S. Army Corps of Engineers (Section 404 permit, which may not be required for an ephemeral stream).

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

In accordance with Section 21080.3.1 of the California Public Resources Code, a Notice of Opportunity to Request Consultation was sent on December 8, 2020, to the Wilton Rancheria, the one California Native American tribe that has requested notification of proposed projects within Contra Costa County. On January 4, 2021, staff received an email from the Wilton Rancheria requesting consultation for this project. Since that time, Wilton Rancheria has reviewed the project and had no substantive comments on the project.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics and Visual Resources	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☒ Geology and Soils	☒ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☒ Hydrology and Water Quality	☒ Land Use/Planning	☐ Mineral Resources
☒ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☒ Tribal Cultural Resources
☐ Utilities/Services Systems	☐ Wildfire	☒ Mandatory Findings of Significance

ENVIRONMENTAL DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that, although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☒ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Francisco Avila, Principal Planner
Contra Costa County
Department of Conservation & Development

Date

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. *AESTHETICS* *Except as provided in Public Resources Code Section 21099,* w*ould the project*:				
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	☒	☐	☐	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage points.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

SUMMARY:

a-d) The Applicant has prepared visual simulations of the proposed project under reclamation conditions (included as Appendix C of the Draft EIR). The simulations were peer reviewed by County-retained Benchmark Resources in November 2020. County staff has determined that reclaiming the project site to open space with a quarry lake with a controlled outflow would alter the aesthetics of the site. Therefore, the proposed project could result in a potentially significant impact on aesthetics and visual resources. The topic will be analyzed at length in the EIR. Please see Section 4.1, "Aesthetics and Visual Resources," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2. *AGRICULTURAL AND FOREST RESOURCES* *Would the project:*				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use?	☐	☐	☒	☐

SUMMARY:

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The land use of the subject property features mining and processing facilities; no agricultural land uses are being conducted on the site. Although the General Plan Designation for the site is "Agricultural Lands" and the zoning designation is General Agricultural District (A-2), Figure 8-2, "Important Agricultural Lands," of the *Contra Costa County General Plan* indicates that the site is not located within an area designated as "Important Agricultural Lands." The California Important Farmland Finder, managed by the California Department of Conservation (DOC), indicates that the subject property is classified as "Other Land"; thus, no Prime, Unique, or Farmland of Statewide Importance would be converted to non-agricultural uses as a result of the proposed reclamation plan, and there would be no impact (DOC 2021).

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The site is not included in a Williamson Act contract. Furthermore, the project would maintain the current zoning of General Agricultural District (A-2) and result in a potential end use of open space, which is consistent with this zoning designation. Therefore, no impact would occur.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

(c & d) The project would not convert forestland to non-agricultural uses, nor will it result in the loss of any forest or timberland, since there is no timberland or timber production on the site. No impact would occur to forest or timberland.

e) Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use?

Certain land uses have the potential to result indirectly in the conversion of agricultural land. Such conversion could result from increasing nuisance complaints from residents against farmers who operate adjacent to new urban uses (e.g., noise, dust, and odors). In addition, urbanization can increase land values and taxes on land without Williamson Act protection, which can compel landowners to consider urbanization over continued farming. Under the reclamation plan, the site would be converted to open space land use upon the completion of mining. The location and nature of the open space land use would not generate changes in the existing environment that could cause the conversion of farmland to non-agricultural use. This impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
3. *AIR QUALITY* *Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☒	☐	☐	☐

SUMMARY:

a-d) The Applicant has submitted the *Air and Greenhouse Gas Emissions Study* and *Public Health Risk Assessment of Site Reclamation* prepared by Compass Land Group (included as Appendices D-1 and D-2 of the Draft EIR) to evaluate impacts to air quality and human health risks associated with air pollutant emissions under the proposed project. These analyses were peer reviewed by County-retained Rincon Consultants, Inc. in February and October of 2020. County staff has determined the proposed project would result in a potentially significant increase in emissions of criteria pollutants. Therefore, the topic will be analyzed at length in the EIR. Please see Section 4.2, "Air Quality," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
4. *BIOLOGICAL RESOURCES* *Would the project:*				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐

SUMMARY:

a-f) The Applicant has submitted a *Biological Resources Assessment*, *Arborist Report*, and *Clean Water Act Jurisdictional Delineation* prepared by LSA Associates, Inc. (LSA) (included as Appendix E-1, E-2, and E-3 of the Draft EIR) that provided the information that the County used in evaluating the impacts associated with biological resources under the proposed project. These analyses were peer reviewed by County-retained Rincon Consultants in 2020. County staff has determined the proposed project could result in potentially significant impacts to a variety of protected plant and animal species and their habitats. Therefore, the topic will be analyzed at length in the EIR. Please see Section 4.3, "Biological Resources," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
5. *CULTURAL RESOURCES* *Would the project:*				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

SUMMARY:

a-c) The project site likely does not contain historic structures. Figure 9-2, "Archaeological Sensitivity Map," of the *Contra Costa County General Plan* shows that the site is located in an area that is designated "medium sensitivity." Therefore, there is a potential of encountering human remains or cultural resources on the site during soil disturbing activities. Mining in the quarry pit is part of vested mining activity and not associated with the proposed project that involves reclamation activities. However, reclamation activities under the proposed project would involve other ground disturbing activities, which could adversely affect buried human remains or archaeological resources, should such resources be encountered in the course of reclamation.

The demolition of the plant site would remove existing equipment from already disturbed areas. If determined necessary by a soil scientist, the area would be resoiled prior to revegetation. Because these areas are disturbed (see Figure 3) and because any additional ground disturbance would be limited to surficial soils, the potential to encounter buried human remains or archaeological resources would be low.

The overburden fill areas would be used for the placement of overburden and would not be excavated with the exception of the salvaging of topsoil. It is possible, although unlikely, that buried human remains or archaeological resources could be encountered in the topsoil.

Additionally, the proposed 24-inch diameter drainage pipeline that would convey flows from the quarry pipeline to the 18-inch stormwater line located along Mitchell Canyon Road would cross the Knoxville formation and quaternary alluvium. Although the proposed pipeline would disturb a relatively narrow corridor within the project site, it is possible that buried human remains or archaeological resources could be encountered during the development of the 1,700-foot cut and cover segment of the pipeline (it would not be possible to identify significant resources during the development the 300-foot jack and bore segment of the pipeline because these methods do not allow the observation of the materials encountered by the drilling equipment). Therefore, the development of the drainage pipeline would have the potential to result in impacts to cultural resources.

The implementation of Mitigation Measure CUL-1 and CUL-2 would require on-site education to instruct personnel in the identification of prehistoric and historic deposits, stopping work when archeological or tribal resources are uncovered until experts are brought to the site to evaluate the significance of the find, and notifying the coroner and/or the most likely decedent to make recommendations to the land owner for treatment and disposition of the ancestor's remains. Incorporation of these measures would reduce the potential impact to human remains and archaeological resources to less than significant.

CUL–1: The following Mitigation Measures shall be implemented during project demolition/construction activities.

1. A program of on-site education to instruct all demolition/construction personnel in the identification of prehistoric and historic deposits shall be conducted prior to the start of any grading or construction activities.
2. If archaeological materials are uncovered during grading, trenching, or other onsite excavation, all work within 30 yards of these materials shall be stopped until a professional archaeologist who is certified by the Society for California Archaeology (SCA), and/or Society of Professional Archaeology (SOPA), and the Wilton Rancheria Tribe, have had an opportunity to evaluate the significance of the find and suggest appropriate mitigation(s) if deemed necessary.

CUL–2: Should human remains be uncovered during grading, trenching, or other on-site excavation(s), earthwork within 30 yards of these materials shall be stopped until the County coroner has had an opportunity to evaluate the significance of the human remains and determine the proper treatment and disposition of the remains. Pursuant to California Health and Safety Code Section 7050.5, if the coroner determines the remains may be those of a Native American, the coroner is responsible for contacting the Native American Heritage Commission (NAHC) by telephone within 24 hours. Pursuant to California Public Resources Code Section 5097.98, the NAHC will then determine a Most Likely Descendant (MLD) tribe and contact them. The MLD tribe has 48 hours from the time they are given access to the site to make recommendations to the land owner for treatment and disposition of the ancestor's remains. The land owner shall follow the requirements of Public Resources Code Section 5097.98 for the remains.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
6. *ENERGY* *Would the project:*				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

SUMMARY:

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The project includes reclaiming an existing mining operation to open space, grading, screening berm construction, and creating a quarry lake by allowing the pit to slowly fill with stormwater over time. As part of the construction phase of the reclamation plan, employees and/or contractors would be required to comply with the CalGreen/Construction and Demolition Debris Recovery Program. The program requires at least 65 percent by weight of job site debris to be recycled, reused, or otherwise diverted from landfill disposal. The end use of the project site is open space, which would not require energy use. Compliance with CalGreen and the lack of need for energy use after reclamation suggests that the project would not result in wasteful use of energy during construction or post-reclamation use. Therefore, the project would have a less than significant impact regarding wasteful use of energy resources.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The State of California has taken steps to increase the efficiency of vehicles and other construction equipment to provide more renewable energy. Legislation is routinely passed and codified to address climate change and clean energy production. Based on the fact that no buildings or structures requiring energy use are proposed and that construction equipment would be required to meet energy efficiency standards, there is no part of the proposed project that suggests it would impede any State or Local initiatives that aimed at increasing renewable energy or efficiency. Therefore, this impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
7. *GEOLOGY AND SOILS* *Would the project:*				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☒	☐	☐	☐
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐

SUMMARY:

a) The Applicant submitted *Geotechnical Evaluations for Revised Reclamation Plan* prepared by Golder Associates, Inc. (Golder) (included as Appendix F-1 of the Draft EIR) to evaluate impacts to geology and soils under the proposed project. The analysis was peer reviewed by County-retained Benchmark Resources in 2020. County staff has determined the proposed project could result in a potentially significant impact to soil conditions and slope stability at the project site. Therefore, the topic will be analyzed at length in the Draft EIR. Please see Section 4.4, "Geology and Soils," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
8. *GREENHOUSE GAS EMISSIONS* *Would the project:*				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

SUMMARY:

a-b) The Applicant has prepared the *Air and Greenhouse Gas Emissions Study* (Appendix D-1 of the Draft EIR) to evaluate impacts to greenhouse gas emissions under the proposed project. This analysis was peer reviewed by County-retained Rincon Consultants, Inc. in February 2020. County staff has determined the proposed reclamation-related activities would cause an increase in emissions of greenhouse gases. Therefore, the proposed project could result in a potentially significant greenhouse gas emission impacts. The topic will be analyzed at length in the EIR. Please see Section 4.5, "Greenhouse Gas Emissions," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
9. HAZARDS AND HAZARDOUS MATERIALS *Would the project:*				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

SUMMARY:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The proposed project consists of reclaiming an existing mining operation to an end use of open space, including the creation of a quarry lake to slowly fill with stormwater with a controlled outflow, permanent overburden fill areas, grading, and revegetation. Current and future mining activity is vested and not part of the proposed project. The site would be reclaimed to open space and would therefore not require routine transport of hazardous materials to sustain the use or property. No undue risk, as limited by the building and fire codes, would be introduced to the project as no new buildings are proposed. Therefore, the revised reclamation plan would not

involve a significant increase in risks associated with transport of hazardous materials within the area, resulting in a less than significant impact.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

The proposed project does not include mining activity; thus, no industrial uses that involve significant amounts of hazardous material are involved. Overburden fill would be sourced from the project site. The project does not involve transporting or using large volumes of hazardous materials. Petroleum-based fuels and oils are used on-site for fueling and maintaining the project trucks and heavy equipment. On-site storage of fuels is contained consistent with applicable County and regulatory requirements to ensure that both groundwater and surface water are adequately protected. Mobile service trucks conduct on-site maintenance operations; major repair and equipment rebuilds occur off-site. Petroleum products are disposed of off-site in a state-licensed facility. None of these existing permitted operations would change as a result of the revised reclamation plan approvals. This impact would be less than significant.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The project site is not located within 0.25 mile of an existing or proposed school. Therefore, the project would have no impact with regards to release of hazardous materials near an existing or proposed school.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?

The site is not listed as a hazardous materials site; thus, no impact would occur (DTSC 2020).

e) For a project located within an airport land use plan or, where such a plan has not yet been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

The subject property is not located within an airport land use plan area, thus no impact would occur.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The proposed project would be located completely within the boundaries of CEMEX's property. As determined under the *Air and Greenhouse Gases Emissions Study* (Appendix D-1 of the Draft EIR), the proposed project would generate up to 98 daily vehicle trips, including all worker, vendor, and hauling trips, during removal of the processing plant, which is the reclamation activity with the highest trip count (CEMEX 2020). This number falls below the Contra Costa County Transportation Authority's (CCTA) Congestion Management Program (CMP) threshold of 100 net new peak hour vehicle trips, above which as traffic impact analysis would be required (Contra Costa County 2020). Furthermore, traffic associated with the proposed project would be less than existing traffic levels associated with mining and processing operations at the site, and less than 100 net new peak hour vehicle trips. Therefore, the number of trips would not pose a significant impact on transport or access along any roadways or waterways that may be part of an emergency response or evacuation plan.

The project does not propose to remove or alter any existing structures that are an element of any existing emergency response or evacuation plan. Lastly, the proposed project would not negatively impact any communications methods that may be used during an emergency situation. This impact would be less than significant.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

The project site is not located within an area designated as forest land or within a Very High Fire Hazard Severity Zone (VHFHSZ). However, the site is located in a State Responsibility Area and designated a High Fire Hazard Severity Zone. The Contra Costa County Fire Protection District has reviewed the project and did not submit any comments regarding wildfire. Furthermore, while the proposed project would result in an increase in grassland after the plant site has been reclaimed, the property owner would be required to maintain the site per the County Fire Code to reduce wildfire risk. Additional discussion of wildfire risk is provided in Section 20, below. However, because the project would not expose people or structures, directly or indirectly, to risk involving wildland fires more so than under current conditions, this impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
10. *HYDROLOGY AND WATER QUALITY* *Would the project:*				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☒	☐	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☒	☐	☐	☐
i) Result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
iv) Impede or redirect flood flows?	☒	☐	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☒	☐	☐	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☒	☐	☐	☐

SUMMARY:

a-e) The Applicant has prepared the *Hydrology and Water Quality Evaluation Report* by EMKO Environmental, Inc. (EMKO) (Appendix G-1 of the Draft EIR) to evaluate impacts to hydrology and water quality under the proposed project. The analysis was peer reviewed by County-retained Brown and Caldwell in March of 2020. County staff has determined the proposed altered drainage plan and end use as an open pit lake may result in potentially significant impacts to hydrology and water quality. Therefore, the topic will be analyzed at length in the EIR. Please see Section 4.6, "Hydrology and Water Quality," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
11. *LAND USE AND PLANNING* *Would the project:*				
a) Physically divide an established community?	☒	☐	☐	☐
b) Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐

SUMMARY:

a-b) County staff has determined that the proposed project has the potential to conflict with land use plans, policies, and regulations. Therefore, the proposed project could result in a potentially significant impact to land use and planning. Therefore, the topic will be analyzed at length in the EIR. Please see Section 4.7, "Land Use and Planning," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
12. *MINERAL RESOURCES* *Would the project:*				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

SUMMARY:

a-b) The project would accommodate the already permitted ability to continue mining by revising the reclamation plan. The project would continue to allow for the production of these mineral resources, thereby making them available for beneficial use within Alameda County and surrounding areas. The project's utilization and development of these mineral resources is not considered adverse in terms of the County's CEQA review because the site is being used for the extraction of mineral resources. The proposed end use of open space would not preclude future additional mineral extraction on the site if the applicant and the County deem such additional extraction to be desirable and if the necessary reclamation plan amendment and associated CEQA review were conducted. Thus, impacts to mineral resources would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
13. *NOISE* *Would the project result in:*				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☒	☐	☐	☐

SUMMARY:

a-c) The subject site is located adjacent to several single-family residential neighborhoods in unincorporated area of Contra Costa County. Earth-moving activity under the project would generate noise and possible ground vibrations in the area due to grading and the use of heavy-duty construction equipment and vehicles. Therefore, the topic will be analyzed at length in the EIR. Please see Section 4.8, "Noise," of the Draft EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
14. *POPULATION AND HOUSING* *Would the project:*				
a) Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

SUMMARY:

a) Would the project induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure?

The project does not include activities that would substantially increase the number of jobs needed to operate the mine and complete the activities under the existing reclamation plan. Therefore, the project would not substantially induce population growth in the area. The project does not include a proposal for new homes or businesses. No new public roads or public services would be installed that could induce population growth. The impact on population grown would be less than significant.

b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The project would not result in the removal of existing housing and would not create a need for the construction of new housing. No impact would occur regarding displacement of people or housing.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
15. *PUBLIC SERVICES*				
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire Protection?	☐	☐	☐	☒
b) Police Protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

SUMMARY:

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a-e) The project would not develop businesses, homes, or otherwise intensify land uses such that there would be a need for new or altered public facilities or public services including roads, or governmental services (police and fire protection and medical facilities). Therefore, the project would not cause physical impacts associated with the alteration or construction of new governmental facilities. There would be no impact related to public services.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
16. *RECREATION*				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒

SUMMARY:

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Increased use of parks and other recreational facilities typically results from general population growth over time and from development of specific projects that significantly increase the number of people in the immediate vicinity of such facilities. The proposed project would not increase the population of the area by building houses or creating new jobs, and therefore would not have the potential to increase the use of an existing neighborhood or regional park. There would be no impact to existing neighborhood and regional parks.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

The project proposes to reclaim the site to open space. However, the site would continue to be private land and no recreational facilities are proposed as part of the project. Therefore, the project would not have an adverse physical effect on the environment through the development or expansion of recreational facilities. There would be no impact.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
17. *TRANSPORTATION* *Would the project:*				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

SUMMARY:

a) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

As discussed in Section 9, "Hazards and Hazardous Materials," above, the CCTA serves as the congestion management agency for Contra Costa County. The CCTA develops and implements the applicable CMP, which outlines CCTA's strategies for managing the performance of regional transportation within the County and must be updated every other year. CCTA last updated the CMP in 2019 (CCTA 2019). The CMP covers State highways, principal arterials, and the Bay Area Rapid Transit (BART) system. CCTA recognizes I-680 and State Route 242 as the nearest CMP-covered highways, and Kirker Pass Road, Ignacio Valley Boulevard, and Clayton Road (west of the intersection of Kirker Pass/Ignacio Valley) as the nearest principal arterials and routes of regional significance. The CMP designates principal arterials with average daily traffic that equals or exceeds 20,000 vehicles per day for a segment of one mile or greater. Chapter 5 of the CMP includes a program to analyze the impacts of land use decisions made by local jurisdictions on these regional transportation systems. For short-range analysis of land use

impacts, the CMP relies on the traffic impact analysis required by the Measure J Growth Management Program. That program requires every jurisdiction to conduct a traffic impact analysis for any proposed development project, development plan, or General Plan Amendment that would generate more than 100 net new peak hour vehicle trips.

Although the project site is located within two miles of the principal arterials and roadways of regional significance that are designated in the CMP, the proposed project would not conflict with the CMP because reclamation activities would occur for short periods of time and would place limited traffic on existing roadways. Traffic associated with project reclamation activity would be less than existing traffic levels associated with mining and processing operations at the site and would generate fewer than 100 net new peak hour vehicle trips. Based on the project trip generation estimates reported in the project's *Air and Greenhouse Gas Emissions Study* (Appendix D-1 of the Draft EIR), the proposed project would generate up to 98 daily vehicle trips, including all worker, vendor, and hauling trips, during removal of the processing plant, which is the reclamation activity with the highest trip count. This corresponds to 49 trips entering and 49 trips leaving the site each day. To put these figures into perspective, as of 2017 Caltrans estimated that State Route 242 at Concord Avenue, which is the closest of the nearby highways, will experience 136,500 annual average daily traffic (AADT). The project would not interfere with any bicycle or pedestrian facilities as none are located on or adjacent to the site. Therefore, the proposed project would not conflict with an applicable plan.

In summary, the project would result in the fewer daily motor-vehicle trips to and from the project site for employees and equipment and supplies delivery than under existing conditions. In addition, the proposed project would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, accounting for all modes of transportation and relevant components of the circulation system. This would be a less than significant impact.

b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)?

In addition to the checklist items provided above, the Resources Agency has promulgated a new checklist item that focuses on a project's impacts associated with Vehicle Miles Traveled (VMT). The Contra Costa County Transportation Analysis Guidelines provide screening criteria to determine whether or not a project is required to provide VMT analysis. Based on the screening criteria, VMT analysis is not required for the proposed project because it generates fewer than 110 daily vehicle trips (Contra Costa County 2020). The site is accessed via Mitchell Canyon Road, which is a public roadway with no bicycle facilities or transit facilities. The nearest transit facilities are located on Clayton Road. No alterations to project site access would occur. Therefore, the project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b), resulting in a less than significant impact.

Even though VMT analysis is not required, the following VMT analysis for the proposed project is provided for informational purposes. Table 1, "Vehicle Miles Traveled for Reclamation Actions," provides a summary of the proposed VMTs for the proposed reclamation actions. In summary, for Overburden Fill Areas reclamation actions, worker trips would amount to 216 VMT, while vendor trips would be 0.0, and hauling trips would be 0.0. For Quarry Pit Area reclamation actions, worker trips would amount to 1,447.2 VMT, while vendor trips would be 248.20, and hauling trips would be 40.0. For Plant Area reclamation actions, worker trips would amount to 842.4 VMT, while vendor trips would be 14.6, and hauling trips would be 1,120.0. Last, for off-site drainage reclamation actions, worker trips would amount to 129.6 VMT, while vendor trips would be 14.6, and hauling trips would be 80.0. The combined total of VMT under

the project would be 4,152.6. The VMT for existing mining activity at the site is not provided since VMT analysis is not required.

Table 1
Vehicle Miles Traveled for Reclamation Actions

	Worker Trips			Vendor Trips			Hauling Trips		
Phase Name	***Number of Trips***	***Trip Length (miles)***	***Total Miles***	***Number of Trips***	***Trip Length (miles)***	***Total Miles***	***Number of Trips***	***Trip Length (miles)***	***Total Miles***
OVERBURDEN FILL AREAS									
Finish Slopes and Drainage	6.00	10.80	**64.8**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
Revegetation	14.00	10.80	**151.2**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
		TOTALS:	**216.0**			**0.0**			**0.0**
QUARRY PIT AREA									
Contour Final Knoxville Slope	14.00	10.80	**151.2**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
Riprap Knoxville Slope Face	20.00	10.80	**216.0**	2.00	7.30	**14.6**	0.00	20.00	**0.0**
Drainage: East Rim Haul Road	14.00	10.80	**151.2**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
Drainage: Rock Slope Protection Swales on Knoxville Face	6.00	10.80	**64.8**	18.00	7.30	**131.4**	0.00	20.00	**0.0**
Drainage Outlet Structure	16.00	10.80	**172.8**	2.00	7.30	**14.6**	2.00	20.00	**40.0**
Jack and Bore (1)	8.00	10.80	**86.4**	0.00	7.30	**0.00**	0.00	20.00	**0.00**
Jack and Bore (2)	16.00	10.80	**172.8**	4.00	7.30	**29.2**	0.00	20.00	**0.0**
Tree Screen Along East Rim Road	6.00	10.80	**64.8**	2.00	7.30	**14.6**	0.00	20.00	**0.0**
Install Drainage Outlet Pipe to Mitchell Canyon Road	12.00	10.80	**129.6**	4.00	7.30	**29.2**	0.00	20.00	**0.00**
Riprap Mound at Quarry Drainage Outlet	14.00	10.80	**151.2**	0.00	7.30	**0.00**	0.00	20.00	**0.00**
Fencing and Gates	8.00	10.80	**86.4**	2.00	7.30	**14.6**	0.00	20.00	**0.00**
		TOTALS:	**1,447.2**			**248.20**			**40.0**
PLANT AREA									
Landscape Screening Berm	14.00	10.80	**151.2**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
Removal of Processing Plant and Support Structures	40.00	10.80	**432.0**	2.00	7.30	**14.6**	56.00	20.00	**1,120.0**
Contour Grading and Resoiling	20.00	10.80	**216.0**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
Revegetation	4.00	10.80	**43.2**	0.00	7.30	**0.0**	0.00	20.00	**0.0**
		TOTALS:	**842.40**			**14.6**			**1,120.0**
OFF-SITE DRAINAGE									
Storm Drain Replacement	12.00	10.80	**129.6**	2.00	7.30	**14.6**	4.00	20.00	**80.0**
		TOTALS:	**129.6**			**14.6**			**80.0**

Source: Vehicle mile travel data estimated from Air and Greenhouse Gas Emissions Study data (Appendix D-1 of the Draft EIR).

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

There are no increased hazards due to a design feature such as curves or intersections. The project's ingress/egress would be provided the existing driveway entrance on the west side of Mitchell Canyon Road. The Contra Costa Fire Protection District has also reviewed the project for conformance with the Fire District standards, which include emergency access, and no comments of concern were received. Therefore, the project would have a less than significant impact.

d) Would the project result in inadequate emergency access?

The project's ingress/egress would be provided the existing driveway entrance on the west side of Mitchell Canyon Road. Furthermore, no project features would impede this access. The Contra Costa Fire Protection District has also reviewed the project for conformance with the Fire District standards, which include emergency access, and no comments of concern were received. Therefore, the project would have a less than significant impact on emergency access.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
18. *TRIBAL CULTURAL RESOURCES* *Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:*				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1?	☐	☒	☐	☐

SUMMARY:

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a-b) As discussed in Section 5, "Cultural Resources," mining in the quarry pit is part of vested mining activity and not the proposed project. However, reclamation activities under the proposed project would involve other ground disturbing activities that could disturb buried tribal resources. With that understanding, on December 8, 2020, a Notice of Opportunity to Request Consultation was forwarded to Wilton Rancheria. On January 4, 2021, staff received an email from the Wilton Rancheria requesting consultation for this project. Wilton Rancheria reviewed the project and had no comment other a request to view the revegetation plans for the proposed project. The County granted the request, and Wilton Rancheria gave no further comment.

Consultation with Wilton Rancheria did not indicate the potential presence for tribal cultural resources on the project site. The implementation of Mitigation Measure CUL-1 and CUL-2

(please see Section 5, above) would require on-site education to instruct personnel in the identification of prehistoric and historic deposits, stopping work when archeological or tribal resources are uncovered until experts are brought to the site to evaluate the significance of the find, and notifying the coroner and/or the most likely decedent to make recommendations to the land owner for treatment and disposition of the ancestor's remains. Incorporation of these measures would reduce the potential impact to tribal cultural resources to less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
19. *UTILITIES AND SERVICE SYSTEMS – Would the project:*				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

SUMMARY:

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects?

The proposed project does not include vested mining activity and pertains to reclamation activities only. Existing utility connections include power, sewer, water, and stormwater. With the exception of stormwater drainage facilities, no aspect of the proposed reclamation activities would increase demands on any utility or service system beyond existing conditions because reclamation activity utility or service requirements would be the same or less than that used for the vested mining operation. Furthermore, the site's proposed end use would be open space, which would require little to no reliance on utilities and service systems aside from stormwater drainage facilities, discussed below. Therefore, the proposed project would not result in the construction of new power, sewer, or water facilities or expansion of existing facilities.

With regards to stormwater, a stormwater drainage pipeline is proposed on the project site. The environmental effects of the development of this pipeline are analyzed in this initial study and in the Draft EIR. The applicant has prepared the *Evaluation of Runoff from Mitchell Canyon Road to DA71A Storm Drains* by EMKO (Appendix G-5 of the Draft EIR). This memorandum indicates

that runoff rates to the DA71A drainage system would increase when the water level in the quarry pit lake reaches 735 feet msl and begins to flow to the proposed stormwater drainage pipeline. However, the peak storm flows from the quarry would likely not occur until after the peak flows from the lower sub-watersheds have begun to recede due to the time it would take water in the quarry pit lake to accumulate and rise above the outlet structure opening.

Furthermore, the existing capacity of the DA71A storm drain system within the 15-inch reinforced concrete pipeline to which the drainage pipeline would connect is about 18 cubic feet per second (cfs). As shown on Figure 4.6-2, "DA 71A Storm Drains East of CEMEX Site," of the Draft EIR, the drainage pipeline downstream of the 15-inch reinforced concrete pipeline is 18-inches in diameter. The capacity of the 18-inch pipeline is much higher due to the larger diameter and the steeper slope along Diablo Downs Drive compared to Mitchell Canyon Road. Therefore, the 18 cfs capacity of the 15-inch reinforced concrete pipeline is the limiting factor in the DA71A drainage system. Based on the watershed area and Contra Costa County Flood Control and Water Conservation District (1991) guidance, the storm drains within DA71A should be designed to convey the runoff from a 10-year, 24-hour storm. Existing discharges to the 15-inch reinforced concrete pipeline during a 10-year, 24-hour storm consist of approximately 10.8 cfs (9 cfs from the project site and 1.8 cfs from Mitchell Canyon Road). The controlled discharge from the quarry pit lake for the 10-year, 24-hour storm would be approximately 4.2 cfs. Therefore, total discharge to the DA71A storm drain system would be approximately 15.0 cfs and would not exceed its existing capacity. In addition, the *Hydrology and Water Quality Evaluation Report* prepared by EMKO indicates that the project would divert stormwater runoff to the quarry pit lake from an 8-acre watershed that currently drains to Mitchell Creek, and thereby reduce runoff to Mitchell Creek. Therefore, no expansion or modification to existing stormwater drainage facilities in DA71/71A would be required.

The revised reclamation plan would not alter the northern watershed area which drains north to DA96 with the exception of the removal of the existing processing plant facility and development of a berm along the northeast corner of the project site. The existing settling ponds and containment basins would be re-graded to final contours, but the stormwater detention pond at the open field to the north of the processing plant site would be retained. Post-reclamation runoff from the plant site would be directed to the stormwater detention pond. The stormwater detention pond can hold up to 225,000 gallons of stormwater per day, which is equivalent to the 225,000 gallons per day of stormwater that the existing stormwater conveyance and containment system is designed to hold (CEMEX 2019). Any excess stormwater would enter the existing drainage swale across the open field that would convey runoff to existing and man-made drainage courses in DA96 in the City of Concord. The removal of the processing plant facility would decrease impervious surfaces within the northern watershed area and thereby decrease both the peak flow rate and the total runoff generated from the plant site area relative to existing conditions. Therefore, no expansion or modification to existing stormwater drainage facilities in DA96 would be required.

In summary, the project would not require the construction of new facilities or expansion of existing facilities. This impact would be less than significant.

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

The subject property would be reclaimed to open space. Therefore, no off-site water supplies would be necessary for the project area during and following reclamation, so the impact would be less than significant.

c) Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No part of the proposed project would change the existing use of the site from mining to a more intense use (e.g., commercial or industrial). The proposed project would convert the existing mining operation (not part of the proposed project) to open space. Therefore, it is not anticipated that any unexpected demands would be placed on wastewater infrastructure. The impact would be less than significant.

d-e) Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Solid wastes from the project requiring off-site disposal would be stored in on-site material stockpiles, which would not remain following reclamation completion and would be disposed in accordance with federal, state, and local regulations. The information available from the Public Facilities/Services Element of the *Contra Costa County General Plan* indicates that the Keller Canyon Landfill serves the Clayton area, including the project site (Contra Costa County 2014). Keller Canyon Landfill has sufficient landfill space to accommodate the County's needs through 2030 (CalRecycle 2021). The proposed reclamation activities would store overburden on-site and would not generate significant solid waste that would be required for off-site disposal between 2030 and the anticipated end date of the reclamation plan of 2068 (CEMEX 2020). In addition, it is reasonably foreseeable that the Contra Costa Health Services Department, Environmental Health Division will establish sufficient landfill capacity to accommodate future County demand, including the limited amount of solid waste that would be generated by reclamation activities between 2030 and 2068. Furthermore, the proposed project is required to comply with applicable federal, state, and local statutes and regulations related to solid waste in general. No aspects of the project have been identified that suggest an inability to comply with applicable regulations and statutes. Therefore, the proposed project would have a less than significant impact regarding these issues.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
20. *WILDFIRE* *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:*				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby, expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

SUMMARY:

The project site is located within an area of state responsibility, but it is not classified as very high fire hazard severity zone (FHSZ). However, the site is located in a high FHSZ and surrounded by very high FHSZs on two sides (CalFire 2020).

a) Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

The Contra Costa Emergency Operations Plan (Contra Costa County 2015) applies to all emergencies in unincorporated areas of Contra Costa County and within incorporated areas when those emergencies require multi-agency coordination at the operational area level. It provides the basis for a coordinated response before, during, and after an emergency affecting Contra Costa County. The project would not substantially impair the adopted plan as site access would continue to exist under the proposed project. The impact would be less than significant.

b) Due to slope, prevailing winds, and other factors, would the project exacerbate wildfire risks, and thereby, expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The proposed project involves fill, grading, and/or revegetation at the north and south overburden fill areas and the plant site. The north overburden fill area has already been developed, but the proposed slopes of the south overburden fill area would be developed at 2.5H:1V (horizontal to vertical) (slope angle 21.8 degrees). As the project site is located on the slopes of Mount Zion with natural slope inclinations of approximately 20 to 35 degrees in the area of the project site, these slopes would be consistent with the topography of the area.

The project also includes revegetation and installation of a tree screen along the proposed quarry lake east rim. In addition, to accommodate the south overburden fill area, the project proposes removal of 79 out of 123 existing trees, 77 of which are protected trees, consisting primarily of blue oak and valley oak trees (Appendix E-2 of the Draft EIR). The project proposes that the 79 removed trees should be replaced by 400 pine trees. This is because replacing removed oaks with the same species would require substantially more spacing between trees, resulting in fewer trees able to comprise the tree screen at the top of the quarry east rim. Furthermore, by replacing removed protected trees with pines, which have narrower canopies and may be more densely positioned than oak trees, all trees can be aligned in a single horizontal line at the top of the east rim of the future quarry lake. This tree alignment and species choice would create a low hazard risk buffer between the two adjacent VHFHSZs and would not exacerbate wildfire risk relative to existing conditions. Therefore, the potential impact related to the exacerbation of wildfire risks would be less than significant.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

The proposed project would require the installation or maintenance of a stormwater drainage pipeline between the proposed quarry pit lake and Mitchell Canyon Road. The pipeline would be located underground and maintenance access would be through two manholes at the ground surface. Additionally, the project would place drainage facilities (i.e., rock-lined ditches and culverts) along the quarry rim haul road. The underground pipeline, roadway ditches and culverts, and associated maintenance activities would not use materials or activities that could substantially exacerbate fire risk. Therefore, the potential of the proposed installation and maintenance of infrastructure on the project site to exacerbate fire risk would be less than significant.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Although there would be drainage changes and revised topography due to final grading for reclamation, the project would not increase fire risk, as discussed in Impacts (a) and (b) above. Flood and landslide hazards unrelated to wildfire will be evaluated in Section 4.6, "Hydrology and Water Quality," of the Draft EIR. As the overall potential for wildfire would be reduced under the proposed project, flood or landslide risk to people or structures resulting from wildfire would also be reduced compared to existing conditions. Therefore, this impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
21. *MANDATORY FINDINGS OF SIGNIFICANCE*				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

SUMMARY:

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

The Applicant has submitted a *Biological Resources Assessment*, *Arborist Report*, and *Clean Water Act Jurisdictional Delineation* by LSA (Appendices E-1, E-2, and E-3 of the Draft EIR) to evaluate impacts to biological resources under the proposed project. These analyses were peer reviewed by County-retained Rincon Consultants in 2020 and determined them adequate for the project. County staff has preliminarily determined the proposed project could result in potentially significant impacts to a variety of protected plant and animal species and their habitats. Therefore, this topic will be analyzed at length in the EIR. Please see Section 4.3, "Biological Resources," of the Draft EIR.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable

when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

The Applicant has prepared the *Air and Greenhouse Gas Emissions Study* and *Public Health Risk Assessment of Site Reclamation* (Appendices D-1 and D-2 of the Draft EIR) to evaluate impacts to air quality and human health risks associated with air pollutant and greenhouse gas emissions under the proposed project. These analyses were peer reviewed by County-retained Rincon Consultants, Inc. in February and October of 2020 and determined them adequate for the project. County staff has determined the proposed project would result in a potentially significant increase in emissions of criteria pollutants and greenhouse gases. Because air quality and greenhouse gas emissions are typically associated with cumulatively considerable impacts, these topics and their cumulative impacts will be analyzed at length in the EIR.

c) Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?

As noted above, the staff has determined the proposed project would result in a potentially significant increase in emissions of criteria pollutants and resulting health risk for humans. Because pollutant emissions and their exacerbation of human health risk are typically associated with cumulatively considerable impacts, these topics and their cumulative impacts will be analyzed at length in the Draft EIR.

REFERENCES

REFERENCES

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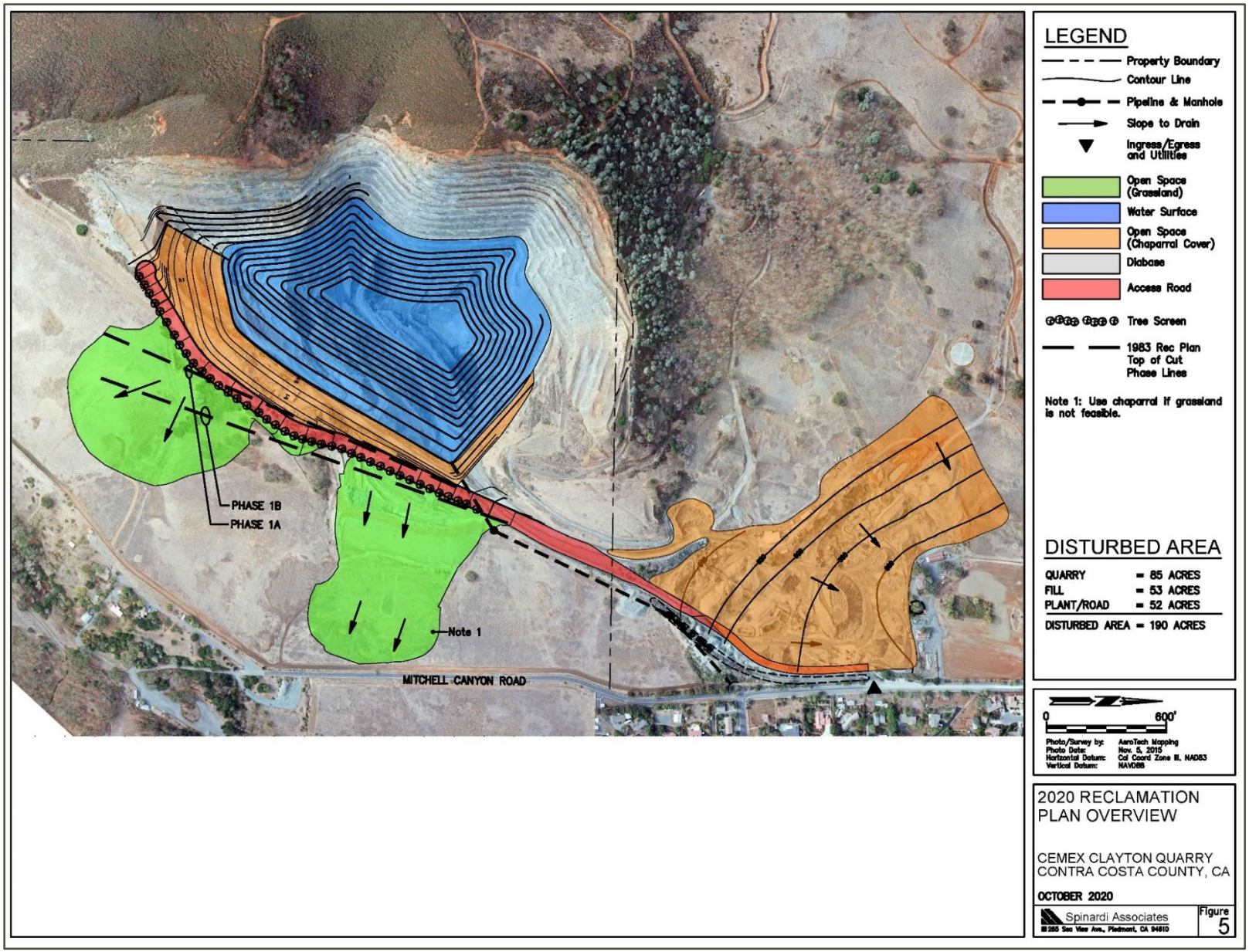
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FIGURES



SOURCE: CEMEX 2020; compiled by Benchmark Resources in 2020

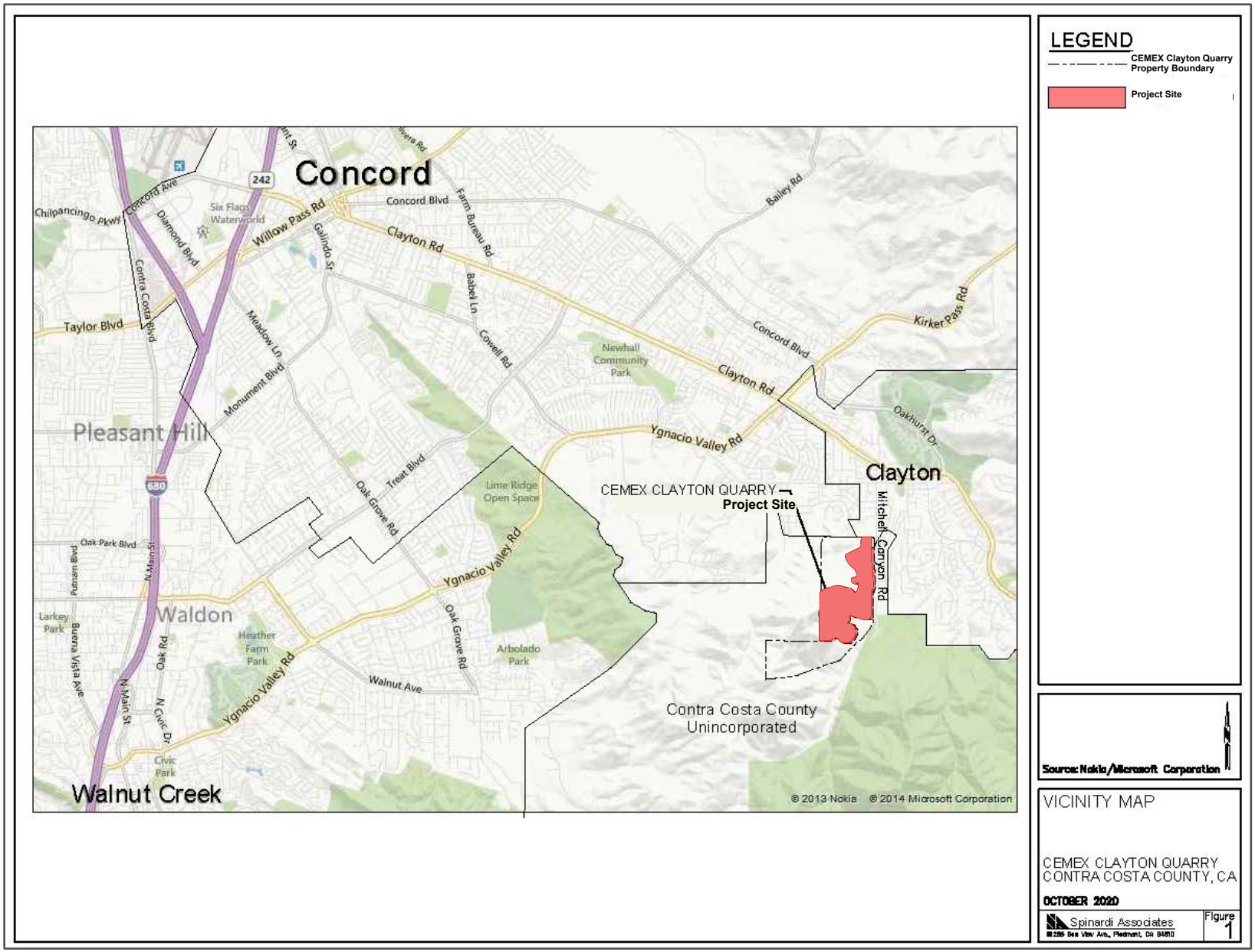
NOTE: Figure is not to scale.

Proposed Reclamation Plan Overview

CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

INITIAL STUDY

Figure 1



SOURCE: Compass Land Group 2020; modified by Benchmark Resources in 2021

NOTE: Figure not to scale

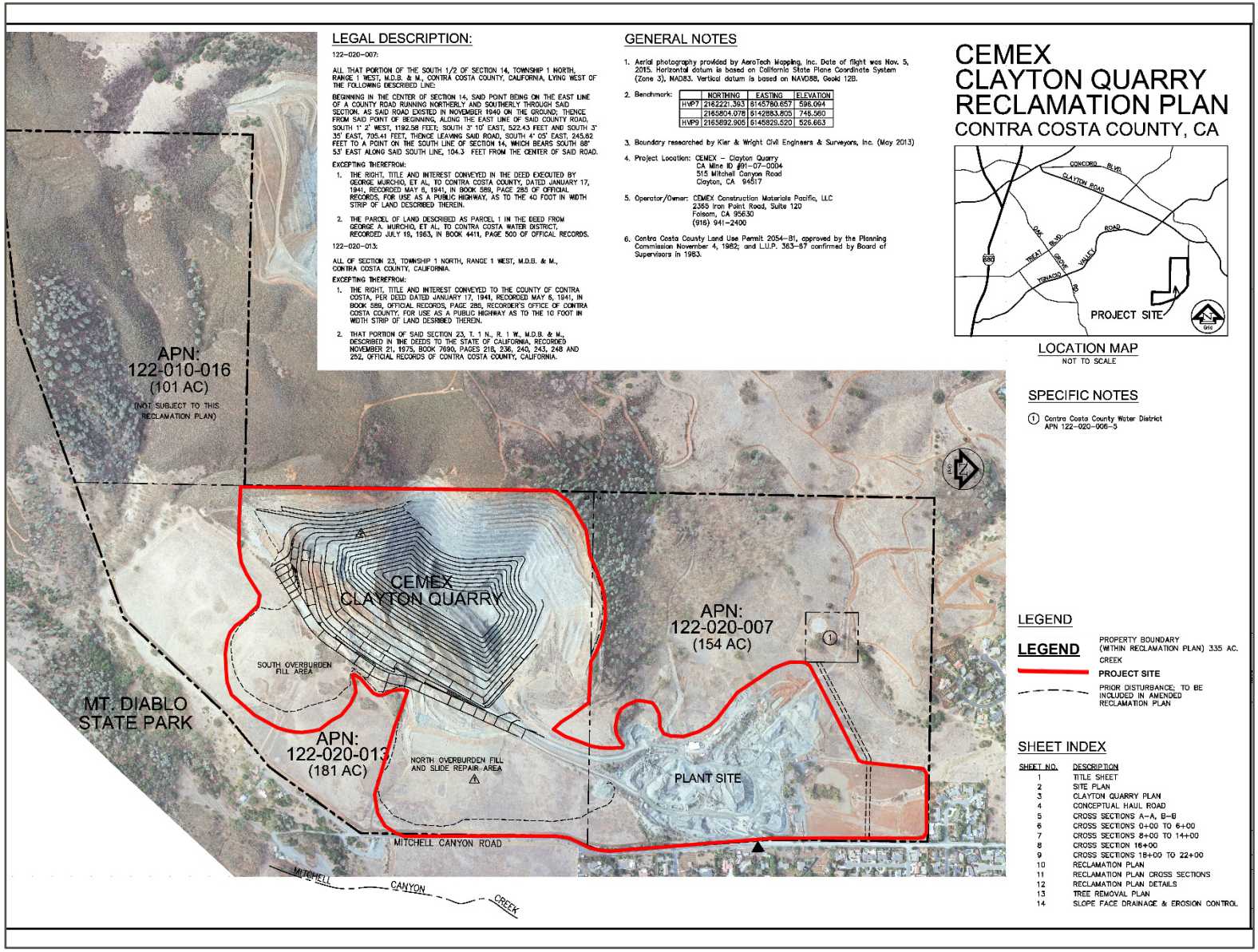
Regional Location

CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

DRAFT EIR

Figure 2

BENCHMARK RESOURCES



SOURCE: Spinardi Associates 2021; modified by Benchmark Resources in 2021
NOTE: Figure not to scale.

Site Location
CLAYTON QUARRY RECLAMATION PLAN AMENDMENT
DRAFT EIR
Figure 3

BENCHMARK RESOURCES

APPENDIX A-5
NOC OF THE NOTICE OF PREPARATION

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: CEMEX Clayton Quarry Reclamation Plan Amendment

Lead Agency: Department of Conservation and Development | Contact Person: Francisco Avila

Mailing Address: 30 Muir Road | Phone: (925) 674-7801

City: Martinez | Zip: 94553 | County: Contra Costa

Project Location: County: Contra Costa | City/Nearest Community: Clayton

Cross Streets: Mitchell Canyon Road and Diablo Downs Road | Zip Code: 94517

Longitude/Latitude (degrees, minutes and seconds): 37 ° 55 ′ 15.99″ N / 121 ° 56 ′ 46.53″ W | Total Acres: 335

Assessor's Parcel No.: 112-020-007 & 013, 112-010-016 | Section: - | Twp.: - | Range: - | Base: -

Within 2 Miles: State Hwy #: None | Waterways: Mitchell Creek

Airports: None | Railways: None | Schools: Pine Hollow, Mt.Diablo

Document Type:

CEQA: ☒ NOP ☐ Draft EIR | NEPA: ☐ NOI | Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR | ☐ EA | ☐ Final Document
☐ Neg Dec (Prior SCH No.) _____ | ☐ Draft EIS | ☐ Other: _____
☐ Mit Neg Dec Other: _____ | ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☒ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☐ Other: _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational: _____
☐ Recreational: _____
☐ Water Facilities: Type _____ MGD _____
☐ Transportation: Type _____
☒ Mining: Mineral Diabase
☐ Power: Type _____ MW _____
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☐ Other: _____

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Fiscal ☐ Recreation/Parks ☐ Vegetation
☐ Agricultural Land ☐ Flood Plain/Flooding ☐ Schools/Universities ☒ Water Quality
☒ Air Quality ☐ Forest Land/Fire Hazard ☐ Septic Systems ☐ Water Supply/Groundwater
☐ Archeological/Historical ☒ Geologic/Seismic ☐ Sewer Capacity ☐ Wetland/Riparian
☒ Biological Resources ☒ Minerals ☐ Soil Erosion/Compaction/Grading ☐ Growth Inducement
☐ Coastal Zone ☒ Noise ☐ Solid Waste ☒ Land Use
☐ Drainage/Absorption ☐ Population/Housing Balance ☐ Toxic/Hazardous ☐ Cumulative Effects
☐ Economic/Jobs ☐ Public Services/Facilities ☐ Traffic/Circulation ☐ Other: _____

Present Land Use/Zoning/General Plan Designation:

Zoning: A-2, General Agricultural District, General Plan: Agricultural Lands

Project Description: *(please use a separate page if necessary)*

Please see attached.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

x Air Resources Board
_____ Boating & Waterways, Department of
_____ California Emergency Management Agency
_____ California Highway Patrol
x Caltrans District #4
_____ Caltrans Division of Aeronautics
_____ Caltrans Planning
_____ Central Valley Flood Protection Board
_____ Coachella Valley Mtns. Conservancy
_____ Coastal Commission
_____ Colorado River Board
_____ Conservation, Department of
_____ Corrections, Department of
_____ Delta Protection Commission
_____ Education, Department of
_____ Energy Commission
X Fish & Game Region #3
_____ Food & Agriculture, Department of
_____ Forestry and Fire Protection, Department of
_____ General Services, Department of
_____ Health Services, Department of
_____ Housing & Community Development
X Native American Heritage Commission

_____ Office of Historic Preservation
_____ Office of Public School Construction
_____ Parks & Recreation, Department of
_____ Pesticide Regulation, Department of
_____ Public Utilities Commission
X Regional WQCB #2
_____ Resources Agency
_____ Resources Recycling and Recovery, Department of
_____ S.F. Bay Conservation & Development Comm.
_____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
_____ San Joaquin River Conservancy
_____ Santa Monica Mtns. Conservancy
_____ State Lands Commission
_____ SWRCB: Clean Water Grants
_____ SWRCB: Water Quality
_____ SWRCB: Water Rights
_____ Tahoe Regional Planning Agency
_____ Toxic Substances Control, Department of
_____ Water Resources, Department of

_____ Other: _____
_____ Other: _____

Local Public Review Period (to be filled in by lead agency)

Starting Date February 14, 2020 Ending Date March 16, 2020

Lead Agency (Complete if applicable):

Consulting Firm: _____
Address: _____
City/State/Zip: _____
Contact: _____
Phone: _____

Applicant: _____
Address: _____
City/State/Zip: _____
Phone: _____

Signature of Lead Agency Representative: _____ **Date:** _____

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

APPENDIX A-6
NOP DISTRIBUTION LIST

APN	P_OWNER_NM	N_STR_NBR	N_STR_NM	N_STR_SUF	N_CTY_ST	N_ZIP	N_ZIP_I	S_STR	S_STR_NM	S_STR_SUF	S_CTY_ABBR	S_ZIP
122010015	CALIFORNIA STATE OF	650	HOWE	AVE	SACRAMENTO CA	95825	4731		NO ADDRESS		CLYTN	94517
122010008	CALIFORNIA STATE OF		NO ADDRESS		CLAYTON CA	94517			NO ADDRESS		CLYTN	94517
122010016	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501		NO ADDRESS		CLYTN	94517
122020014	CALIFORNIA STATE OF	650	HOWE	AVE	SACRAMENTO CA	95825	4731		MITCHELL CANYON	RD	CLYTN	94517
122010007	CALIFORNIA STATE OF		PO BOX 23440		OAKLAND CA	94623	0440		NO ADDRESS		CLYTN	94517
122020013	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501		MITCHELL CANYON	RD	CLYTN	94517
122010006	MANGINI LAVERNE	5484	PINE HOLLOW	RD	CONCORD CA	94521	4607		NO ADDRESS		CLYTN	94517
122010005	KAISER SAND & GRAVEL COMPANY	3520	PIEDMONT RD STE 410		ATLANTA GA	30305	1512	501	KAISER QUARRY	RD	CLYTN	94517
	OCCUPANT		NO ADDRESS		CLYTN	94517						
	OCCUPANT		NO ADDRESS		CLYTN	94517						
	OCCUPANT		NO ADDRESS		CLYTN	94517						
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517						
	OCCUPANT		NO ADDRESS		CLYTN	94517						
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517						
	OCCUPANT		NO ADDRESS		CLYTN	94517						
	OCCUPANT	501	KAISER QUARRY	RD	CLYTN	94517						
	CEMEX	2365	IRON POINT RD STE 120		FOLSOM CA	95630						
	COMPASS LAND GROUP	3140	PEACEKEEPER WAY STE 102		MCCLELLAN CA	95652						

FILE NO LP15-2030
LP15-2031

APN	P_OWNER_NM	N_STR_NBR	N_STR_NM	N_STR_SUI	N_CTY_ST	N_ZIP	N_ZIP_EXT	S_STR_NB	S_STR_NM	S_STR_SUF	S_CTY_ABB	S_ZIP	S_ZIP_EXT
122020004	CALIFORNIA STATE OF		PO BOX 23440		OAKLAND CA	94623	0440	96	MITCHELL CANYON	RD	CNCD	94520	
712202001	MORRISON CAMERON M	100	MITCHELL CANYON	RD	CLAYTON CA	94517	1532	100	MITCHELL CANYON	RD	CLYTN	94517	1532
712202002	WILLIAMS DANIEL HAROLD		PO BOX 577		MOUNTAIN RANCH	95246	0577	100	MITCHELL CANYON	RD	CLYTN	94517	1532
122020013	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH	33406	1501		MITCHELL CANYON	RD	CLYTN	94517	
122010006	MANGINI LAVERNE	5484	PINE HOLLOW	RD	CONCORD CA	94521	4607		NO ADDRESS		CLYTN	94517	
122020007	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH	33406	1501	515	MITCHELL CANYON	RD	CLYTN	94517	1529
119181012	RODRIGUEZ SANDRA L	740	TALLY HO	CT	CLAYTON CA	94517	1533	740	TALLY HO	CT	CLYTN	94517	1533
119181011	STERLING LARRY A & VALERIE TRE	731	TALLY HO	CT	CLAYTON CA	94517	1533	731	TALLY HO	CT	CLYTN	94517	1533
119181007	ABEYTA JOSEPH	730	TALLY HO	CT	CLAYTON CA	94517	1533	730	TALLY HO	CT	CLYTN	94517	1533
119181008	WISE THOMAS S	720	TALLY HO	CT	CLAYTON CA	94517	1533	720	TALLY HO	CT	CLYTN	94517	1533
119181009	PIERCE MIAO T TRE	710	TALLY HO	CT	CLAYTON CA	94517	1533	710	TALLY HO	CT	CLYTN	94517	1533
119181010	ALLEN GEORGE J TRE	800	DIABLO DOWNS	DR	CLAYTON CA	94517	1528	800	DIABLO DOWNS	DR	CLYTN	94517	1528
119182001	MARSHALL THOMAS A	811	COACHMAN	PL	CLAYTON CA	94517	1526	811	COACHMAN	PL	CLYTN	94517	1526
119190001	STRICKLAND ROBERT D JR	821	COACHMAN	PL	CLAYTON CA	94517	1526	821	COACHMAN	PL	CLYTN	94517	1526
119190002	ECHELMEIER MARTIN & RACHEL	831	COACHMAN	PL	CLAYTON CA	94517	1526	831	COACHMAN	PL	CLYTN	94517	1526
119190003	CHU ALLAN TRE	841	COACHMAN	PL	CLAYTON CA	94517	1526	841	COACHMAN	PL	CLYTN	94517	1526
119190004	JAFFE RANDALL TRE	851	COACHMAN	PL	CLAYTON CA	94517	1526	851	COACHMAN	PL	CLYTN	94517	1526
119190005	JENSEN RYAN & LINDSAY	861	COACHMAN	PL	CLAYTON CA	94517	1526	861	COACHMAN	PL	CLYTN	94517	1526
119190006	BOWRON JAMES R & ALISA L	871	COACHMAN	PL	CLAYTON CA	94517	1526	871	COACHMAN	PL	CLYTN	94517	1526
119190007	TOW LAURA TRE	881	COACHMAN	PL	CLAYTON CA	94517	1526	881	COACHMAN	PL	CLYTN	94517	1526
122020006	CONTRA COSTA WATER DISTRICT		PO BOX H2O		CONCORD CA	94524	2099		NO ADDRESS		CLYTN	94517	
119130011	LINZEY TAYLOR C & KATHRYN W	145	WIDMAR	PL	CLAYTON CA	94517	1355	145	WIDMAR	PL	CLYTN	94517	1355
119130012	BURMEISTER WILLIAM P TRE	144	WIDMAR	PL	CLAYTON CA	94517	1355	144	WIDMAR	PL	CLYTN	94517	1355
119130010	MOORE MELINDA MOLLOY TRE	137	WIDMAR	PL	CLAYTON CA	94517	1355	137	WIDMAR	PL	CLYTN	94517	1355
119130013	SULLIVAN JESSE C & SARAH	136	WIDMAR	PL	CLAYTON CA	94517	1355	136	WIDMAR	PL	CLYTN	94517	1355
119130009	DICKINSON DAVID L & BRENDA	129	WIDMAR	PL	CLAYTON CA	94517	1355	129	WIDMAR	PL	CLYTN	94517	1355
119130014	MARTICORENA PAOLA		PO BOX 680		CLAYTON CA	94517	0680	128	WIDMAR	PL	CLYTN	94517	1355
119130008	TRADUP-MAHLOCH PAMELA	121	WIDMAR	PL	CLAYTON CA	94517	1355	121	WIDMAR	PL	CLYTN	94517	1355
119130015	HEINZ JERRY JR & DANA	120	WIDMAR	PL	CLAYTON CA	94517	1355	120	WIDMAR	PL	CLYTN	94517	1355
119130007	LAVEZZOLI MARK & KRISTEN	10	WIDMAR	CT	CLAYTON CA	94517	1354	10	WIDMAR	CT	CLYTN	94517	1354
119130016	SCOTT LOUIS TRUST	112	WIDMAR	PL	CLAYTON CA	94517	1355	112	WIDMAR	PL	CLYTN	94517	1355
119130003	VESNESKI ERIK L & LINDA L TRE	17	WIDMAR	CT	CLAYTON CA	94517	1354	17	WIDMAR	CT	CLYTN	94517	1354
119130002	KELLY AUSTIN	9	WIDMAR	CT	CLAYTON CA	94517	1354	9	WIDMAR	CT	CLYTN	94517	1354
119130001	DURAN JASON M & AMBER M	1	WIDMAR	CT	CLAYTON CA	94517	1354	1	WIDMAR	CT	CLYTN	94517	1354
122020007	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH	33406	1501	515	MITCHELL CANYON	RD	CLYTN	94517	1529
121050004	CEREGHINO RENA TRE	5484	PINE HOLLOW	RD	CONCORD CA	94521	4607		KAISER	RD	CNCD	94521	
121050003	CEREGHINO RENA L TRE	3520	PIEDMONT RD STE 410		ATLANTA GA	30305	1512		KAISER	RD	CNCD	94521	
121090001	DIEHL LLOYD P TRE	3	HERRIMAN	CT	CLAYTON CA	94517	1324	3	HERRIMAN	CT	CLYTN	94517	1324
119101003	POLLOCK JOHN J & PATRICIA TRE	5864	HERRIMAN	DR	CLAYTON CA	94517	1326	5864	HERRIMAN	DR	CLYTN	94517	1326
119101002	SWITZER ANGELA M	5856	HERRIMAN	DR	CLAYTON CA	94517	1326	5856	HERRIMAN	DR	CLYTN	94517	1326
119101001	SASSER BARBARA	3097	WINDMILL CANYON	DR	CLAYTON CA	94517	1937	5848	HERRIMAN	DR	CLYTN	94517	1326
121090002	MITTONE RICHARD F & CLAIRE TRE	9	HERRIMAN	CT	CLAYTON CA	94517	1324	9	HERRIMAN	CT	CLYTN	94517	1324
121090003	MASON JAMES TRE	15	HERRIMAN	CT	CLAYTON CA	94517	1324	15	HERRIMAN	CT	CLYTN	94517	1324
121201005	TROSCLAIR MICHAEL D	5791	LEWIS	WAY	CONCORD CA	94521	4827	5791	LEWIS	WAY	CNCD	94521	4827
121201006	BRUMLEY CYNTHIA L TRE	5795	LEWIS	WAY	CONCORD CA	94521	4827	5795	LEWIS	WAY	CNCD	94521	4827
121201021	MILLER MICHAEL & SUZANNE TRE	5787	LEWIS	WAY	CONCORD CA	94521	4827	5787	LEWIS	WAY	CNCD	94521	4827
121090004	HARLESS ROGER V & KAREN L	21	HERRIMAN	CT	CLAYTON CA	94517	1324	21	HERRIMAN	CT	CLYTN	94517	1324
119102007	EADE TIMOTHY H & YVONNE M TRE	5859	HERRIMAN	DR	CLAYTON CA	94517	1325	5859	HERRIMAN	DR	CLYTN	94517	1325
119102008	RUBIALES JOHN J & JANICE M TRE	5847	HERRIMAN	DR	CLAYTON CA	94517	1325	5847	HERRIMAN	DR	CLYTN	94517	1325
121090020	WALLACE ROBERTA M TRE	10	HERRIMAN	CT	CLAYTON CA	94517	1324	10	HERRIMAN	CT	CLYTN	94517	1324
121090021	HOELMER LAVON M	4	HERRIMAN	CT	CLAYTON CA	94517	1324	4	HERRIMAN	CT	CLYTN	94517	1324
121201003	MALSEED JAMES I & VICKI W TRE	5783	LEWIS	WAY	CONCORD CA	94521	4827	5783	LEWIS	WAY	CNCD	94521	4827
121201007	PARECADAN PAUL K	5799	LEWIS	WAY	CONCORD CA	94521	4827	5799	LEWIS	WAY	CNCD	94521	4827
121201002	PLUMB TERRENCE C & CHRISTINE	5777	LEWIS	WAY	CONCORD CA	94521	4827	5777	LEWIS	WAY	CNCD	94521	4827

121201013	ESPINOZA LUIS & GRACIELA	1150	BUTTERNUT	WAY	CONCORD CA	94521 4803	1150	BUTTERNUT	WAY	CNCD	94521 4803
119102017	PATTERSON CHARLES W & MELISSA	911	KENSTON	DR	CLAYTON CA	94517 1330	911	KENSTON	DR	CLYTN	94517 1330
121201009	CASTLE TERESA L	5780	LEWIS	WAY	CONCORD CA	94521 4830	5780	LEWIS	WAY	CNCD	94521 4830
121201008	WHITNEY KELLY	5790	LEWIS	WAY	CONCORD CA	94521 4830	5790	LEWIS	WAY	CNCD	94521 4830
121090010	COOPER WILLIAM & ANNA	835	MITCHELL CANYON	RD	CLAYTON CA	94517 1336	835	MITCHELL CANYON	RD	CLYTN	94517 1336
121090019	CORNISH PETER & DIANA	28	HERRIMAN	CT	CLAYTON CA	94517 1324	28	HERRIMAN	CT	CLYTN	94517 1324
121090005	GERNHARDT THOMAS M TRE	27	HERRIMAN	CT	CLAYTON CA	94517 1324	27	HERRIMAN	CT	CLYTN	94517 1324
121090016	CLAYTON FRED B TRE	825	ORANGE	AVE	SAN CARLOS CA	94070 3829		MITCHELL CANYON	RD	CLYTN	94517
121201012	WILLIAMS JAMES E II & KELLY	1160	BUTTERNUT	WAY	CONCORD CA	94521 4803	1160	BUTTERNUT	WAY	CNCD	94521 4803
121030032	CONCORD CITY OF	1950	PARKSIDE	DR	CONCORD CA	94519 2526		PINE HOLLOW	RD	CNCD	94521
121220001	CONCORD CITY OF	1950	PARKSIDE	DR	CONCORD CA	94519 2526		BUTTERNUT	WAY	CNCD	94521
	OCCUPANT	96	MITCHELL CANYON	RD	CNCD	94520					
	OCCUPANT	100	MITCHELL CANYON	RD	CLYTN	94517 1532					
	OCCUPANT	100	MITCHELL CANYON	RD	CLYTN	94517 1532					
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517					
	OCCUPANT		NO ADDRESS		CLYTN	94517					
	OCCUPANT	515	MITCHELL CANYON	RD	CLYTN	94517 1529					
	OCCUPANT	740	TALLY HO	CT	CLYTN	94517 1533					
	OCCUPANT	731	TALLY HO	CT	CLYTN	94517 1533					
	OCCUPANT	730	TALLY HO	CT	CLYTN	94517 1533					
	OCCUPANT	720	TALLY HO	CT	CLYTN	94517 1533					
	OCCUPANT	710	TALLY HO	CT	CLYTN	94517 1533					
	OCCUPANT	800	DIABLO DOWNS	DR	CLYTN	94517 1528					
	OCCUPANT	811	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	821	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	831	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	841	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	851	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	861	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	871	COACHMAN	PL	CLYTN	94517 1526					
	OCCUPANT	881	COACHMAN	PL	CLYTN	94517 1526					
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	OCCUPANT	144	WIDMAR	PL	CLYTN	94517 1355					
	OCCUPANT	137	WIDMAR	PL	CLYTN	94517 1355					
	OCCUPANT	136	WIDMAR	PL	CLYTN	94517 1355					
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	OCCUPANT	128	WIDMAR	PL	CLYTN	94517 1355					
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	OCCUPANT	9	WIDMAR	CT	CLYTN	94517 1354					
	OCCUPANT	1	WIDMAR	CT	CLYTN	94517 1354					
	OCCUPANT	515	MITCHELL CANYON	RD	CLYTN	94517 1529					
	OCCUPANT		KAISER	RD	CNCD	94521					
	OCCUPANT		KAISER	RD	CNCD	94521					
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	OCCUPANT	5856	HERRIMAN	DR	CLYTN	94517 1326					
	OCCUPANT	5848	HERRIMAN	DR	CLYTN	94517 1326					
	OCCUPANT	9	HERRIMAN	CT	CLYTN	94517 1324					
	OCCUPANT	15	HERRIMAN	CT	CLYTN	94517 1324					
	OCCUPANT	5791	LEWIS	WAY	CNCD	94521 4827					

	OCCUPANT	5795	LEWIS	WAY	CNCD	94521	4827
	OCCUPANT	5787	LEWIS	WAY	CNCD	94521	4827
	OCCUPANT	21	HERRIMAN	CT	CLYTN	94517	1324
	OCCUPANT	5859	HERRIMAN	DR	CLYTN	94517	1325
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	OCCUPANT	10	HERRIMAN	CT	CLYTN	94517	1324
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	OCCUPANT	5783	LEWIS	WAY	CNCD	94521	4827
	OCCUPANT	5799	LEWIS	WAY	CNCD	94521	4827
	OCCUPANT	5777	LEWIS	WAY	CNCD	94521	4827
	OCCUPANT	1150	BUTTERNUT	WAY	CNCD	94521	4803
	OCCUPANT	911	KENSTON	DR	CLYTN	94517	1330
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	OCCUPANT	27	HERRIMAN	CT	CLYTN	94517	1324
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517	
	OCCUPANT	1160	BUTTERNUT	WAY	CNCD	94521	4803
	OCCUPANT		PINE HOLLOW	RD	CNCD	94521	
	OCCUPANT		BUTTERNUT	WAY	CNCD	94521	
	CEMEX	2365	IRON POINT RD STE 120		FOLSOM CA	95630	
	COMPASS LAND GROUP	3140	PEACEKEEPER WAY STE 102		MCCLELLAN CA	95652	

APN	P_OWNER_NM	N_STR_NBR	N_STR_NM	N_STR_SU	N_CTY_ST	N_ZIP	N_ZIP_EX	S_STI	S_STR_NM	S_STR_SUF	S_CTY_ABBR	S_ZIP	S_ZIP_EXT
122010015	CALIFORNIA STATE OF	650	HOWE	AVE	SACRAMENTO CA	95825	4731		NO ADDRESS		CLYTN	94517	
122010016	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501		NO ADDRESS		CLYTN	94517	
122020014	CALIFORNIA STATE OF	650	HOWE	AVE	SACRAMENTO CA	95825	4731		MITCHELL CANYON	RD	CLYTN	94517	
122010007	CALIFORNIA STATE OF		PO BOX 23440		OAKLAND CA	94623	0440		NO ADDRESS		CLYTN	94517	
122020004	CALIFORNIA STATE OF		PO BOX 23440		OAKLAND CA	94623	0440	96	MITCHELL CANYON	RD	CNCD	94520	
712202001	MORRISON CAMERON M	100	MITCHELL CANYON	RD	CLAYTON CA	94517	1532	100	MITCHELL CANYON	RD	CLYTN	94517	1532
712202002	WILLIAMS DANIEL HAROLD		PO BOX 577		MOUNTAIN RANCH CA	95246	0577	100	MITCHELL CANYON	RD	CLYTN	94517	1532
122020013	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501		MITCHELL CANYON	RD	CLYTN	94517	
122010006	MANGINI LAVERNE	5484	PINE HOLLOW	RD	CONCORD CA	94521	4607		NO ADDRESS		CLYTN	94517	
122020007	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501	515	MITCHELL CANYON	RD	CLYTN	94517	1529
119181012	RODRIGUEZ SANDRA L	740	TALLY HO	CT	CLAYTON CA	94517	1533	740	TALLY HO	CT	CLYTN	94517	1533
119181007	ABEYTA JOSEPH	730	TALLY HO	CT	CLAYTON CA	94517	1533	730	TALLY HO	CT	CLYTN	94517	1533
122020007	RMC PACIFIC MATERIALS INC	1501	BELVEDERE	RD	WEST PALM BEACH FL	33406	1501	515	MITCHELL CANYON	RD	CLYTN	94517	1529
121050004	CEREGHINO RENA TRE	5484	PINE HOLLOW	RD	CONCORD CA	94521	4607		KAISER	RD	CNCD	94521	
121050003	CEREGHINO RENA L TRE	3520	PIEDMONT RD STE 410		ATLANTA GA	30305	1512		KAISER	RD	CNCD	94521	
	OCCUPANT		NO ADDRESS		CLYTN	94517							
	OCCUPANT		NO ADDRESS		CLYTN	94517							
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517							
	OCCUPANT		NO ADDRESS		CLYTN	94517							
	OCCUPANT	96	MITCHELL CANYON	RD	CNCD	94520							
	OCCUPANT	100	MITCHELL CANYON	RD	CLYTN	94517	1532						
	OCCUPANT	100	MITCHELL CANYON	RD	CLYTN	94517	1532						
	OCCUPANT		MITCHELL CANYON	RD	CLYTN	94517							
	OCCUPANT		NO ADDRESS		CLYTN	94517							
	OCCUPANT	515	MITCHELL CANYON	RD	CLYTN	94517	1529						
	OCCUPANT	740	TALLY HO	CT	CLYTN	94517	1533						
	OCCUPANT	730	TALLY HO	CT	CLYTN	94517	1533						
	OCCUPANT	515	MITCHELL CANYON	RD	CLYTN	94517	1529						
	OCCUPANT		KAISER	RD	CNCD	94521							
	OCCUPANT		KAISER	RD	CNCD	94521							
	CEMEX	2365	IRON POINT RD STE 120		FOLSOM CA	95630							
	COMPASS LAND GROUP	3140	PEACEKEEPER WAY STE 102		MCCLELLAN CA	95652							

APPENDIX B

PROPOSED RECLAMATION PLAN AMENDMENT

APPENDIX B-1

PROPOSED RECLAMATION PLAN AMENDMENT

REVISED RECLAMATION PLAN
FOR THE
CLAYTON QUARRY
(CA MINE ID #91-07-0004)

Owner / Operator:

CEMEX Construction Materials Pacific, LLC.
2365 Iron Point Road, Suite 120
Folsom, CA 95630

Prepared by:

Compass Land Group
3140 Peacekeeper Way, Suite 102
McClellan, CA 95652

October 2020

TABLE OF CONTENTS

RECLAMATION PLAN SUMMARY v

CHART OF SMARA CONTENTS [PRC §2770.5] vi

1.0 INTRODUCTION 1

1.1 Plan Organization 1

1.2 Site History 1

1.3 Current Operating Entitlements and Vested Rights 2

1.4 Purpose for Revised Reclamation Plan [CCR §3502(a)] 3

2.0 SURFACE MINING AND RECLAMATION ACT REQUIREMENTS 4

2.1 Description of Mining Operations 4

2.1.1 Name and Address of Operator and Agent [PRC §2772(c)(1)] 4

2.1.2 Quantity and Type of Mineral to be Mined [PRC §2772(c)(2)] 4

2.1.3 Initiation and Termination Dates [PRC §2772(c)(3)] 4

2.1.4 Maximum Anticipated Depth of Mining [PRC §2772(c)(4)] 5

2.1.5 Reclamation Plan Map Requirements [PRC §2772(c)(5)] 5

2.1.6 Mining Description and Time Schedule [PRC §2772(c)(6)] 5

2.1.7 Public Health and Safety (Exposure) [CCR §3502(b)(2)] 6

2.2 End Land Use 7

2.2.1 Proposed or Potential End Uses [PRC §2772(c)(7)] 7

2.2.2 Reclamation Measures Adequate for the End Use [PRC §2772(c)(8)] 7

2.2.3 Impact of Reclamation on Future Mining in the Area [PRC §2772(c)(9)] 9

2.3 Environmental Setting [CCR §3502(b)(1)] 9

2.3.1 Assessor Parcels, Zoning and General Plan Designations 9

2.3.2 Access and Utilities 9

2.3.3 Geology 10

2.3.4 Soils 10

2.3.5 Seismicity 11

2.3.6 Hydrology 11

2.3.7 Vegetation and Wildlife 12

2.4 Effect on Surrounding Land Uses [CCR §3502(b)(1)] 15

2.4.1 Surrounding Land Uses 15

2.4.2 Effect that Reclaimed Site Conditions May Have on Surrounding Land Uses 15

2.5 Slope Stability and Disposition of Fill Materials 15
2.5.1 Final Slopes; Slope Angles Flatter than Critical Gradient [CCR §3502(b)(3)] 15
2.5.2 Fill Slopes and Compaction Standards 16
2.6 Hydrology and Water Quality 17
2.6.1 Surface and Groundwater Quality Protected in Accordance with Porter-Cologne and Clean Water Acts [CCR §3710(a)] 17
2.6.2 Drainage, Sediment and Erosion Control [PRC §2773(a)] 19
2.6.3 Contaminant Control and Mine Waste Disposal [PRC §2772(c)(8)(A)] 24
2.6.4 In-stream Activities [CCR §3710(b)] 24
2.7 Protection of Fish and Wildlife Habitat [CCR §3503(c)] 24
2.8 Resoiling [CCR §3503(f)] 27
2.9 Revegetation [CCR §3705] 29
2.9.1 Vegetative Cover and Planting Procedures 29
2.9.2 Revegetation Test Plots [CCR §3705(b)] 34
2.9.3 Revegetation of Roads and Traffic Routes 35
2.9.4 Noxious Weed Management [CCR §3705(k)] 35
2.9.5 Plant Protection Measures, Fencing, Caging [CCR §3705(l)] 35
2.9.6 Revegetation Performance Standards and Monitoring [PRC 2773(a)] 36
2.9.7 Agricultural Fertility Performance Standards [CCR §3707 and CCR §3708] 38
2.10 Equipment Removal and Incidental Waste Disposal 38
2.11 Closure of Portals, Shafts and Openings 39
2.12 Administrative Requirements 39
2.12.1 Statement of Reclamation Responsibility [PRC §2772(c)(10)] 39
2.12.2 Financial Assurances [PRC §2773.1] 39
2.12.3 Lead Agency Approvals [PRC §2772.1] 39
2.12.4 All Mining Operations Since 1/1/76 Included in Reclamation Plan [PRC §2776] . 39
2.12.5 Mining in 100-year Floodplain and Within One Mile of State Highway Bridge [PRC §2770.5] 40
3.0 LEAD AGENCY REQUIREMENTS [PRC §2772(c)(11)] 40
3.1 General Plan 40
3.2 Surface Mining and Reclamation Code [Chapter 88-11] 41
3.2.1 Land Use Permit Required [SMRC §88-11.602] 41
3.2.2 Post-1976 Operations Included [SMRC §88-11.804] 41

3.2.3 Reclamation Plan Requirements [SMRC §88-11.810] 41
3.2.4 General Requirements [SMRC §88-11.812] 41
3.2.5 Guarantees [SMRC §88-11.814] 41
3.2.6 Progressive Reclamation [SMRC §88-11.816] 41
3.2.7 Disposal of Overburden and Mining Waste [SMRC §88-11.818] 41
3.2.8 Drainage, Erosion and Sediment Control [SMRC §88-11.820] 41
3.2.9 Final Slope Gradient [SMRC §88-11.822] 41
3.2.10 Emplacement of Fill [SMRC §88-11.824] 41
3.2.11 Resoiling [SMRC §88-11.826] 42
3.2.12 Revegetation [SMRC §88-11.828] 42
3.2.13 Water [SMRC §88-11.830] 42
3.2.14 Financial Assurances [SMRC §88-11.834] 42

TABLES

Table 1 Assessor Parcels, Zoning and General Plan Designations 9
Table 2 Slope and Bench Configurations 16
Table 3 Chaparral Revegetation Seed Mix 32
Table 4 Grassland Revegetation Seed Mix 33

FIGURES

Figure 1 Vicinity Map
Figure 2 Existing Conditions Aerial Photograph
Figure 3 1983 Reclamation Plan Overview
Figure 4 Vested Mining Permits
Figure 5 2020 Reclamation Plan Overview
Figure 6 Site Geology Map
Figure 7 Site NRCS Soils Map
Figure 8 Knoxville-Diabase Transition Concept

SHEETS

Sheet 1 Title Sheet
Sheet 2 Site Plan
Sheet 3 Clayton Quarry Plan
Sheet 4 Conceptual Haul Road
Sheet 5 Cross Sections A-A, B-B
Sheet 6 Cross Sections 0+00 to 6+00
Sheet 7 Cross Sections 8+00 to 14+00

Sheet 8 Cross Section 16+00
Sheet 9 Cross Sections 18+00 to 22+00
Sheet 10 Reclamation Plan
Sheet 11 Reclamation Cross Sections
Sheet 12 Reclamation Details
Sheet 13 Tree Removal Plan
Sheet 14 Slope Face Drainage and Erosion Control Plan

APPENDICES

Appendix A Statement of Reclamation Responsibility [PRC Section 2772(c)(10)]
Appendix B Site Legal Description [PRC Section 2772(c)(5)]
Appendix C Clean Water Act Jurisdictional Delineation
Appendix D Biological Resources Assessment
Appendix E Arborist Report
Appendix F Geotechnical Evaluation
Appendix G Hydrology and Water Quality Evaluation
Appendix H Runoff from Overburden Fill Areas
Appendix I Runoff from East Rim Access Road
Appendix J Revegetation Plan
Appendix K Reclamation Related Conditions of Approval [Reserved]

RECLAMATION PLAN SUMMARY

Mine Name:	Clayton Quarry
California Mine ID Number:	91-07-0004
Mine Operator:	CEMEX Construction Materials Pacific, LLC.
Mine Location:	515 Mitchell Canyon Road Clayton, CA 94517 Latitude 37.92^{o} and Longitude -121.94^{o}.
Site Contact:	Todd Nixon, Plant Manager
Contact Phone:	925.672.4900
Property Owner(s):	CEMEX Construction Materials Pacific, LLC.
Address:	2365 Iron Point Road, Suite 120 Folsom, CA 95630
Contact Person:	Oscar Frias, VP Planning & Administration – West Region
Contact Phone:	602.416.2912
Assessor Parcel(s):	122-020-007, 122-020-013
Total Parcel Size(s):	335± acres
Area to be Mined/Reclaimed:	190± acres
Type of Material to be Mined:	Diabase and Knoxville aggregates
Quantity of Material to be Mined:	23.8 million tons diabase and 4.6 million tons Knoxville
Maximum Anticipated Depth:	1,390 feet from crest to floor
Maximum Anticipated Floor Elev:	110’ mean sea level
Proposed Initiation Date:	Active and continuous since 1948
Proposed Termination Date:	2068 (anticipated)
Potential End Use(s):	Open space

CHART OF SMARA CONTENTS [PRC §2770.5]

SMARA Section		Location in Plan (e.g., Page #s)	Lead Agency Checklist
SMARA Statutes (California PRC Sections 2772, 2773 and 2773.3)			
2772(b)	Chart of contents	vi (this chart)	☐ YES ☐ NO ☐ N/A
2772(c)(1)	Operator and agent contact info	4	☐ YES ☐ NO ☐ N/A
2772(c)(2)	Quantity and type of materials	4	☐ YES ☐ NO ☐ N/A
2772(c)(3)	Initiation and termination dates	4	☐ YES ☐ NO ☐ N/A
2772(c)(4)	Maximum anticipated depth	4-5	☐ YES ☐ NO ☐ N/A
2772(c)(5)	Reclamation plan maps	5, Sheets 1-2, 10-12, and 14	☐ YES ☐ NO ☐ N/A
2772(c)(6)	Mining description and schedule	6	☐ YES ☐ NO ☐ N/A
2772(c)(7)	Proposed or potential end uses	7, Figure 4	☐ YES ☐ NO ☐ N/A
2772(c)(8)	Reclamation description	7-9, 15-39	☐ YES ☐ NO ☐ N/A
2772(c)(9)	Effect on future mining in area	9	☐ YES ☐ NO ☐ N/A
2772(c)(10)	Statement of responsibility	39, Appendix A	☐ YES ☐ NO ☐ N/A
2772(c)(11)	Lead agency requirements	40-42	☐ YES ☐ NO ☐ N/A
2773(a)	Site specific reclamation plan	1-42, Sheets 1-2, 10-12, 14	☐ YES ☐ NO ☐ N/A
2773.3	Requirements for metallic mines	N/A	☐ YES ☐ NO ☐ N/A
SMARA Regulations, Article 1, Surface Mining and Reclamation Practice (Title 14, California CCR §3500 et seq.)			
3502(a)	Reclamation objectives	3-4	☐ YES ☐ NO ☐ N/A
3502(b)(1)	Environmental setting	9-15	☐ YES ☐ NO ☐ N/A
3502(b)(2)	Public health and safety	6-7	☐ YES ☐ NO ☐ N/A
3502(b)(3)	Final slopes	15-16, Sheets 10-12, Appendix F	☐ YES ☐ NO ☐ N/A
3502(b)(4)	Borrow and settlement of fills	16-17	☐ YES ☐ NO ☐ N/A
3502(b)(5)	Disposition of old equipment	38	☐ YES ☐ NO ☐ N/A
3502(b)(6)	Stream and watershed diversions	24	☐ YES ☐ NO ☐ N/A
3503(a)	Soil erosion control	19-24, 27-29	☐ YES ☐ NO ☐ N/A
3503(b)	Water quality / watershed control	19-23, Appendix G	☐ YES ☐ NO ☐ N/A
3503(c)	Protection of fish / wildlife habitat	24-26	☐ YES ☐ NO ☐ N/A
3503(d)	Disposal of waste / overburden	24, Appendix F	☐ YES ☐ NO ☐ N/A
3503(e)	Erosion and drainage	19-23, Appendices G-I	☐ YES ☐ NO ☐ N/A
3503(f)	Resoiling	27-29, Appendix J	☐ YES ☐ NO ☐ N/A
3503(g)	Revegetation	29-38, Appendix J	☐ YES ☐ NO ☐ N/A
SMARA Regulations, Article 9, Reclamation Standards (Title 14, California CCR §3700 et seq.)			
3703	Wildlife and habitat protection	24-26, Appendix D	☐ YES ☐ NO ☐ N/A
3704	Backfill, grading and slopes	15-17, Appendix F	☐ YES ☐ NO ☐ N/A
3704.1	…for metallic mines	N/A	☐ YES ☐ NO ☐ N/A
3705	Revegetation	29-38, Appendix J	☐ YES ☐ NO ☐ N/A
3706	Water quality, drainage, runoff	19-23, Appendices G-I	☐ YES ☐ NO ☐ N/A
3707	Standards for prime agriculture	N/A	☐ YES ☐ NO ☐ N/A
3708	Standard for other agriculture	N/A	☐ YES ☐ NO ☐ N/A
3709	Equipment storage and removal	38	☐ YES ☐ NO ☐ N/A
3710	Surface / groundwater protection	19-23, Appendix G	☐ YES ☐ NO ☐ N/A
3711	Topsoil salvage and redistribution	27-29, Appendix J	☐ YES ☐ NO ☐ N/A
3712	Mine waste disposal	24	☐ YES ☐ NO ☐ N/A
3713	Drill holes and water wells	39	☐ YES ☐ NO ☐ N/A

1.0 INTRODUCTION

This Revised Reclamation Plan ("Plan" or "Revised Plan") has been prepared in support of ongoing and vested surface mining reclamation activities at the CEMEX Construction Materials Pacific, LLC. ("CEMEX" or "Operator") Clayton Quarry in Contra Costa County, California. Clayton Quarry is located at 515 Mitchell Canyon Road, on the east side of Mount Zion, approximately one-half mile south of the City of Clayton in an unincorporated portion of the County (see Figure 1, Vicinity Map, and Figure 2, Existing Conditions Aerial Photograph). Surface mining disturbances are planned on 190± acres of two parcels totaling 335± acres, with the remainder left undisturbed or reserved for other uses allowed under existing zoning (see Sheet 1, Title Sheet, and Sheet 2, Site Plan). The planned end use for Clayton Quarry is open space, providing for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow.

1.1 Plan Organization

Section 2.0 of this Plan provides an overview of reclamation activities and is generally organized around SMARA requirements, beginning with SMARA's key statutory requirements. Section 3.0 of this Plan addresses specific Contra Costa County (lead agency) requirements, where those requirements supplement or amplify the requirements covered in Section 2.0.

This Plan has been prepared pursuant to the following requirements associated with the reclamation of mined lands:

- California Surface Mining Reclamation Act of 1975, as amended (Public Resource Code §2710 et seq.) ("SMARA");
- State Mining and Geology Board implementing regulations (California Code of Regulations, Title 14, §3500 et seq.);
- Contra Costa County General Plan; and
- Contra Costa County Zoning Code, including Chapter 88-11, Surface Mining and Reclamation.

Many statutory and regulatory sections of SMARA are either presented verbatim or summarized to facilitate a better understanding of plan contents and requirements. Requirements found in Article 1 (14 CCR §3500 *et seq.*) and Article 9 (14 CCR §3700 *et seq.*) of SMARA's implementing regulations are addressed under combined resource headings where possible, to minimize duplication of plan contents. SMARA citations and standards that follow section headings in *italics* have been abbreviated.

1.2 Site History

CEMEX owns and operates the Clayton Quarry, originally developed by John J. Harrison following issuance of a quarry permit by the Contra Costa County Board of Supervisors on February 17, 1947. In 1953, the County issued a permit to transfer Harrison's mining rights to Pacific Coast

Aggregates. In 1968, Pacific Coast Aggregates obtained approval of Land Use Permit ("LUP") #363-67 (confirmed in 1983) to expand quarrying operations at the site to cover areas in use that were not covered by the original 1947 permit ("1968 Operating Permit"). In May 1981, Pacific Coast Aggregates, under its new name Lone Star Industries, filed an application for the first Reclamation Plan for Clayton Quarry, which was approved by the County as LUP #2054-81 on May 27, 1983 ("1983 Reclamation Plan"). See Figure 3, 1983 Reclamation Plan Overview.

1.3 Current Operating Entitlements and Vested Rights

Operations at Clayton Quarry are currently governed by and vested under the 1968 Operating Permit and 1983 Reclamation Plan. Once approved, this Revised Plan will replace the 1983 Reclamation Plan.

SMARA exempts a vested rights holder from the need to acquire any additional permit to mine from the local permitting agency as long as such vested rights continue and as long as no substantial changes are made in the mining operation (PRC §2776(a)). Under SMARA, a person is deemed to have a vested right if, "prior to January 1, 1976, the person has, in good faith and in reliance upon a permit or other authorization, if the permit or other authorization was required, diligently commenced surface mining operations and incurred substantial liabilities for work and materials necessary for the surface mining operations." (Id.)

The Clayton Quarry has been continuously mined for construction material aggregates since 1948. Additionally, CEMEX's predecessors obtained mine permits in 1947 and 1968 (i.e., all before the effective date of SMARA on January 1, 1976). CEMEX's vested rights include the following as documented in the 1947 Harrison permit and 1968 Operating Permit and as shown on Figure 4, Vested Mining Permits:

- Quarrying (surface mining) activities in the N.W. ¼ of Section 23, T1N, R1W, MDBM.
- Stockpiling in the S.W. ¼ of Section 14, T1N, R1W, and N.W. ¼ of Section 23, T1N, R1W, MDBM.
- Blasting and crushing in the quarry pit.
- Use of Mitchell Canyon Road to Clayton Road as a primary truck haul road.

The focus of this Revised Plan is to amend the 1983 Reclamation Plan in areas subject to CEMEX's vested mining rights to conform it to planned operations and provide for current reclamation standards to be achieved. A reclamation plan can cover an area smaller than the company's vested right area, which is the case here. A future reclamation plan amendment would be required in order to mine in the vested right area beyond the boundaries of this Revised Plan.

As demonstrated below, no "substantial changes" to CEMEX's ongoing mining operations are proposed or required as part of this Revised Plan. CEMEX proposes no increase in production levels, no change in the existing methods of mining, and no increase in the surface area subject to mining. The surface mining disturbance footprint under this Revised Plan (190± acres) is

similar to the surface mining disturbance footprint approved under the 1983 Reclamation Plan (184± acres as shown on Figure 3).

1.4 Purpose for Revised Reclamation Plan [CCR §3502(a)]

Consistent with the Surface Mining and Reclamation Act ("SMARA") Public Resources Code ("PRC") §2712, this Revised Plan has been developed to assure that:

(a) Adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses.

(b) The production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.

(c) Residual hazards to the public health and safety are eliminated.

While the purpose of this Plan is to describe reclamation activities, ongoing vested surface mining activities (e.g., drilling, blasting, excavation, and overburden handling) are also described and referenced throughout for contextual purposes.

This Plan addresses reclamation pursuant to SMARA and its implementing regulations for those areas subject to CEMEX's vested mining rights including under the 1968 Operating Permit. Consistent with PRC §2773(a), this Plan is specific to these properties and based upon the character of the site and surrounding areas. Site-specific performance standards are included for evaluating compliance with this Plan.

This Plan has specifically been developed to provide a feasible and environmentally superior replacement to the original 1983 Reclamation Plan for Clayton Quarry and to accomplish the following objectives:

1. Complete reclamation over an anticipated period of 50 years (including monitoring) to a post-mining land use of open space;
2. Facilitate reduction of the surface mining footprint that leaves the east rim of the quarry intact, providing visual buffer between the quarry and view sheds to the east;
3. Create permanent overburden fill areas to be revegetated with an appropriate California native grassland or chaparral seed mix;
4. Establish final grading contours reflecting a maximum depth of excavation at elevation 110' msl with finish slope angles that achieve adequate factors of safety;
5. Establish a final drainage plan that provides for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow that conveys stormwater to natural drainage courses and man-made drainage facilities;

6. Facilitate revegetation of the quarry east rim, overburden fill areas and processing plant site to a combination of chaparral and grassland habitats that feature California native seed mixes;
7. Eliminate requirements to backfill, grade, and compact the quarry floor and benches, given that the planned open space end use will provide for a future quarry lake;
8. Clarify pre-1976 (pre-SMARA) disturbance areas, including any areas disturbed outside the boundaries of the 1983 Reclamation Plan;
9. Remove facilities, structures and equipment associated with mining; and
10. Achieve current State reclamation standards during reclamation.

This Revised Plan is conceptually depicted on Figure 5, 2020 Reclamation Plan Overview.

2.0 SURFACE MINING AND RECLAMATION ACT REQUIREMENTS

2.1 Description of Mining Operations

2.1.1 Name and Address of Operator and Agent [PRC §2772(c)(1)]

Owner / Operator:

CEMEX Construction Materials Pacific LLC
2365 Iron Point Road, Suite 120
Folsom, CA 95630

Contact: Oscar Frias, VP Planning & Administration – West Region
Telephone: 602.416.2912
Email: oscar.frias@cemex.com

2.1.2 Quantity and Type of Mineral to be Mined [PRC §2772(c)(2)]

The quarry will produce an anticipated 23.8 million tons (11.9 million cubic yards at approximately 2 tons per cubic yard) of quarried diabase and an anticipated 4.6 million tons (2.8 million cubic yards at 1.65 tons per cubic yard) of Knoxville materials, for a total of 28.4 million tons.

2.1.3 Initiation and Termination Dates [PRC §2772(c)(3)]

Surface mining operations are active and have been continuous since 1948. Supplemental information provided to the County in support of the 1983 Reclamation Plan estimated a termination date of 120 years, which would correspond to year 2101. However, under this Revised Plan, a revised estimated date of termination is 47 years from the date of approval. Assuming an approval date of May 1, 2021, the surface mining operation would have an estimated termination date of April 30, 2068.

2.1.4 Maximum Anticipated Depth of Mining [PRC §2772(c)(4)]

The maximum anticipated depth of the surface mining operation is 1,390 feet from the crest of the quarry to the planned pit floor, or to elevation ±110' msl (see Sheet 3, Clayton Quarry Plan, and Sheet 8, Cross Section 16+00). Actual depths may vary depending on geologic and market conditions.

For information purposes, the anticipated depth to the pit floor from the approximate midpoint of the quarry east rim at elevation 820' msl is 710 feet.

2.1.5 Reclamation Plan Map Requirements [PRC §2772(c)(5)]

Size, Legal Description, and Owners of Surface and Mineral Interests [PRC §2772(c)(5)(A)]

See Sheet 1 and Appendix B, Site Legal Description.

Property Lines, Setbacks, and Reclamation Plan Boundary [PRC §2772(c)(5)(B)]

See Sheets 1, 2, 3 and 10. The Reclamation Plan boundary encompasses ±190 acres on two assessor parcels (APNs 122-020-007 and 122-020-013) totaling ±335 acres in size, with the remainder of the site left undisturbed. No specific setback requirements are applicable or shown.

Existing and Final Topography [PRC §2772(c)(5)(C)]

See Sheets 2 through 11.

Geologic Description [PRC §2772(c)(5)(D)]

See Figure 6, Site Geology Map. The contact between the diabase and Knoxville geologic formations is represented by the strike and dip lines shown on Sheets 2 through 9.

Railroads, Utilities, Access, and Roads [PRC §2772(c)(5)(E)]

See Sheets 1, 2, 3, 4 and 10. No railroads are located in the vicinity of the quarry.

Preparation by Licensed Professionals As Required [PRC §2772(c)(5)(F)]

Sheets 1 through 14 have been prepared and stamped by Karen Spinardi (Spinardi Associates), a California-licensed engineer.

2.1.6 Mining Description and Time Schedule [PRC §2772(c)(6)]

Mining Methods and Equipment Use

Mining operations will continue as a single phase open-pit quarry with benches (see Sheet 3 and Sheets 5 through 9, Cross Sections). Quarrying generally begins near the top of the slope,

progressing downward towards the quarry floor. Benches will continue to be constructed for access and safety purposes.

In order to reach marketable reserves, overburden is removed and either sold, placed in designated overburden fill areas or used as backfill in the quarry. Overburden is generally removed using conventional scrapers, haul trucks, bulldozers, front-end loaders and excavators. Motor graders, water trucks and various service vehicles provide support as needed.

Mining of marketable diabase (harder, more competent rock) requires blasting. Blasting has been a standard practice at Clayton Quarry for decades. Explosives used for blasting are standard commercial products specifically designed for quarry applications. The transportation, storage, and handling of explosives and blasting agents will continue to be performed by licensed individuals in accordance with applicable County, State, and Federal regulations. The design of blasting configurations (i.e., drill-hole pattern, diameter, depth, explosive type, quantities, and delay systems) varies depending on the location of the blast, rock conditions, and purpose of the blast.

After blasting, excavators and front-end loaders are used to load quarry pit-run into haul trucks. The haul trucks transport mined materials to the processing plant where they are screened, washed and crushed for use in construction materials. To facilitate truck transport, a haul road exists and will continue to be developed toward the pit-bottom as quarrying progresses (see Sheet 4, Conceptual Haul Road Plan). The haul road may need to be reconfigured as quarrying progresses based on geologic and operating conditions observed in the field at the time. In addition, and at the Owner's discretion, primary crushing and conveyor belts may be used as a substitute for haul trucks in the future.

Schedule for Completion of Mining and Commencement of Reclamation

Mining will continue to progress in a manner that will allow for reclamation to be initiated at the earliest possible time on those portions of mined lands that will not be subject to further disturbance by the surface mining operation. For example, many of the benches near the top of the quarry that will not undergo further mining have already been reclaimed and planted with pine trees. To the extent feasible, slope contouring and revegetation of the overburden fill areas will occur concurrent with ongoing quarrying activities. Final reclamation activities (including equipment removal) will begin after surface mining activities are terminated, currently estimated at 47 years from approval of this Revised Plan in 2068.

At the Owner's option, a portion of the quarry pit may be partially backfilled with overburden or left at the final mining elevation and allowed to form a quarry lake. See Sheet 10, Reclamation Plan, and Sheet 11, Reclamation Cross Sections, for details.

2.1.7 Public Health and Safety (Exposure) [CCR §3502(b)(2)]

Implementation of this Revised Plan will not jeopardize public health and safety. Clayton Quarry is located on private property owned by CEMEX. The public is neither presently allowed on the

site, nor will be during mining or reclamation activity. Safety measures such as fencing, signs, and setbacks are implemented as necessary to ensure public safety. In addition, haul roads leading to the pit bottom (generally sloped at a 10 to 12 percent grade) may be left in place for post-reclamation access and safety, providing a gradually sloped emergency exit ramp from the future quarry lake (see Sheet 10). All visitors to the site are asked to sign-in and undergo site-specific safety training as appropriate.

2.2 End Land Use

2.2.1 Proposed or Potential End Uses [PRC §2772(c)(7)]

The 1983 Reclamation Plan called for a range of potential subsequent end uses, including high density residential, residential, business park, industrial park or grazing land, with the final determination more properly left to the discretion of the property owner.

Under this Revised Plan, the quarry has a planned end use of open space, providing for the quarry pit to slowly fill with stormwater to form a quarry lake with a controlled outflow. An open space end use is compatible with the site's surroundings, such as the adjacent grassland and chaparral habitats of Mt. Zion and Mt. Diablo.

In addition to the planned open space end use, following reclamation sign-off the Owner may elect to return the site to other uses that are allowed under the current zoning designations for the site. For example, overburden fill areas that are revegetated with grassland habitats could support pasture, which is allowed under current zoning.

The owner's acknowledgment of the potential end uses is evidenced by the execution of the statement of reclamation responsibility found at the end of this Revised Plan (see Appendix A, Statement of Reclamation Responsibility).

2.2.2 Reclamation Measures Adequate for the End Use [PRC §2772(c)(8)]

As further detailed later in this Plan, reclamation will generally be conducted in the following manner to support the planned end use of open space:

All Areas

1. Remove facilities, structures and equipment associated with mining. The following may be left in place to facilitate the planned end use: fencing, perimeter and screening berms, quarry haul roads, and site access roads.
2. Implement best management practices as needed to minimize erosion and sedimentation pursuant to applicable standards.
3. Collect and dispose of any incidental refuse or garbage in accordance with applicable standards.

Quarry Pit

4. Contour final reclamation slope angles to achieve adequate factors of safety.
5. Install light-class rip-rap on Knoxville slope faces in the east rim of the quarry that may come in contact with water in the future quarry lake to minimize against the effects of wave erosion (see Sheet 14).
6. For the Knoxville slope faces in the quarry east rim that do not receive rip-rap treatment, rip, disc and/or scarify as needed to relieve compaction and remove rills or other surface irregularities.
    - Where slopes are too steep to rip without causing slides, use a bulldozer to track-walk the slope vertically in order to roughen the surface.
7. After substrate preparation on the Knoxville slope faces, hydroseed with a California native chaparral seed mix, compost and mulch as specified in the revegetation plan.
8. Install adequate drainage controls along the east rim access road and segment of the upper quarry haul road constructed in Knoxville materials (e.g., cross slopes, rock-lined ditches and rock slope protection swales) to direct precipitation and runoff from Knoxville slopes to the diabase benches in the pit (see Sheet 14).
9. Install drainage outflow structure and pipeline with an invert elevation of 735' msl to control drainage from the future quarry lake and direct it to existing drainage courses off-site (see Sheets 10 and 12).

Overburden Fill Areas

10. Place overburden that is not otherwise sold as product or used in reclamation in designated overburden fill areas.
11. Prior to placing overburden in designated fill areas, salvage the top 18 inches of topsoil for stockpiling or immediate use in reclamation, separate from other overburden materials.
12. Contour final reclamation slope angles to achieve adequate factors of safety.
13. Prior to resoiling, rip, disc and/or scarify fill areas as needed to relieve compaction and remove rills, ruderal vegetation, or other surface irregularities.
14. As the fill areas reach capacity, redistribute topsoil in preparation for revegetation.
15. After resoiling, hydroseed with a California native grassland seed mix and mulch.

Plant Site and Haul Road

16. Dismantle and remove processing plant equipment and associated structures that will not remain to support the open space end use.
17. Prepare substrate and re-soil in the manner described in Section 2.8, Resoiling, subsection "Resoiling – Plant Site."

18. Following substrate preparation, and based on the findings of the soil scientist, apply one of the following revegetation methods:
    - If suitable mineral subsoil is exposed at the plant site, then hydroseed with a California native grassland seed mix, compost and mulch.
    - If augmented overburden materials must be applied to the surface, then hydroseed with a California native chaparral seed mix, compost and mulch.
19. Install a tree screen along the east side of the east rim access road consisting of 400 foothill pine plantings. Irrigation is not required.

2.2.3 Impact of Reclamation on Future Mining in the Area [PRC §2772(c)(9)]

Implementation of this Revised Plan will not preclude future mining in the area. In fact, the existing footprint of the Clayton Quarry is surrounded on at least three sides (north, south and west) by competent diabase that can be mined, processed and used in various construction applications.

2.3 Environmental Setting [CCR §3502(b)(1)]

2.3.1 Assessor Parcels, Zoning and General Plan Designations

Clayton Quarry Assessor Parcel Numbers, County Zoning and County General Plan land use designations are shown on Table 1, below.

TABLE 1
ASSESSOR PARCELS, ZONING AND GENERAL PLAN DESIGNATIONS

APN	Acres (approx.)	Zoning	General Plan
122-020-007	154	General Agricultural District (A-2)	Agricultural land
122-020-013	181	General Agricultural District (A-2)	Agricultural land
Total:	**335**		

The Contra Costa County General Plan recognizes Clayton Quarry as a significant mineral resource area that is to be protected.

See also Appendix B, Site Legal Description.

2.3.2 Access and Utilities

Access roads, waterways and utilities are shown on Sheet 2. Access to Clayton Quarry is provided via a driveway along Mitchell Canyon Road. Existing utilities include power, sewer and water. There are no railroads on or in proximity to the lands to be reclaimed. Site access and roads that will remain to facilitate the planned end use are shown on Sheet 10.

2.3.3 Geology

The geology of the site is shown on Figure 6, Site Geology Map. Mineral resources consist primarily of diabase rock types found in the Mt. Diablo Ophiolite. The Mt. Diablo Ophiolite is a local name for the Coast Range Ophiolite, a sequence of rock that formed during the Jurassic Period in the ocean at a submarine spreading center. The Mt. Diablo Ophiolite is comprised of two primary rock types: diabase and basalt. The Knoxville formation, comprised of marine sediments, makes contact with the diabase at the east rim of the Quarry (Golder 2017).

2.3.4 Soils

The Natural Resources Conservation Service has mapped the following soil units on the Project site (see Figure 7, Site NRCS Soils Map):

Quarry:

- Qa Quarry
- Re Rock outcrop-Xerorthents associations
- GcF Gilroy clay loam, 30 to 50 percent slopes
    - *H1: 0 to 15 inches: clay loam*
    - *H2: 15 to 29 inches: clay loam*
    - *H3: 29 to 40 inches: very gravelly clay loam*
    - *H4: 40 to 44 inches: unweathered bedrock*

Fill Area:

- GcF Gilroy clay loam, 30 to 50 percent slopes
    - *H1: 0 to 15 inches: clay loam*
    - *H2: 15 to 29 inches: clay loam*
    - *H3: 29 to 40 inches: very gravelly clay loam*
    - *H4: 40 to 44 inches: unweathered bedrock*
- LhE Los Osos clay loam, 15 to 30 percent slopes
    - *H1 - 0 to 10 inches: clay loam*
    - *H2 - 10 to 32 inches: clay*
    - *H3 - 32 to 36 inches: weathered bedrock*
- PaD Perkins gravelly loam, 9 to 15 percent slopes
    - *H1 - 0 to 19 inches: gravelly loam*
    - *H2 - 19 to 60 inches: gravelly clay loam*

Plant site:

- PaC Perkins gravelly loam, 2 to 9 percent slopes
    - *H1 - 0 to 19 inches: gravelly loam*
    - *H2 - 19 to 60 inches: gravelly clay loam*
- GcE Gilroy clay loam, 15 to 30 percent slopes
    - *H1 - 0 to 15 inches: clay loam*
    - *H2 - 15 to 29 inches: clay loam*

- *H3 - 29 to 40 inches: very gravelly loam*
- *H4 - 40 to 44 inches: unweathered bedrock*

2.3.5 Seismicity

The Clayton Quarry is located in a seismically active area of California. A review of fault data from the United States Geological Survey indicates that the site is located within 10 miles of the active Calaveras and Green Valley Faults. The site is also located about 17 and 35 miles from the Hayward and San Andreas Faults, respectively.

2.3.6 Hydrology

Surface Waters and Drainage

The area in the vicinity of the quarry is drained by Mitchell Creek, an intermittent stream trending to the north-northeast, and draining the northwest-slopes of Mount Diablo and the east side of Mount Zion (see Figure 2).

For the purpose of managing stormwater drainage, Contra Costa County is divided into numerous drainage areas. The quarry and part of the processing plant site are located in Drainage Area 71. The neighborhood to the east of the plant site entrance (aka "Diablo Downs") is located in Drainage Area 71A. The north side of Mt. Zion, the northwestern part of the plant site, and the open field north of the plant site are located within Drainage Area 96.

Under existing conditions, the site generally drains as follows:

1. Water enters the quarry pit from direct precipitation, runoff from the watershed above and abutting the quarry, and springs that are present in the lower part of the quarry pit;
    - Water that collects in the quarry pit is currently pumped and used for processing operations and dust control. The quarry pit functions as an effective internal basin that contains storm water.
2. Portions of the quarry east rim access road, processing plant site, and open field to the north of the plant site drain to existing storm sewers in the City of Concord in Drainage Area 96; and
3. Sheet flow from the existing overburden fill areas and grasslands on the east side of the quarry drain to a roadside ditch along Mitchell Canyon Road and then either into Mitchell Creek in Drainage Area 71 or storm drains in Drainage Area 71A.

Groundwater

The quarry is unlikely to encounter significant groundwater or intersect a regional aquifer (Golder 2017). The diabase in the quarry consists of dense igneous rock with very low porosity and hydraulic conductivity. Groundwater, where encountered in such rocks, occurs only in fractures and results from surface water seeping into fractures in the rock mass on the slopes of Mount

Zion. The quarry is located approximately 1,800 feet to the west of Mitchell Creek, and Mitchell Creek is underlain by a different geologic unit (Alluvium). Geologic maps of the area do not indicate any faults or other geologic structures that might intercept surface water flowing in Mitchell Creek or act as conduit for groundwater flow into the quarry.

Regulated Wetlands and Waters

LSA Associates, Inc. ("LSA") prepared a jurisdictional wetland delineation for undeveloped portions of the site that may be subject to future surface mining disturbances (see Appendix C, Clean Water Act Jurisdictional Delineation). LSA identified one unnamed ephemeral channel in the footprint of the southern overburden fill area on parcel APN-122-020-013. The channel is 300 feet long, covers 1,800 square feet, and flows into a constructed debris basin that lacks any evidence of ponding and does not support a wetland plant community. No other jurisdictional wetlands or waters were identified. LSA's delineation was verified by the U.S. Army Corps of Engineers ("USACE") in January 2016.

2.3.7 Vegetation and Wildlife

Vegetation

LSA prepared a biological resources assessment for the site in March 2017, which was revised in June 2020 following a County peer review (see Appendix D, Biological Resources Assessment). Based on LSA's findings, undeveloped portions of the site support vegetation characteristic of Mount Diablo, including grassland, chaparral, oak woodland and ruderal/disturbed. LSA also conducted a tree survey for the overburden fill areas in May and June 2015 and produced a revised report in June 2020 (see Appendix E, Arborist Report).

Each of the biological communities present on site are described below:

> Grassland. Non-native grasslands cover most of the flatter areas of the site. Plant species composition within the non-native grassland is dominated by introduced annual grasses and broadleaf forbs. Common grass species include wild oats (*Avena barbata* and *A. fatua*), soft chess (*Bromus mollis*), and ripgut brome (*Bromus diandrus*). Common introduced broadleaf species include black mustard (*Brassica nigra*), filaree (*Erodium cicutarium*) and Italian thistle (*Carduus pycnocephalus*). Foothill needlegrass (*Stipa lepida*) and California melic (*Melica californica*) are two native grasses that grow along the margins of chaparral stands. Ithurial's spear (*Triteleia laxa*), a native wildflower, is also present. Very few other native species occur in the grassland and only in small numbers.
>
> Chaparral. Stands of chaparral are present on steeper slopes. The chaparral vegetation type is composed of several shrub species which form a dense cover with little or no understory vegetation. Black sage (*Salvia mellifera*) is often the dominant species with California sagebrush (*Artemisia californica*) sticky monkeyflower (*Mimulus aurantiacus*) and yerba santa (*Eriodictyon californicum*) present around the margins of the chaparral.

Deer weed (*Lotus scoparius*), an herbaceous perennial, grows in openings and along the margins of the chaparral.

Woodland. Oak woodland stands are present on slopes. The dominant trees are blue oak (*Quercus douglasii*) and valley oak (*Quercus lobata*). Grass species, similar to those found in the non-native grassland, are present in the understory. Coast live oak (*Quercus agrifolia*) is the dominant tree in some areas, with some California buckeye (*Aesculus californica*) and blue elderberry (*Sambucus mexicana*) also present. In some areas the dominant tree is gray pine (*Pinus sabiniana*).

Ruderal/disturbed. Much of the site has been disturbed by previous quarry activities, including previous overburden fill disposal. A variety of weedy species which have colonized these sites form a ruderal/disturbed vegetation type.

Wildlife Habitat

Based on LSA's findings, wildlife species are found in association with the vegetation cover types that fulfill their requirements for food, water and cover. Depending on the species and their specific habitat requirements, an animal may use several vegetation cover types or just one.

Wildlife associations with the three primary vegetation communities are described below:

Non-native grassland. Common wildlife species that depend primarily on grasslands include Botta's pocket gopher, California meadow mouse, western harvest mouse, western meadowlark and lark sparrow. Species which move regularly between the grassland and adjacent habitats include brush rabbits and western bluebirds. Although they do not depend solely on it, larger mammals and birds also regularly use the grassland for hunting or feeding. This group includes bobcat, coyote, black-tailed deer, American kestrel, redtailed hawk and great horned owl. Reptiles likely to be found in the grassland include the western fence lizard, California kingsnake, gopher snake and western yellow-bellied racer.

Chaparral. Bird species found primarily within the chaparral include wrentit, Bewick's wren, blue-gray gnatcatcher and spotted towhee. These species remain within the shrubs, only occasionally moving into adjacent areas. Other bird species regularly move between the chaparral and adjacent grasslands or woodlands. This group includes Anna's hummingbird, scrub jay, bushtit, California towhee, dark-eyed junco, white-crowned and goldencrowned sparrows. Larger mammals, including bobcat, coyote, gray fox and deer, use the chaparral for rest and cover. A variety of small mammals are also found in the chaparral. They include brush rabbit, deer mouse, and striped skunk. Expected reptiles include western fence lizard, southern alligator lizard, western rattlesnake and Alameda striped racer.

Woodland. The oak woodland supports a variety of bird species that favor deciduous oaks. These species include acorn woodpecker, Nuttall's woodpecker, ash-throated

flycatcher, oak titmouse, whitebreasted nuthatch, western bluebird and Bullock's oriole. A variety of other bird species depend on the oaks for roosting, nesting, and feeding. The natural and excavated cavities which are present are important nest sites. Acorns are a food source for a variety of bird and mammal species.

Special Status Species

Based on the results of LSA's June 2020 biological resources assessment (Appendix D), the following special status species are known to occur or may have potential to occur on site (federally endangered, federally threatened, California endangered, and California threatened species are denoted as "FE", "FT", "CE", and "CT", respectively):

Plant Species

1. Bent-flowered fiddleneck (*Amsinckia lunaris*)
2. Mount Diablo manzanita (*Arctostaphylos auriculata*)
3. Contra Costa manzanita (*Arctostaphylos manzanita* ssp. *laevigata*)
4. Big tarplant (*Blepharizonia plumosa*)
5. Round-leaved filaree (*California macrophylla*)
6. Mt. Diablo fairy lantern (*Calochortus pulchellus*)
7. Hospital Canyon larkspur (*Delphinium californicum* subsp. *interius*)
8. Mt. Diablo buckwheat (*Eriogonum truncatum*)
9. Fragrant fritillary (*Fritillaria liliacea*)
10. Toren's grimmia (*Grimmia torenii*)
11. Diablo helianthella (*Helianthella castanea*)
12. Showy madia (*Madia radiata*)
13. Hall's bush mallow (*Malacothamnus hallii*)
14. Woodland wooly threads (*Monolopia gracilens*)
15. Lime Ridge navarretia (*Navarretia gowenii*)
16. Rock sanicle (*Sanicula saxatilis*)
17. Chaparral ragwort (*Senecio aphanactis*)
18. Mt. Diablo jewel-flower (*Streptanthus hispidus*)
19. Oval-leaved viburnum (*Viburnum ellipticum*)

Animal Species

1. California red-legged frog (*Rana draytonii*) **FT**
2. Burrowing owl (*Athene cunicularia*)
3. Golden eagle (*Aquila chrysaetos*) (CDFW Fully Protected)
4. American peregrine falcon (*Falco peregrinus*) (CDFW Fully Protected)

5. White-tailed kite (*Elanus leucurus*) (CDFW Fully Protected)
6. Crotch bumble bee (*Bombus crotchii*)
7. Western bumble bee (*Bombus occidentalis*)
8. Ring-tailed cat (*Bassariscus astutus*) (CDFW Fully Protected)
9. Alameda striped racer (aka "whipsnake") (*Coluber constrictor lateralis*) **FT, CT**
10. Coast horned lizard (*Phrynosoma blainvillii*)
11. San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)
12. Pallid bat (*Antrozous pallidus*)
13. Townsend's big-eared bat (*Corynorhinus townsendii*)

2.4 Effect on Surrounding Land Uses [CCR §3502(b)(1)]

2.4.1 Surrounding Land Uses

Predominant land uses in the vicinity of the Project include mining, open space, parks and residential. To the west, the site is bound by open space (the top of Mt. Zion) and the Lehigh Hanson Aggregates Kaiser Quarry. To the south and east the quarry is bound by open space lands and the Mt. Diablo State Park. Mitchell Canyon Road and Mitchell Creek are also located east of the quarry. To the north and northeast, the CEMEX property is bound by existing residential communities in the City of Concord and unincorporated Contra Costa County.

2.4.2 Effect that Reclaimed Site Conditions May Have on Surrounding Land Uses

Reclamation to the planned end use of open space is not anticipated to affect existing and future uses of surrounding lands. An open space end use is compatible with the underlying zoning of the site and surrounding properties. In addition, the ultimate quarry lake will contain and slowly release stormwater runoff and could be used (e.g., by Cal Fire) as a valuable water source for regional fire suppression.

2.5 Slope Stability and Disposition of Fill Materials

2.5.1 Final Slopes; Slope Angles Flatter than Critical Gradient [CCR §3502(b)(3)]

CCR §3704(f). *Final cut slopes have minimum factor of safety for end use and conform with surrounding topography and/or approved end use.*

Golder Associates Inc. ("Golder") prepared a geotechnical evaluation in support of this Revised Plan in May 2017 (see Appendix F, Geotechnical Evaluation).

Golder concludes that the cut slope and bench configurations shown in Table 2 will be stable with adequate factors of safety for the planned end use:

TABLE 2
SLOPE AND BENCH CONFIGURATIONS

Rock Type	Bench Face Slope	Bench Height	Catch Bench Width
Knoxville Formation	1H:1V (45 degrees)	60 feet	30 feet
Knoxville/Diabase Contact	Vertical (90 degrees)	60 feet	60 feet
Diabase	Vertical (90 degrees)	60 feet	30 feet

As the diabase benches approach the Knoxville/diabase contact in the southern portion of the quarry, the bench width will be gradually tapered to a width of 90 feet from its regular 30 foot bench width configuration. The bench height and bench face angle of the diabase is intended to stay the same as it approaches the Knoxville contact. The contact is on an inclined plane and the precise location of the contact may vary in the field. The diabase to diabase/Knoxville transition concept is illustrated on Sheet 5, Detail 1 and on Figure 8, Knoxville-Diabase Transition Concept.

2.5.2 Fill Slopes and Compaction Standards

CCR §3502(b)(4). *Disposition of fill materials considered. Foundation fills for end use in conformance with good engineering practice.*

CCR §3704(a). *For urban use, fill compacted in accordance with UBC, local grading ordinance, or other methods approved by the lead agency.*

CCR §3704(b). *For resource conservation, compact to standard for that end use.*

CCR §3704(d). *Final reclamation fill slopes not exceed 2:1, except when allowed by site-specific engineering analysis, and can be revegetated.*

CCR §3704(e). *At closure, final landforms of fills conform with surrounding topography and/or approved end use.*

Although backfills for urban, structural and resource conservation uses are not planned, Golder did specifically evaluate the existing (north) and planned (south) overburden fill areas (see Appendix F). Golder's evaluation includes the planned slope stabilization improvements to the existing north overburden fill area between the quarry and Mitchell Canyon Road. Reclamation fill slopes will not exceed 2H:1V and will be compatible with the open space end use once revegetation prescribed in this plan is complete.

North Overburden Fill Area (Existing)

The existing north overburden fill area experienced slope instability in March 2016 in response to heavy rainfall, and based on available records, likely represented a renewed failure of a landslide that occurred in 2000. Based on a design prepared by Golder, the existing north

overburden fill area was improved in 2017 with construction of a shear key in the form of a gravity buttress between the Quarry haul road and Mitchell Canyon Road (as shown on Sheets 2 and 10, and detailed in Appendix F). This improvement was authorized under Contra Costa County Building Permit BIG16-011287 and was designed to accommodate additional fill placement under the guidance of Golder. Additional work is underway to expand the shear key to improve stability of the north fill area and accomplish a more aesthetic profile for the buttress fill, pursuant to Contra Costa County Building Permit BIG20-003645. This work is anticipated to be completed in 2021.

South Overburden Fill Area (Planned)

Golder also evaluated the future south overburden fill area and provided recommendations for fill area construction (see Appendix F). Golder concluded the following with respect to the south overburden fill area:

1. Proposed overburden fill slopes of 2.5H:1V have adequate factors of safety; and
2. Foundation conditions in the proposed overburden fill area (native slopes east-southeast of the quarry) appear suitable for the proposed fills provided that design of the fills incorporate Golder's recommendations.

CEMEX will implement Golder's recommendations contained in Appendix F. Specific to compaction, Golder recommends that fill be compacted to a maximum relative compaction of at least 85 percent and at a moisture content of between -1 and +4 percent of the optimum moisture content. Golder anticipates that wheel-rolling and/or track-walking should provide sufficient compactive effort to obtain the specified density.

Quarry Floor

At CEMEX's option, overburden may also be placed as backfill in portions of the quarry pit once final mining grades are achieved. Since the planned end use for the quarry is open space, providing for the quarry to slowly fill with stormwater to form a quarry lake, no specific compaction specifications are necessary.

2.6 Hydrology and Water Quality

2.6.1 Surface and Groundwater Quality Protected in Accordance with Porter-Cologne and Clean Water Acts [CCR §3710(a)]

CCR §3706(a). *Mining and reclamation to protect downstream beneficial uses.*

CCR §3706(b). *Water quality, recharge, and groundwater storage that is accessed by others shall not be diminished, except as allowed by plan.*

CCR §3503(b)(2). *Substantially prevent siltation of groundwater recharge areas.*

While surface mining activities will not be conducted in surface waters or groundwater, the site is subject to storm water events and surface water discharges. Accordingly, the Operator will continue to comply with its National Pollutant Discharge Elimination System ("NPDES") Industrial Storm Water General Permit requirements, including implementation of its Storm Water Pollution Prevention Plan ("SWPPP") with Best Management Practices ("BMPs") to control erosion, sedimentation, and pollution during surface mining and reclamation activity.

In addition, EMKO Environmental, Inc. ("EMKO") conducted a hydrologic evaluation in support of this Revised Plan in May 2017, which was revised in May 2020 following a County peer review (see Appendix G, Hydrology and Water Quality Evaluation). EMKO evaluated existing hydrologic conditions, post-reclamation water quality, water levels and discharges from the reclaimed quarry (once it forms a quarry lake), and potential effects on downstream uses.

The primary source of water for the quarry lake will be local rainfall, including rain that falls on the quarry lake and runoff that occurs from the surrounding watershed and the exposed quarry walls. Due to the general lack of groundwater within the hardrock formations, the post-mining water quality in the quarry lake will primarily be affected by the leaching of the minerals from the underlying geologic formations in the runoff from the surrounding watershed (mostly diabase). To evaluate the potential for minerals to leach into rainwater, EMKO conducted leaching tests on samples collected at the Clayton Quarry in 2014. The crushed diabase sample consisted of material that had been mined and then crushed around the date the sample was collected, representing a composite sample of the active mining area at that time. The samples were leached using deionized water following the Waste Extraction Test protocols, commonly referred to as a DI-WET test. Overall, the results from the DI-WET test are considered to be indicative of the effects geologic materials may have on the quality of transient waters such as rainfall runoff. On the basis of those tests, EMKO's 2017 water quality evaluation concluded that the concentration of dissolved solids in the future quarry lake would remain well below applicable water quality standards.

Subsequent to the original round of sampling and analysis, CEMEX has more recently observed several zones within the quarry that consist of carbonate veining and minor sulfide mineralization (i.e. pyrite). The presence of the zones of calcareous veining and sulfide mineralization were not known in 2014. Preliminary literature review by EMKO and CEMEX suggests that localized oxidation of the pyrite is being neutralized by the calcareous veins, such that acid rock drainage ("ARD") is not occurring. However, neutralization of oxidized pyrite could cause chemical reactions that could elevate concentrations of sulfate, calcium, and magnesium along with elevated total dissolved solids (TDS) levels in the runoff water. Given the duration of the proposed mining activities at the quarry (anticipated until 2068), and the long timeframe after reclamation for the quarry lake to form, it is not possible with the existing data, or with data from the existing diabase exposures in the quarry, to reliably determine the water quality in the reclaimed quarry lake and assess whether or not water quality standards would potentially be exceeded in the future. The rock exposures in the current walls and floor of the quarry are not the same as those that will exist once mining is completed, except for part of the west diabase highwall.

Accordingly, EMKO has recommend an adaptive management program to be implemented at the time of reclamation that includes monitoring, comparison of monitoring results with action levels, and subsequent implementation of corrective measures if the action levels are exceeded. Quarry lake water quality sampling would begin once mining is completed and water begins to accumulate within the bottom of the excavation. Specific corrective measure would depend on the nature of the underlying exceedance, but if necessary might include for example aeration or mechanical circulation of the water in the quarry lake, or treatment using ion-exchange. CEMEX anticipates that implementation of this adaptive management strategy will become a County condition of approval of this Plan, following review of this Plan pursuant to CEQA. CEMEX will append any permit conditions of approval and CEQA mitigation measures that relate to reclamation of mined lands to this approved Plan, pursuant to PRC Section 2772.1(b)(7)(B). Appendix K, Reclamation Related Conditions of Approval [Reserved], is included as a placeholder for this purpose.

Regarding potential effects on groundwater aquifers, EMKO's evaluation concludes that no mining occurs in surface waters or geologic materials that form aquifers that are the source of water for domestic, agricultural or other uses. While a few small seeps have been observed near the base of the current quarry, the water within the fractures is interpreted by EMKO as percolation of local rainfall from within the watershed of the quarry.

In sum, EMKO concludes that this Revised Plan, with implementation of the adaptive management program described above, does not have the potential to adversely affect water quality, recharge potential, or storage capacity of ground water aquifers.

2.6.2 Drainage, Sediment and Erosion Control [PRC §2773(a)]

CCR §3503(a)(3). *Erosion control facilities constructed and maintained where necessary.*

CCR §3503(b)(1). *Settling ponds used where they will provide significant benefit to water quality.*

CCR §3503(e). *Grading and revegetation to minimize erosion and convey surface runoff to natural drainage courses or interior basins. Spillway protection.*

CCR §3706(c). *Erosion and sedimentation controlled during all phases of construction, operation, reclamation, and closure of surface mining operation to minimize siltation of lakes and water courses per RWQCB/SWRCB.*

CCR §3706(d). *Surface runoff and drainage controlled to protect surrounding land and water resources. Erosion control methods designed for not less than 20 year/1 hour intensity storm event.*

CCR §3706(e). *Altered drainages shall not cause increased erosion or sedimentation.*

This Revised Plan is designed to control the potential for erosion and sedimentation and convey surface runoff to interior basins (e.g., the quarry pit) and natural drainage courses (in the City of

Concord and unincorporated Contra Costa County). The Operator will comply with the requirements of its SWPPP, including BMPs to control erosion, sedimentation, and pollution during surface mining and reclamation activities. The Operator will also obtain a drainage permit as required by Contra Costa County and its Flood Control and Water Conservation District.

Drainage, erosion and sediment controls are discussed below for each of the following areas:

- Quarry pit (future quarry lake);
- Overburden fill areas;
- Processing plant site; and
- East rim access road / quarry haul road.

In addition, and at the request of the County, this section addresses the potential for drainage resulting from a landslide-generated wave.

Drainage - Quarry Pit

Under existing conditions, water enters the quarry pit from direct precipitation, runoff from the watershed above and abutting the quarry, and springs that are present in the lower part of the quarry pit. Water that collects in the quarry pit is currently pumped and used for processing operations and dust control. The quarry pit will continue to function as an effective internal basin that contains storm water. The quarry pit will contain water during periods of runoff (surface runoff and sidewall seepage), minimizing peak flow discharges from the site during the rainy season.

This Revised Plan provides for the reclaimed quarry pit to slowly fill with stormwater to form a quarry lake, with a design pipe outflow structure at the northeast corner of the pit to convey discharges from the future quarry lake to existing and man-made drainage courses in the unincorporated County (in Drainage Area 71A, which feeds into Drainage Area 71). In contrast, the original 1983 Reclamation Plan contemplated a partially backfilled quarry pit with generally uncontrolled surface runoff (sheet flow) toward Mitchell Canyon Road and ultimately Mitchell Creek via drainage infrastructure in unincorporated Contra Costa County (in Drainage Area 71).

EMKO assisted with drainage design and conducted a hydrologic evaluation in support of this Revised Plan (see Appendix G). EMKO's report includes a post-reclamation water budget/balance, evaluation of drainage under existing conditions, and evaluation of drainage from the reclaimed quarry after implementation of this Revised Plan.

With input from EMKO, CEMEX has incorporated the following quarry pit drainage design criteria in this Revised Plan (see Sheets 10 thru 12 for detail):

1. Drainage pipe outlet structure in the northeast corner of the quarry pit consisting of a bulkhead with a steel plate and notch at an invert elevation of 735' msl;

2. Pipeline (±1,800 linear feet) from the drainage pipe outlet structure to an existing 18-inch diameter storm drain pipe at Mitchell Canyon Road, on the southeast side of the existing processing plant site.
3. Pipeline maintenance from the manholes and inlet.

Based on the design criteria, EMKO estimates the following:

1. The quarry pit will take ±174 years to fill with water to the design water surface elevation of 735' msl, which amounts to a volume of ±8,520 acre-feet ("AF").
2. Once full, the reclaimed quarry pit lake will be capable of completely retaining runoff from both a 100-year, 24-hour storm event and a 20-year, 1-hour storm event, with more than 18 feet of freeboard.
3. To minimize off-site discharge volumes and the potential for erosion and sedimentation, the drainage pipe outlet structure will only allow a *maximum* quarry pit discharge rate of 6 cubic feet per second ("cfs") with two feet of head (a temporary water level of 737' msl).
    a. This maximum discharge rate is substantially less than the rate of runoff that would occur from the 100- and 20-year design storm events under existing conditions or implementation of the 1983 Reclamation Plan.

Overall, this Revised Plan substantially reduces the peak runoff from reclaimed areas by retaining runoff in the quarry and, once full, slowly releasing runoff after storm events (see Appendix G for detail). The drainage design ensures that runoff from the post-reclamation pit-lake is controlled, erosion is minimized, surface runoff is conveyed to existing drainage courses, and peak storm discharge volumes are attenuated for downstream protection.

Drainage - Overburden Fill Areas

This Revised Plan includes two design overburden fill areas (north and south) as shown on Sheet 10. The north overburden fill area is approximately 22 acres and the south overburden fill area is approximately 13 acres. The north overburden fill area has been in use since approximately the 1960s, and is being actively managed as a component of ongoing slide repair activities (discussed earlier in this Plan). Under existing conditions, the footprint of both overburden fill areas generally drains to a roadside ditch along Mitchell Canyon Road and then to Mitchell Creek in Drainage Area 71.

While the 1983 Reclamation Plan did not individually identify "overburden fill areas," the footprint of the north and south overburden fill areas was generally encompassed by the larger surface mining disturbances approved under the original plan (see Figure 3). In addition, the 1983 Reclamation Plan contemplated that the partially backfilled quarry would drain via generally uncontrolled sheet flow to Mitchell Creek in Drainage Area 71.

EMKO specifically evaluated the potential runoff from the planned overburden fill areas in support of this Revised Plan (see Appendix H, Runoff from Overburden Fill Areas). Runoff from the overburden fill areas will be conveyed to existing drainage courses and drainage facilities will be constructed to the 20-year, one-hour storm event as required by CCR §3706(d). The peak runoff from a 20-yr, 1-hr storm event from the north and south overburden fill areas is estimated at 16 cfs and 9 cfs, respectively. Runoff from these areas is planned to be conveyed to Mitchell Creek in Drainage Area 71, and will be covered by a County Drainage Permit. Runoff could also be conveyed northward to the existing storm sewers in either Drainage Area 71A (in unincorporated Contra Costa County) or Drainage Area 96 (in the City of Concord) subject to additional coordination with the County and/or City of Concord.

The north and south overburden fill areas have been designed to the following criteria to control erosion and sedimentation (as recommended by Golder in Appendix F):

1. 2.5H:1V or flatter slopes with wheel and track rolling compactive effort;
2. Slope heights under 50 feet vertical, unless interim benches are used for drainage control;
3. Use of "J-ditches" or functional equivalent where beneficial to direct drainage horizontally across fill areas to designated drainage channels;
4. Fill slopes revegetated with appropriate erosion control seed mix; and
5. Erosion control fabric, wattles and other BMPs implemented as needed to reduce erosion and improve stability of the surficial layer of soil.

Fill area construction plans will be confirmed by the project engineer prior to fill placements.

Drainage - Processing Plant Site

Under existing conditions, storm water runoff from the plant site is generally conveyed to the following features (see Figure 2 and Sheet 2):

1. On-site retention pond system where runoff is contained and used for dust control.
2. Containment pond at the north end of the plant site that outfalls to an existing storm water detention pond in the open field to the north of the plant site.
    - The detention pond feeds an existing drainage swale across the open field that conveys runoff to existing and man-made drainage courses in the City of Concord.

Under existing conditions, storm water that commingles with process waters is directed to on-site settling ponds or containment basins (used for recycling process water) through contour paving, drainage swales, berms, curbing and/or other similar controls. Storm water from the haul road area (between the quarry and plant site) is allowed to sheet flow into constructed swales that convey water to a retention pond system at the plant site where runoff is contained and used for dust control (see Sheet 2). Storm water from all other areas of the site is directed to designated storm water discharge points.

As part of final reclamation, processing equipment will be removed from the site and the area will graded (as shown on Sheet 10) and revegetated with chaparral or grassland cover. Post-reclamation runoff from the plant site will be directed to the storm water detention pond at the open field to the north, which ultimately conveys runoff to existing and man-made drainage courses in the City of Concord.

Drainage - East Rim Access Road / Quarry Haul Roads

EMKO evaluated potential runoff from the quarry east rim access road and provided preliminary parameters for cross-slopes, culverts and side-channels to prevent erosion (see Appendix I, Runoff from East Rim Access Road). Spinardi Associates designed the east rim drainage plan based on these preliminary parameters (see Sheet 14). The quarry east rim access road and upper quarry haul roads (above the Knoxville formation slopes in the east wall of the quarry) will have a one percent (1%) cross-slope toward rock-lined ditches on the west side of the roads to intercept runoff from direct precipitation. At approximate intervals of 600 linear feet, the rock-lined ditch along the east rim access road will drain to a side-entry drop inlet and discharge through a 24-inch pipe to the erosion-resistant diabase faces in the pit (below approximate elevation 625' msl). As detailed in Appendix I, these erosion control drainage facilities are designed to the 100-year, 24-hour storm, which exceed Contra Costa County design criteria (for a 10-year storm) and SMARA standards (for a 20-year, 1 hour storm). Haul roads constructed in diabase (below approximate elevation 625' msl) do not require special treatment because the diabase is not susceptible to erosion from direct precipitation or stormwater runoff.

Drainage - Potential for Landslide-Generated Wave

At the request of Contra Costa County, Golder evaluated the potential for a landslide-generated wave to overtop the northeast quarry rim (lowest point at the quarry) after a quarry lake forms, in the area of the drainage outlet structure (see Appendix F). Golder determined that potential overtopping of the quarry rim (caused by a hypothetical pit-slope failure) would be mitigated with the following design parameters incorporated in this Plan (see Sheets 10 thru 12):

- Drainage pipe outlet structure at elevation 735' msl;
- 2H:1V slope above the outlet structure that is covered with rip rap or other material to provide a high level of roughness;
- Native geologic freeboard preserved to elevation 750' msl (15 feet) above the drainage pipe outlet structure; and
- Rip-rap pile (5 feet tall, 35 feet wide) at the top of the quarry rim above the drainage pipe outlet structure.

Based on these parameters, Golder concludes that a maximum of 20 gallons of water could potentially overtop the quarry rim. This small volume of water will easily be absorbed by the rip-rap pile such that there would not be any downslope erosion (as noted by EMKO in Appendix G).

2.6.3 Contaminant Control and Mine Waste Disposal [PRC §2772(c)(8)(A)]

CCR §3503(a)(2). *Overburden stockpiles managed to minimize water and wind erosion.*

CCR §3503(d). *Disposal of mine waste and overburden shall be stable and not restrict natural drainage without suitable provisions for diversion.*

CCR §3712. *Mine waste and tailings, and mine waste disposal units governed by SWRCB/IWMB (Article 1, Subchapter 1, Chapter 7, Title 27, CCR).*

Overburden materials will either be sold as a product (e.g., for fill), placed in the designated overburden fill areas, or used in reclamation (e.g., redistributed as growth media across the plant site or used to backfill portions of the quarry pit). The overburden fill areas and any temporary overburden stockpiles will be seeded and wetted as needed to minimize water and wind erosion, and will not restrict natural drainage courses. No material stockpiles will be left following reclamation. However, any existing berms that have been installed and vegetated for screening purposes (e.g., along Mitchell Canyon Road) will be left in place.

2.6.4 In-stream Activities [CCR §3710(b)]

PRC §2772(c)(8)(B). *Rehabilitation of streambanks/beds to minimize erosion.*

CCR §3502(b)(6). *Temporary stream and water diversions shown.*

CCR §3706(f)(1). *Stream diversions constructed in accordance with Fish and Game Code.*

CCR §3706(f)(2). *Stream diversions constructed in accordance with Federal Clean Water Act and Rivers and Harbors Act of 1899.*

CCR §3706(g). *All temporary stream diversions eventually removed.*

CCR §3710(c). *In-stream channel elevations and bank erosion evaluated annually using extraction quantities, cross-sections, aerial photos.*

CCR §3710(d). *In-stream mining not cause fish to be trapped in pools or off-channel pits, or restrict migratory or spawning activities.*

Not applicable. The Project does not involve in-stream mining or any work in an active waterway.

2.7 Protection of Fish and Wildlife Habitat [CCR §3503(c)]

CCR §3703(a). *Sensitive species conserved or mitigated.*

CCR §3703(b). *Wildlife habitat at least as good as pre-project, if approved end use is habitat.*

CCR §3703(c). *Wetlands avoided or mitigated at 1:1 minimum.*

CCR §3704(g). Piles or dumps not placed in wetlands without mitigation.

The Plan footprint is permitted for surface mining disturbances pursuant to CEMEX's existing County land use entitlements and vested rights. With the exception of portions of the overburden fill areas, most of the Plan boundary has already been disturbed by past and present surface mining activity. As such, no new impacts to fish and wildlife habitat, sensitive species or wetlands are anticipated to occur as a result of quarrying and processing activities.

For new disturbances in the Plan boundary (e.g., construction of the planned south overburden fill area), the Operator will implement the following avoidance and minimization measures from LSA (see Appendix D):

1. A qualified botanist will conduct botanical surveys prior to the commencement of any activities that may modify undisturbed natural vegetation, such as clearing, mowing, or ground-breaking activities in affected areas. The surveys will be floristic in nature and timed appropriately for each target species. If special-status plants are discovered, species-specific plan will be developed to avoid, minimize, and mitigate impacts to less-than-significant levels.
2. A qualified biologist approved by the USFWS and the California Department of Fish and Wildlife ("CDFW") will conduct a preconstruction survey for special-status vertebrate species within 48 hours prior to the initiation of any construction activities in new disturbance areas (e.g., staging, clearing, grading, tree trimming or removal). If a special-status species is detected, all work will be halted until the animal has left the work area.
3. Prior to building demolition or tree removal or pruning, a qualified biologist will conduct surveys for bat roosts in structures and trees with large cavities. In the event bat roosts are detected, a plan to mitigate impacts to the bats would have to be developed and implemented.
4. A temporary wildlife exclusion fence will be installed around the perimeter of any previously undisturbed area prior to the initiation of new ground-disturbing activities to discourage small wildlife from entering the site. The fence shall have escape funnels pointing outwards to allow small wildlife to exit the work area.
5. A qualified biologist will be present for initial ground-disturbing activities.
6. To prevent the entrapment of Alameda striped racers (aka "whipsnake") and other wildlife, monofilament plastics will not be used for erosion control.
7. A qualified biologist will conduct a preconstruction survey for nesting birds no more than seven days prior to the initiation of construction related activity in new disturbance areas (e.g., staging, clearing, grading, tree trimming or removal) if this activity occurs between February 1 and July 31.
8. If active bird nests are found on or adjacent to the site, an exclusion zone should be established around the nest as specified by the qualified biologist. The exclusion zone should be centered on the nest. Active nests should be monitored weekly to ensure that

the exclusion zones are intact and that the young are developing. The exclusion zones should remain in place until the young have fledged and are foraging independently as determined by a qualified biologist.

9. If an active burrowing owl burrow is detected and an effective exclusion area for burrowing owls cannot be established, an experienced burrowing owl biologist will develop a site specific plan to minimize the potential to affect the reproductive success of the owls.
10. To avoid take of Crotch and western bumblebee species, a qualified biologist will conduct a take avoidance survey for active bumblebee colony nesting sites prior to each phase of construction. Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors will conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as binoculars. If no Crotch or western bumble bees or potential Crotch or western bumble bees are detected, no further mitigation is required. If potential Crotch or western bumble bees are seen but cannot be identified, the quarry would obtain authorization from CDFW to use nonlethal netting methods to capture bumble bees to identify them to species. If protected bumble bee nests are found, a plan to protect bumble bee nests and individuals will be developed and implemented in consultation with CDFW.
11. If required by the USFWS, the quarry will obtain take coverage for federally listed species (Alameda striped racer and California red-legged frog). This may be from a Section 7 Consultation resulting in a Biological Opinion (“BO”) or a Section 10 consultation resulting in a Habitat Conservation Plan (“HCP”).
12. If necessary, a qualified biologist approved under an active BO or HCP will be contracted to trap and move federally listed species (Alameda striped racer and California red-legged frog) to nearby suitable habitat.
13. If required by CDFW, the quarry will obtain a California Endangered Species Act Section 2081 Incidental Take Permit (“ITP") for the Alameda striped racer associated with new disturbances. If further surveys warrant their inclusion, the permit would cover Crotch and/or western bumble bee as well.

While no wetlands have been mapped in the Plan boundary, LSA mapped one unnamed ephemeral channel (300 linear feet) in the footprint of the south overburden fill area (as shown in Appendix C). The Operator will avoid this channel until such time as it obtains necessary authorizations from regulatory agencies to place fill (e.g., USACE, RWQCB). The impacted feature shall be mitigated at a minimum 1:1 ratio consistent with the USACE “no net loss” policy.

2.8 Resoiling [CCR §3503(f)]

CCR §3704(c). *Mine waste stockpiled to facilitate phased reclamation and separate from growth media.*

CCR §3503(a)(1). *Removal of vegetation and overburden preceding mining kept to a minimum.*

CCR §3711(a). *All salvageable topsoil removed. Topsoil and vegetation removal not precede mining by more than one year.*

CCR §3711(b). *Topsoil resources mapped prior to stripping, location of stockpiles on map. Topsoil and growth media in separate stockpiles.*

CCR §3711(c). *Soil salvage and phases set forth in plan, minimize disturbance, designed to achieve reveg success.*

CCR §3711(d). *Topsoiling phase ASAP. Topsoil stockpiles not be disturbed until needed. Topsoil stockpiles clearly identified and planted with vegetation or otherwise protected.*

CCR §3711(e). *Topsoil redistributed in stable site and consistent thickness.*

CCR §3707(b). *Segregate and replace topsoil by horizon.*

CCR §3705(e). *Soil altered or other than native topsoil, requires soil analysis. Amend if necessary.*

LSA prepared a revegetation plan in support of the planned open space end use, including standards for resoiling and topsoil salvage (see Appendix J, Revegetation Plan).

Resoiling - Quarry Pit and East Rim

The majority of the quarry pit (i.e., portions in diabase) will not require resoiling or revegetation because the planned end use of open space provides for the pit to slowly fill with stormwater to form a quarry lake. Any topsoil that existed at the onset of quarrying operations (beginning circa 1947) has been removed and comingled with other overburden materials, consistent with the surface mining practices that were acceptable at the time. As evidenced by the soil types mapped by NRCS (see Figure 7), the Operator does not anticipate that additional topsoil will be encountered in the quarry pit (diabase) area.

The remaining undisturbed areas to be mined (in the quarry east rim) are covered by weathered Knoxville formation overburden, which will be removed prior to the extraction of marketable materials and either sold, placed in overburden fill areas or used elsewhere on-site for reclamation. Any topsoil that existed along the quarry east rim has previously been removed and comingled with other overburden materials, as discussed above.

The quarry pit east rim will not undergo resoiling as there is no topsoil available to cover these areas. CEMEX has no other source of topsoil in the quarry vicinity short of stripping topsoil from undisturbed chaparral or grasslands, which would be counter-productive for conservation purposes and discouraged under CCR §3503(f) as denuding other areas of their soils.

Lacking topsoil resources, the Knoxville substrate constitutes the best available substrate material in the quarry. Knoxville-derived spoils have been observed by LSA to promote better tree, shrub and herbaceous growth than diabase-derived spoils, presumably because the Knoxville formation weathers more readily, contains more mineral nutrients, and the spoils contain a higher proportion of fine material than diabase spoils (LSA 2017, as reported in Appendix J).

See also Section 2.9, below, for revegetation details.

Resoiling - Overburden Fill Areas

Prior to revegetation, the Operator will generally prepare and re-soil overburden fill areas in the following manner:

1. Limit topsoil and vegetation removal from fill areas to within one year of fill placement.
2. Divide fill areas into sub-compartments measuring approximately one-quarter to one-half acre in size.
3. Prior to use of a particular sub-compartment, salvage topsoil to a depth of 18 inches (if available) and use to cover a previously completed sub-compartment.
4. If salvaged topsoil cannot be used immediately, then stockpile topsoil separately from other materials and do not disturb until needed for reclamation (see Sheet 2 for topsoil stockpile locations).
5. Seed topsoil stockpiles with an appropriate erosion control seed mixture as needed to prevent water and wind erosion and to discourage weed growth.
6. Prior to resoiling, rip, disc and/or scarify fill areas as needed to relieve compaction and remove rills, ruderal vegetation, or other surface irregularities.
7. Redistribute topsoil in preparation for revegetation.

See also Section 2.9, below, for revegetation details.

Resoiling - Plant Site

After mining is complete, the Operator will remove processing equipment and associated structures from the plant site and dispose of debris off-site. Following equipment removal and prior to revegetation, the Operator will generally prepare and re-soil the plant site in the following manner:

1. As an initial substrate preparation, scrape processed gravels and crushed rock from the plant site surface down to mineral soils and place scraped materials elsewhere at the site as fill (e.g., in the quarry floor). Only minimal quantities are anticipated.
2. Once soils are exposed, rip, disc and/or scarify as needed to relieve compaction.
3. Regrade the plant site to level off steep embankments and provide for positive drainage.
4. With the assistance of a soil scientist, evaluate whether the resulting substrate is suitable for seeding as is (without additional resoiling).
5. If the soil scientist determinates that the substrate requires resoiling, then import Knoxville-derived overburden materials from the quarry or fill areas to use as planting medium. Spread to a depth of 18 inches over the plant site and augment with accumulated wash fines generated by aggregate processing operations (to the extent available) to enhance nutrient and water holding capacity of the soils.

See also Section 2.9, below, for revegetation details.

2.9 Revegetation [CCR §3705]

2.9.1 Vegetative Cover and Planting Procedures

CCR §3503(g). *Revegetation and plant survival (use available research).*

CCR §3705(a). *Vegetative cover, suitable to end use, self-sustaining. Baseline studies documenting cover, density and species richness.*

CCR §3705(c). *Decompaction of site.*

CCR §3705(g). *Use native plant species, unless exotic species meet end use.*

CCR §3705(h). *Plant during correct season.*

CCR §3705(i). *Use soil stabilizing practices and irrigation, when necessary to establish vegetation.*

CCR §3707(d). *Fertilizers and amendments not contaminate water.*

The planned end use for Clayton Quarry is open space, providing for the quarry pit to slowly fill with stormwater to form a quarry lake with a controlled outflow. LSA prepared a revegetation plan in support of the planned end use, including a description of revegetation activity that has already occurred at the quarry (see Appendix J). An overview of the open space end use and revegetation objectives is also shown on Figure 5. Substantive revegetation guidance from LSA's plan is included below for convenience.

The goal of the revegetation plan is to restore native plant communities such as chaparral where it is safe, practicable, and consistent with the planned end use to do so. Seed mixes feature

California native grasses and shrubs that are common in the undisturbed chaparral plant communities surrounding the quarry. The species chosen for inclusion in the seed mixes and are intended to be self-sustaining without dependence on irrigation, or ongoing applications of soil amendments or fertilizers. Where fertilizers are used, they will be applied in accordance with manufacturer specifications to prevent over-application or contamination of water sources. Should any supplemental soil stabilizing practices be needed, straw mulch and/or other BMPs will be used as necessary to control soil erosion.

The revegetation methods described below for each reclamation area are considered by LSA to be the most effective for the conditions present at the Quarry. Revegetation methods may be adjusted periodically as necessary to improve revegetation performance. Adjustments will be reported to the County on an annual basis.

Revegetation - Quarry Pit – Diabase (No Further Revegetation)

Consistent with recommendations from LSA and Golder, the majority of the quarry pit (i.e., the portions in diabase) will not be revegetated for the following reasons:

1. Reclamation provides for the quarry pit to slowly fill with stormwater to form a quarry lake with a water surface elevation of 735’ msl.
2. Visible benches and slopes above the future quarry lake water surface that have not already been revegetated can no longer be safely accessed for purposes of resoiling or revegetation.
3. Quarry diabase faces and benches are stable in their existing condition and do not require revegetation for erosion and sediment control.
4. Golder has cautioned that mature tree roots can weaken the structural integrity of the finished diabase benches.
5. LSA does not believe historic plantings have substantially improved the aesthetic appearance of the quarry face.
    - After more than fifteen years of growth, the tallest foothill pine trees planted on the upper diabase benches are only 15 feet high, with benches that are 60 feet high.
6. Even without revegetation, diabase benches are consistent with the planned end use of open space and may provide habitat for:
    - Avian species, such as common poorwill (that nest on the ground in open rocky areas around Mt. Diablo), peregrine falcon (that nest on cliff ledges), white-throated swifts (that nest in cracks or crevices in rocks) and cliff swallows (that build their nests out of mud on vertical and near vertical faces); and
    - Lizards, which in turn could attract snakes such as the Alameda striped racer, particularly where nearby shrub cover exists.

Revegetation - Quarry Pit East Rim – Knoxville (Chaparral)

After mining is complete, the Operator will revegetate the quarry east rim to chaparral habitats in the following manner:

1. For the Knoxville slope faces in the quarry east rim that do not receive rip-rap treatment (to prevent erosion from future wave action), rip, disc and/or scarify as needed to relieve compaction and remove rills or other surface irregularities.
    - Where slopes are too steep to rip without causing slides, use a bulldozer to track-walk the slope vertically where safe to do so in order to roughen the surface. Track-walking will create cavities that will reduce the threat of later rilling, as well as capture seed and rainfall.
2. After substrate preparation on the Knoxville slope faces, hydroseed with a California native chaparral seed mix, compost and mulch, with the following parameters:

Component	Application Rate
Seed	As specified below
Wood-fiber mulch	1,500 lbs. per acre
Compost	2,000 lbs. per acre (or as recommended by supplier)
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre (or similar)

3. If initial germination rates are poor, pre-treat chaparral brush species such as coastal sage, sticky monkeyflower, or black sage prior to dispersal.
    - The treatments will vary by species, and may include such treatments as stratification, scarification, heat, and smoke.

The Operator will apply the native chaparral seed mix presented in Table 3 below. This seed mix will provide sufficient cover to stabilize the surface against effects of long-term erosion and be similar to naturally occurring chaparral cover in the area. LSA has deemed the seed mix suitable for the substrate conditions on the east rim based on their 20 years of monitoring of both passive natural and active revegetation at the quarry. Not all species are expected to germinate in any given year.

See Appendix J for additional detail.

TABLE 3
CHAPARRAL REVEGETATION SEED MIX

Plant Species[1]	Common Name	Application Rate (lbs/acre PLS[2])
Artemisia californica	Coastal Sage	0.5
Eriogonum nudum	Nakedstem Buckwheat	0.25
Eriophyllum confertifolium	Golden Yarrow	0.5
Grindelia camporum	Gumplant	1.5
Lotus scoparius[3]	Deerweed[3]	5.0
Lupinus albifrons	Silverbush Lupine	3.0
Melica californica	Onion Grass	1.5
Mimulus aurantiacus	Sticky Monkeyflower	0.15
Nasella lepida	Foothill Needlegrass	1.5
Salvia mellifera	Black Sage	1.5
	Total:	**15.4**

Notes:

1. Seed mix for Clayton Quarry recommended by LSA, with input from Pacific Coast Seed (Livermore, CA). Modifications to this seed mix may be appropriate based on availability from suppliers and cost. Substitutions may be made as long as the plant species is found in chaparral plant communities and is native to the San Francisco Bay Area.
2. PLS = pure live seed.
3. Legume seed shall be pellet-inoculated as per Cal-Trans Standard Specs and as per Bulletin 1842, Range-Legume Inoculation and Nitrogen Fixation by Root-Nodule Bacteria.

Revegetation - Quarry East Rim – Tree Screen (Foothill Pine)

The Operator plans to plant foothill pine (fast growing and suitable for substrate conditions) along the crest of the quarry east rim to screen the quarry from viewers on Mitchell Canyon Road (see Figure 5). These plantings will also serve as mitigation for an existing stand of trees that may be removed from the south overburden fill area (see Sheet 13 and Appendix J for detail).

Based on LSA's recommendations, the Operator will install the east rim tree screen in the following manner:

1. Install 400 foothill pine trees in one gallon pots according to the specifications in Appendix J, Figure 2.
    a. To the extent feasible, plantings to be raised from locally-gathered pine nuts (i.e., central Contra Costa County).
2. Install plantings in clusters of 2 to 4 trees, with a spacing of 6 to 10 feet between trees in the same cluster, and spacing of 12 to 20 feet between clusters.

No irrigation of the trees is proposed at this time. If there is unacceptable loss of seedlings (that threaten the ability to meet the performance standards described later in this Plan) due to

summer drought, then the Operator will provide irrigation once a month consisting of at least 10 gallons per tree (or sufficient to saturate entire root zone to a 30 inch depth). Irrigation will commence May 1 and end November 1 each year. The Operator may determine the means of irrigation (e.g., water truck, drip system, pump from stormwater in quarry pit). While temporary irrigation may be used in drought conditions, the tree screen should be self-sustaining without irrigation.

Revegetation - Overburden Fill Areas (Grassland or Chaparral)

The native topsoil in overburden fill areas is anticipated to be a suitable substrate for grassland. Following fill placement and substrate preparation, the Operator will hydroseed the overburden fill areas with a California native grassland seed mix and mulch, with the following parameters:

Component	Application Rate
Seed	As specified below
Wood-fiber mulch	2,000 lbs. per acre
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre (or similar)

The Operator will apply the California native grassland seed mix shown in Table 4, below.

TABLE 4
GRASSLAND REVEGETATION SEED MIX

Plant Species[1]	Common Name	Application Rate (lbs/acre)
Bromus carinatus	California Brome	25
Elymus glaucus	Blue Wildrye	10
Vulpia microstachys	Three Weeks Fescue	6
Trifolium ciliolatum	Foothill Clover	4

Notes:

1. Seed mix for Clayton Quarry recommended by LSA with input from Pacific Coast Seed (Livermore, CA). Modifications to this seed mix may be appropriate based on availability from suppliers, cost, and species determined most suitable at the time planting occurs.
2. Ideally, revegetation will occur in early fall (i.e., October/November).

The native topsoil will already contain a full seedbank of annual grasses, so the pre-existing species are also likely to re-establish. Adding the additional seed mix to the surface provides insurance that there will be an initial flush of growth to protect the soil surface early in the wet season. The species chosen for inclusion in the seed mixes are, however, capable of being self-sustaining without dependence on irrigation or ongoing applications of soil amendments or fertilizers. If the grassland seed mix is not likely to be successful due to the absence or limited supply of topsoil, then the Operator may revegetate the fill areas by implementing the chaparral mix (Table 3) and planting specifications provided for the quarry Knoxville slopes, described above.

Plant Site (Grassland or Chaparral)

Following substrate preparation, and based on the findings of the soil scientist (see Section 2.8), the Operator will apply one of the following revegetation methods:

1. If suitable mineral subsoil is exposed at the plant site, then hydroseed with a California native grassland seed mix, compost and mulch, with the following parameters:

Component	Application Rate
Seed	As specified
Wood-fiber mulch	1,500 lbs. per acre
Compost	2,000 lbs. per acre (or as recommended by supplier)
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre (or similar)

2. If augmented overburden materials must be applied to the surface, then hydroseed with a California native chaparral seed mix, compost and mulch, with the following parameters:

Component	Application Rate
Seed	As specified
Wood-fiber mulch	1,500 lbs. per acre
Compost	2,000 lbs. per acre (or as recommended by supplier)
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre (or similar)

The Operator will either apply the California native chaparral seed mix from Table 3 or the California native grassland seed mix from Table 4.

2.9.2 Revegetation Test Plots [CCR §3705(b)]

Beginning in 2021, and as a component of quarry reclamation, disturbed slopes that have reached their final configuration and will not be further disturbed will serve as test plots for the respective revegetation seed mixes. Planting procedures, species and success criteria will be updated, if necessary, in consultation with the Lead Agency following monitoring of the test plot.

Chaparral Test Plots

The Operator will establish two quarter-acre test plots on the quarry east rim by grading away accumulated vegetation and exposing a fresh substrate. One plot will be left untreated as a control if it is otherwise stabilized, while the other plot will be treated as specified above for chaparral revegetation (i.e., hydro-application of chaparral seed mix, mulch, compost, and fertilizer).

Test plot monitoring will consist of a 100 percent catalog of plant cover in the test plots as measured by areal canopy coverage, and a 100 percent count of shrub individuals with basal diameter over one-half inch. Depending on initial results, and in consultation with the monitoring

biologist, the Operator may choose to test additional revegetation measures and modifications by adding additional test plots.

Grassland Test Plots

In 2016, CEMEX prepared a slope stabilization plan for the existing north overburden fill area (as described in Section 2.5). The stabilization plan largely involves excavation of previously mobilized slide materials and installation of a shear key (in the form of a gravity buttress). This plan was updated in 2020 for an expanded shear key and buttress fill. LSA was asked to prepare a revegetation strategy for the stabilized slope and did so by applying the overburden fill area/grassland methodology described in Section 2.9.1, above. This work will thus serve as a useful test of that methodology since the work is anticipated to be completed in 2021 and is taking place on the same slope and in the same grassland cover as the remainder of the fill areas. CEMEX will assess the success of the slope stabilization revegetation effort using the quantitative monitoring methodology discussed in Section 2.9.6, below.

2.9.3 Revegetation of Roads and Traffic Routes

CCR §3705(d). *Roads stripped of roadbase materials, resoiled and revegetated, unless exempted.*

CCR §3705(f). *Temporary access not bladed. Barriers installed.*

The existing and future road network are planned to be left in place for safety, fire protection, and to facilitate the planned open space end use. For example, the east rim access road and quarry haul roads provide access for maintenance, and the quarry haul roads leading into the quarry pit will serve as emergency exit ramps in the event of an accidental fall in the future quarry lake. No temporary access routes are proposed as part of reclamation.

2.9.4 Noxious Weed Management [CCR §3705(k)]

During the revegetation establishment period, noxious weeds will be managed: (1) when they threaten the success of the proposed revegetation; (2) to prevent spreading to nearby areas; and (3) to eliminate fire hazard. Noxious weeds will be removed using a combination of herbicides, mechanical controls, and hand weeding. In some cases, complete eradication may not be feasible unless the weed-infested patches are small. Noxious weeds include all species classified as highly invasive by the California Exotic Pest Plant Council (CalEPPC).

2.9.5 Plant Protection Measures, Fencing, Caging [CCR §3705(l)]

Foothill pines are not browsed by deer or other animals, and most chaparral dominants are also unpalatable. No browsing controls (such as fencing or caging) are necessary or planned.

2.9.6 Revegetation Performance Standards and Monitoring [PRC 2773(a)]

CCR 3705(m). *Success quantified by cover, density and species-richness. Standards proposed in plan. Sample method set forth in plan and sample size provide 80 percent confident level, as minimum.*

CCR §3705(j). *If irrigated, demonstrate self-sustaining without for two years minimum.*

Revegetation success will be measured against the following performance standards and monitoring criteria (see Appendix J for additional detail):

Chaparral Performance Standards

The following performance standards for chaparral apply to the quarry pit east rim and plant site (if revegetated with chaparral mix):

Cover: No cover standard is proposed because chaparral shrub species and the shrub community as a whole are slow to mature. A correspondence between the developing cover in the reclaimed units and the mature cover in the reference plots can be more effectively achieved by monitoring plant density (stems per acre) and species richness, as is proposed below.

Density: Per-acre density (stems per acre) exceeds 70 percent of the average native shrub density in undisturbed stands of chaparral, as determined at reference plots.

Species Richness: Minimum 4 native chaparral species, which may include species contained in the seed mix as well as natural regeneration.

Grassland Performance Standards

The following performance standards for grassland apply to the overburden fill areas and plant site (if revegetated with grassland mix):

Cover: Exceeds 75 percent of the treated surface. Final cover may include seeded species as well as any non-invasive species that occur in the existing grassland plant community adjacent to the fill areas.

Species Richness: Minimum 3 herbaceous non-invasive species each exceed 10 percent of the total cover.

Tree Screen Performance Standards

The following performance standards apply to the quarry east rim tree screen:

Tree Establishment: Minimum 200 established trees along the crest of the quarry east rim after three years. Trees must be healthy and at least two years old to be considered established.

Screen Continuity: The tree screen will not be considered successful if there are one or more gaps in the screen. A gap is defined as a span of 100 feet or more between established trees.

Monitoring

Qualified conservation biologists or botanists will monitor re-vegetated areas annually for a minimum of three years after seeding to assess whether revegetation is proceeding successfully. Revegetation success will be judged pursuant to the performance standards presented above. Performance standards will only be considered to be met if the plantings required no human intervention during the preceding two years. If intervention is necessary after the second year of monitoring, then remedial measures will be implemented and monitoring will continue for another three years.

Chaparral Reference Plots. Prior to revegetation, a qualified biologist will establish 4 reference plots within representative chaparral cover on the un-mined west-facing slope in the east rim of the quarry. Each plot will be a circle 5 meters in diameter. Plot centers will be staked with rebar or other durable material and their location will be recorded on GPS equipment capable of at least 1 meter accuracy. The following data will be taken at each plot:

- A complete species list, including herbaceous species.
- Total number of shrub individuals, quantified by species.
- Total overall shrub canopy cover and total herbaceous cover (if any).
- A photograph of each plot will be taken from the northern plot edge.

The plot data will be specifically used to establish a chaparral plant density baseline and generally used to provide chaparral community characteristics for comparison with reclaimed areas.

Qualitative Monitoring. Under most circumstances the success or failure of revegetated areas in relation to established performance standards should be immediately evident. In these circumstances, qualitative monitoring is sufficient documentation of the condition and cover of the revegetated areas. Qualitative monitoring consists of a visual determination of the percentage of cover of each plant species in each restoration area, accompanied by multiple photographs of the revegetated area. Statistical determination will not be used.

Quantitative Monitoring. Quantitative monitoring will only be conducted if revegetation monitors have significant doubt as to whether a particular area meets the standards outlined above. In each year that quantitative monitoring is conducted, square meter plots will be randomly placed in each reclamation unit (i.e., quarry pit, overburden fill areas, plant site). No less than 20 randomly located plots will be distributed across each site, and additional plots will be established as necessary to reach the 80 percent confidence interval. Where cover differs markedly within a particular reclamation unit, monitors will stratify the unit into different cover types and sample within each type until 80 percent confidence is reached. The locations of each plot will be recorded on a map or will be recorded using a GPS receiver. See Appendix J for additional detail.

2.9.7 Agricultural Fertility Performance Standards [CCR §3707 and CCR §3708]

CCR §3707(a). *Return prime agriculture to fertility level specified in approved plan.*

CCR §3707(c). *Productivity rates equal pre-project or similar site for two consecutive years. Rates set forth in plan.*

CCR §3708. *Other ag capable of sustaining crops common to area.*

Not applicable. Surface mining disturbance areas are not currently in prime or other agriculture land production.

2.10 Equipment Removal and Incidental Waste Disposal

CCR §3709(a). *Equipment stored in designated area and waste disposed of according to ordinance.*

CCR §3709(b). *Structures and equipment dismantled and removed.*

CCR §3502(b)(5). *Disposition of old equipment.*

Equipment used in mining and reclamation will be stored in designated areas as shown on Sheet 2 and removed from the site following final reclamation.

Processing facilities (e.g., aggregate plant and ancillary components and structures) will be dismantled and removed as part of reclamation. Buildings, fences and the road networks servicing the quarry may be left in place to facilitate the planned end use.

Any incidental refuse or garbage will be collected, hauled off-site and disposed of in accordance with state and local standards.

2.11 Closure of Portals, Shafts and Openings

CCR §3713(a). *Drill holes, water wells, monitoring wells completed or abandoned in accordance with laws.*

CCR §3713(b). *All portals, shafts, tunnels, or openings, gated or protected from public entry, but preserve access for wildlife.*

No portals, shafts, tunnels or other openings to underground workings are mapped or proposed. No drill holes (other than temporary drill holes used for and eliminated during blasting) are proposed. Any water wells or monitoring wells installed in support of surface mining or reclamation activities will be left in place to facilitate the potential end uses or abandoned in accordance with state and local laws and regulations.

2.12 Administrative Requirements

2.12.1 Statement of Reclamation Responsibility [PRC §2772(c)(10)]

Please see Appendix A.

2.12.2 Financial Assurances [PRC §2773.1]

Financial assurances will remain in effect for the duration of the mining operation and any additional period until reclamation is complete. CEMEX's current Financial Assurance Cost Estimate ("FACE") will continue to be updated annually and submitted to the County for review. Financial assurances may be adjusted (up or down as appropriate) based on the updated FACE.

2.12.3 Lead Agency Approvals [PRC §2772.1]

Upon Plan approval, the conditions of approval and/or mitigation measures pertinent to reclamation of mined lands will be added to this Plan pursuant to PRC §2772.1(b)(7)(B). Appendix K is included as a placeholder for this purpose.

2.12.4 All Mining Operations Since 1/1/76 Included in Reclamation Plan [PRC §2776]

No reclamation or reclamation plan approval is required for lands disturbed by surface mining operations conducted before January 1, 1976, which have not since been disturbed by surface mining operations (SMARA §2776). Pre-1976 (pre-SMARA) disturbance areas exempted from the requirements of this Revised Plan are shown on Figure 2, and Sheets 2 and 10. These areas include portions of the original Harrison quarry footprint (developed circa 1947) and small areas of disturbances along the northern and western rim of the quarry where pre-existing roads provide access for emergency services (e.g., fire suppression) and adjacent property owners. Finally, CEMEX's predecessor, RMC Pacific Materials, previously addressed a former landslide area outside the boundaries of the 1983 Reclamation Plan that covered approximately two-tenths of an acre on property owned by the United States and managed by the Department of Interior, Bureau of Land Management ("BLM"). The disturbance resulted from a naturally-

occurring landslide and is not subject to the requirements of this Plan or SMARA. In 1990, BLM authorized a landslide stabilization project which was subsequently conducted to restore revegetation in that area.

2.12.5 Mining in 100-year Floodplain and Within One Mile of State Highway Bridge [PRC §2770.5]

The Project is not located within a Federal Emergency Management Agency ("FEMA") mapped floodplain or within one mile of any State Highway bridges.

3.0 LEAD AGENCY REQUIREMENTS [PRC §2772(C)(11)]

Section 3.0 of this Revised Plan addresses specific lead agency reclamation requirements, where it is believed those requirements either supplement or amplify the requirements of SMARA as outlined in Section 2.0. This part is not intended to restate or address every SMARA code section or policy related to the reclamation of mined lands.

Surface mine reclamation is regulated by Contra Costa County primarily through two documents:

1. **General Plan –** contains language and policy that provides general guidance on how and where mining should occur in the County.

2. **Surface Mining and Reclamation Code Chapter 88-11 ("SMRC") –** addresses County regulations and procedures governing the establishment, use and reclamation of mined lands in accordance with the County General Plan, including mining reclamation plans, financial assurances, reporting, inspections and violations.

Given the Clayton Quarry's vested rights to mine, this Section 3.0 only addresses requirements that specifically relate to the reclamation of mined lands, and not those requirements associated with regulation of the mining activities, including any associated environmental review or land use approvals.

3.1 General Plan

GP Policy 8-61. Reclamation plans prepared for the closure of quarries shall include conditions addressing the future use of the property, and a condition of the reclamation plan shall assure that future use

The quarry has a planned end use of open space and may also be put to other beneficial uses in the future as allowed under current zoning designations for the site. The planned end use is consistent with the site and its surroundings. See Sections 2.2 and 2.4.

3.2 Surface Mining and Reclamation Code [Chapter 88-11]

3.2.1 Land Use Permit Required [SMRC §88-11.602]

Clayton Quarry operations are governed by and vested under the 1968 Operating Permit (quarry and processing operating entitlement) and 1983 Reclamation Plan. Once approved, this Revised Reclamation Plan will replace the 1983 Reclamation Plan.

3.2.2 Post-1976 Operations Included [SMRC §88-11.804]

These requirements are addressed in Section 2.12.3.

3.2.3 Reclamation Plan Requirements [SMRC §88-11.810]

Please refer to the "Chart of SMARA Contents" at the beginning of this Plan.

3.2.4 General Requirements [SMRC §88-11.812]

These requirements are addressed in Section 2.0. Please see also the "Chart of SMARA Contents" at the beginning of this Plan for appropriate references to SMARA requirements.

3.2.5 Guarantees [SMRC §88-11.814]

The Owner/Operator guarantees and accepts responsibility for all reclamation work for the life of the surface mining operation and for a period of at least two years following to assure the permanence of physical reclamation features. See also Appendix A.

3.2.6 Progressive Reclamation [SMRC §88-11.816]

These requirements are addressed in Sections 2.1.5, and 2.2.2.

3.2.7 Disposal of Overburden and Mining Waste [SMRC §88-11.818]

These requirements are addressed in Sections 2.5, 2.6 and 2.10.

3.2.8 Drainage, Erosion and Sediment Control [SMRC §88-11.820]

These requirements are addressed in Section 2.6.

3.2.9 Final Slope Gradient [SMRC §88-11.822]

These requirements are addressed in Section 2.5.

3.2.10 Emplacement of Fill [SMRC §88-11.824]

These requirements are addressed in Section 2.5.

3.2.11 Resoiling [SMRC §88-11.826]

These requirements are addressed in Section 2.8.

3.2.12 Revegetation [SMRC §88-11.828]

These requirements are addressed in Section 2.9.

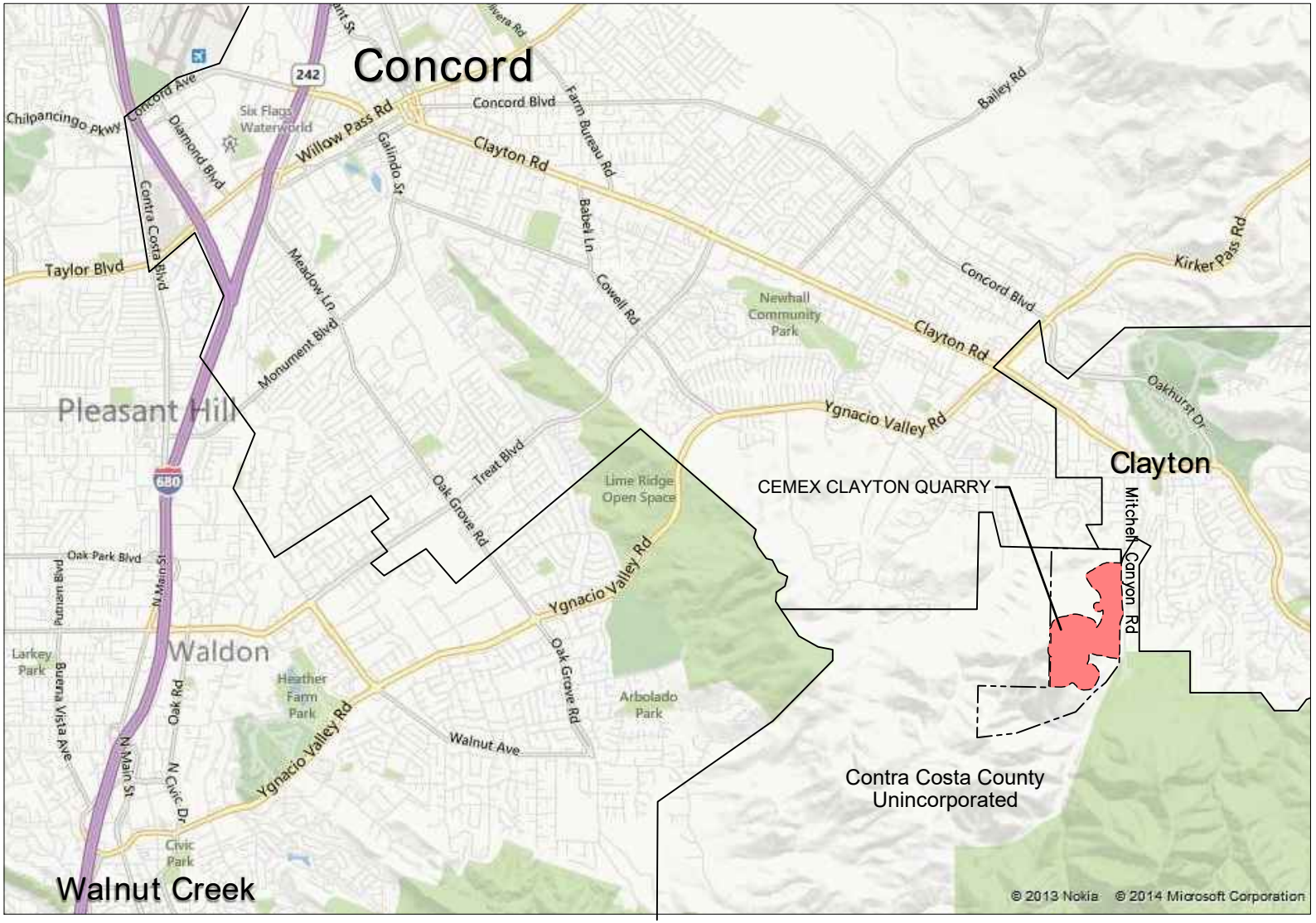
3.2.13 Water [SMRC §88-11.830]

The planned end use for Clayton Quarry is open space, providing for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow. This Plan is subject to County approval and may require issuance of a County Drainage Permit.

3.2.14 Financial Assurances [SMRC §88-11.834]

These requirements are addressed in Section 2.12.2.

FIGURES



LEGEND

Property Boundary

Quarry & Plant Site

Source: Nokia/Microsoft Corporation

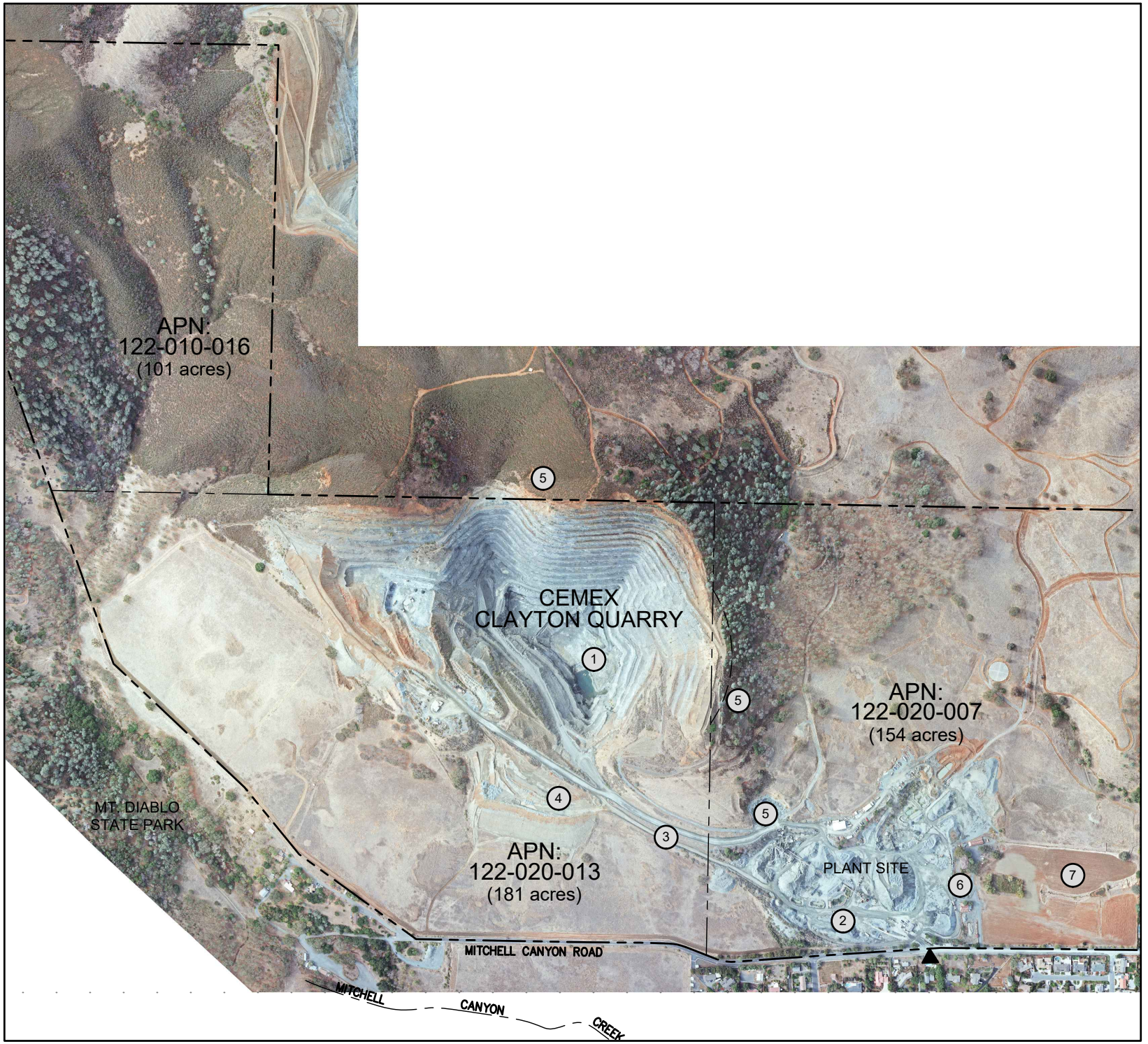
VICINITY MAP

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

OCTOBER 2020

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 1



LEGEND

- Property Boundary
- Creek Alignment
- Prior Disturbance Areas; to be included in Amended Reclamation Plan
- (3) Area Designation
- Ingress/Egress and Utilities

PROJECT SITE FACILITIES

1. Quarry Pit
2. Aggregate Plant Site
3. Haul Road To Quarry
4. Overburdern Fill Area
5. Pre-SMARA Disturbance (no mining since)
6. Detention Pond (Storm Water)
7. Open Field

NOTES

1. No wells in quarry or plant site area.

0 800'

Photo/Survey by:	AeroTech Mapping
Photo Date:	Nov. 5, 2015
Horizontal Datum:	Cal Coord Zone III, NAD83
Vertical Datum:	NAVD88

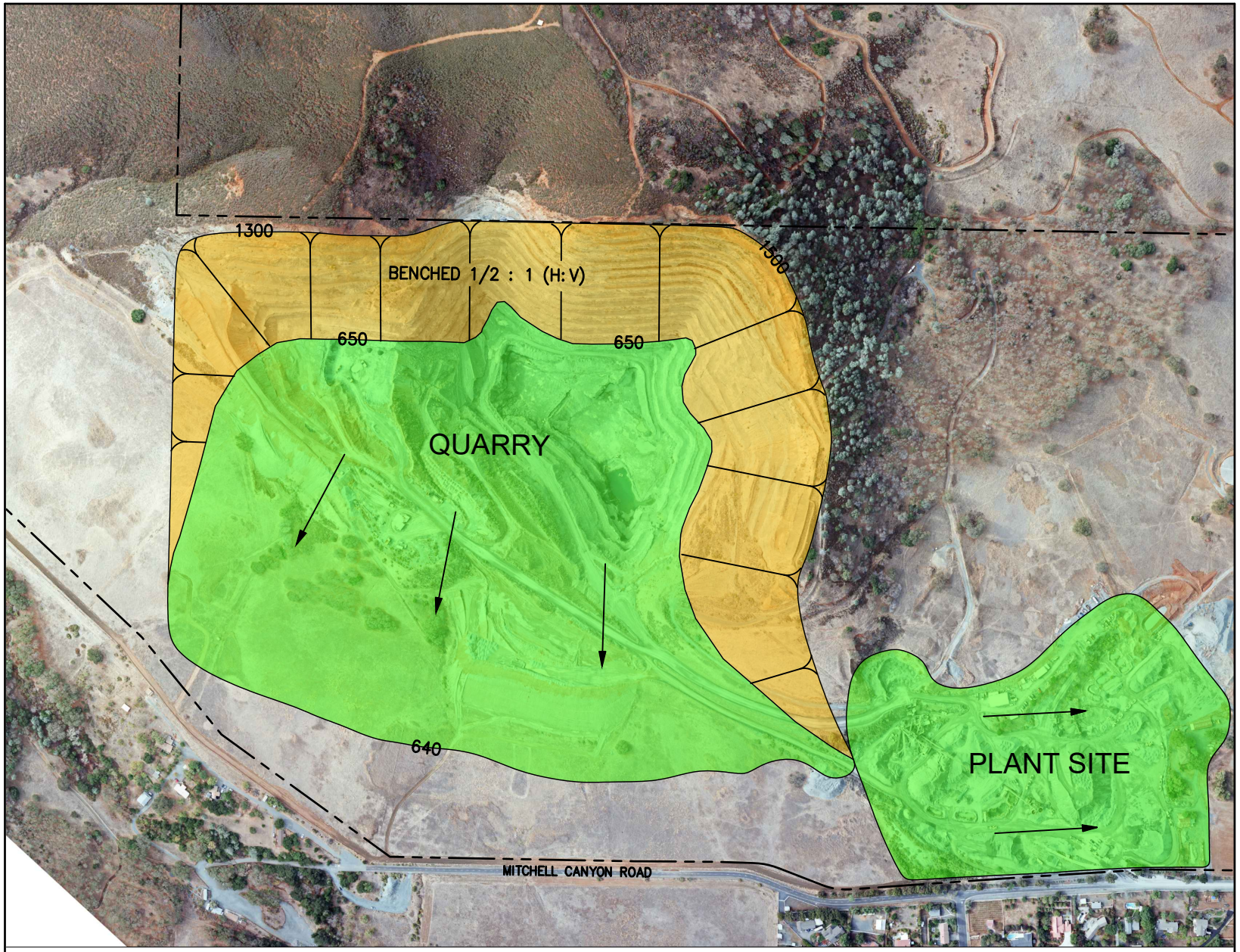
EXISTING CONDITIONS AERIAL PHOTOGRAPH

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

OCTOBER 2020

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 2



LEGEND

- Property Boundary
- 730 Contour Line
- Slope to Drain
- Slope Bank
- Hydroseed
- Benches Planted w/ Trees and Shrubs

DISTURBED AREA

QUARRY = 154 ACRES
PLANT = 30 ACRES
TOTAL = 184 ACRES

0 600'

Photo/Survey by:	Towill, Inc.
Photo Date:	April 18, 2012
Horizontal Datum:	Cal Coord Zone III, NAD27
Vertical Datum:	NGVD29

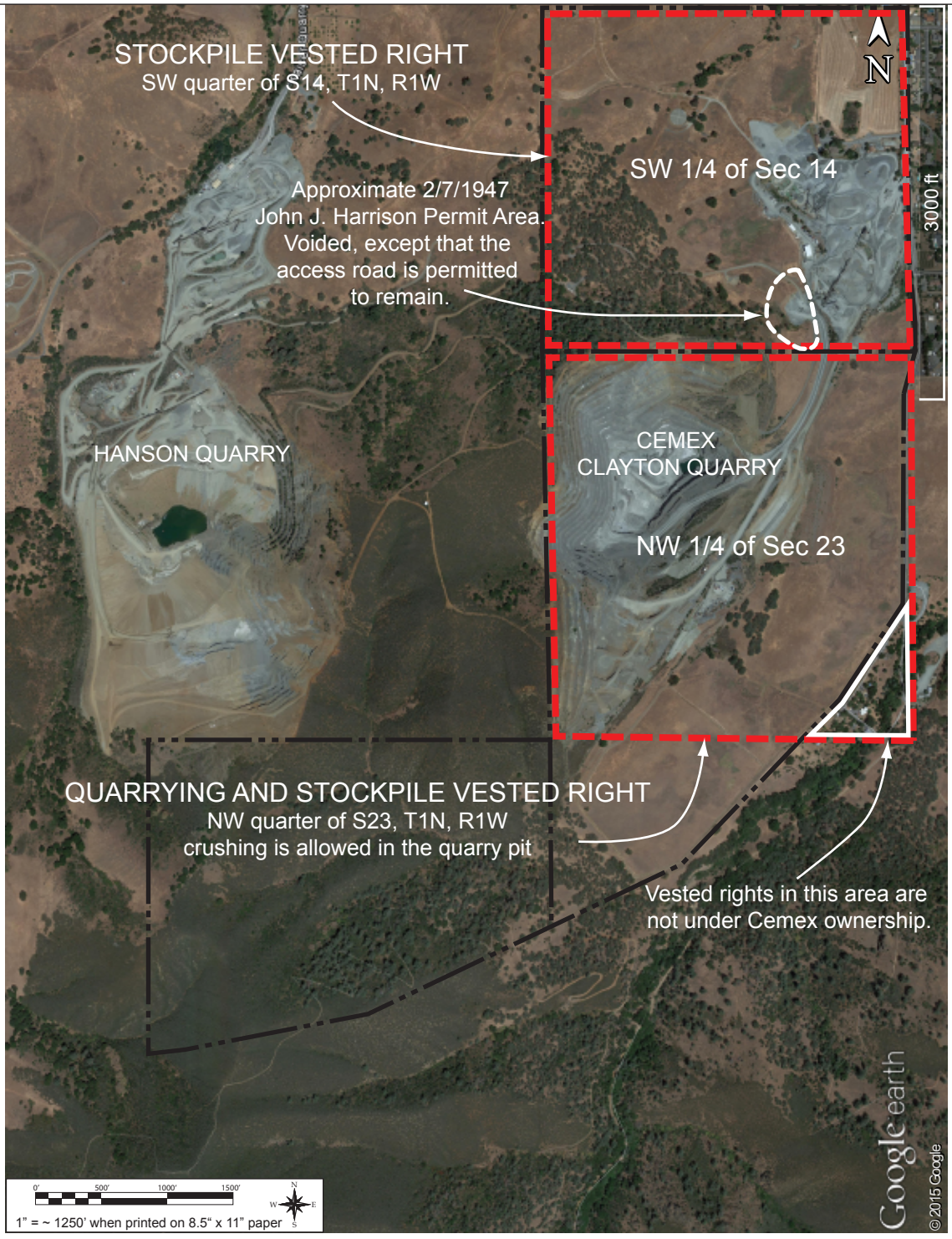
1983 RECLAMATION PLAN OVERVIEW

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

OCTOBER 2020

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 3



Notes

Aerial photo adapted from Google Earth Maps
Imagery Date 6/9/2014

Parcel Boundary

UP 363-76 Vested Right

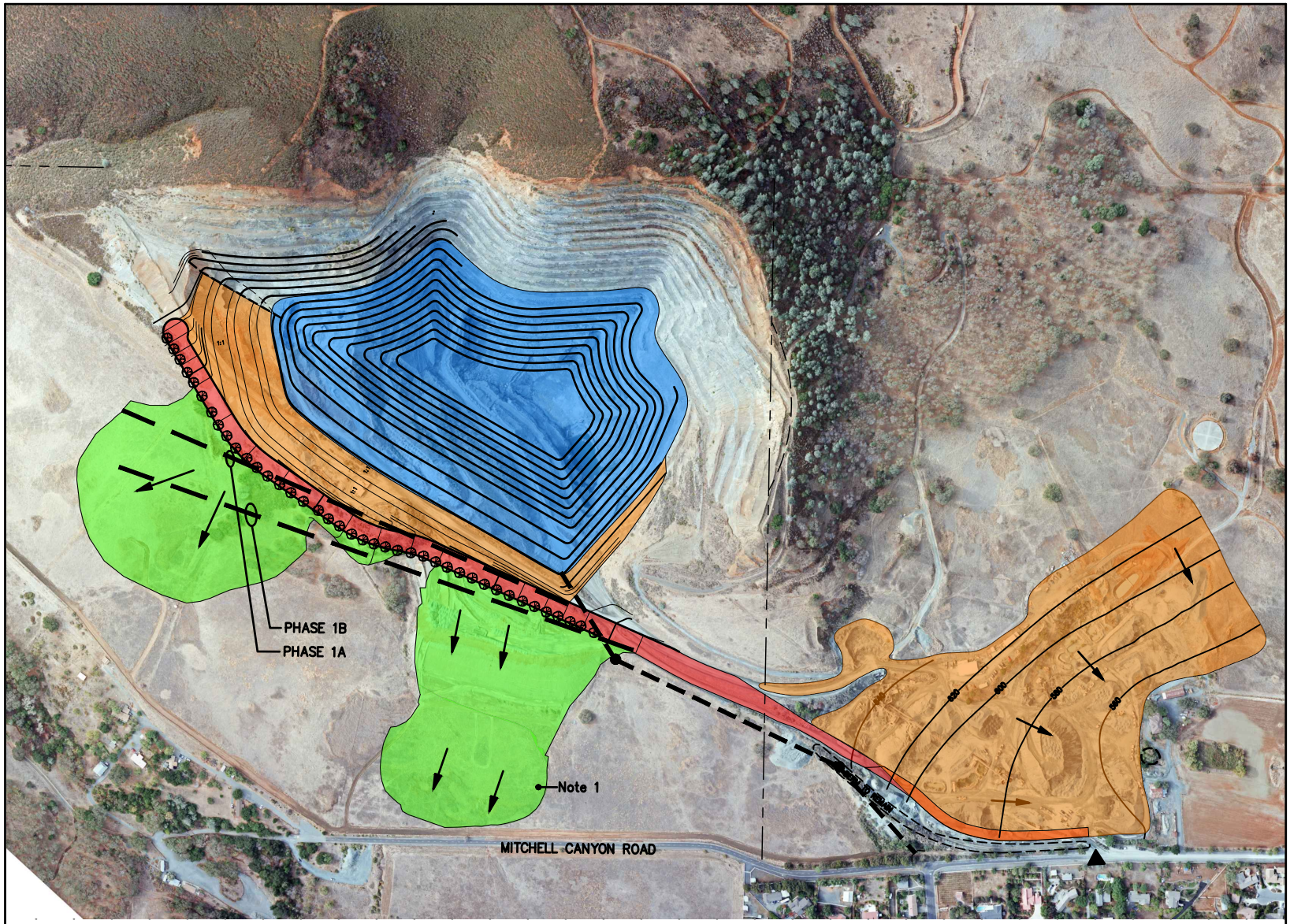
1947 Permit Area

COMPASS LAND GROUP

VESTED MINING PERMITS
CEMEX, CLAYTON QUARRY
Contra Costa County, California

FIGURE 4

Date: 10/2020



LEGEND

- Property Boundary
- Contour Line
- Pipeline & Manhole
- Slope to Drain
- Ingress/Egress and Utilities
- Open Space (Grassland)
- Water Surface
- Open Space (Chaparral Cover)
- Diabase
- Access Road
- Tree Screen
- 1983 Rec Plan Top of Cut Phase Lines

Note 1: Use chaparral if grassland is not feasible.

DISTURBED AREA

QUARRY	= 85 ACRES
FILL	= 53 ACRES
PLANT/ROAD	= 52 ACRES
DISTURBED AREA	= 190 ACRES

0 600'

Photo/Survey by: AeroTech Mapping
Photo Date: Nov. 5, 2015
Horizontal Datum: Cal Coord Zone III, NAD83
Vertical Datum: NAVD88

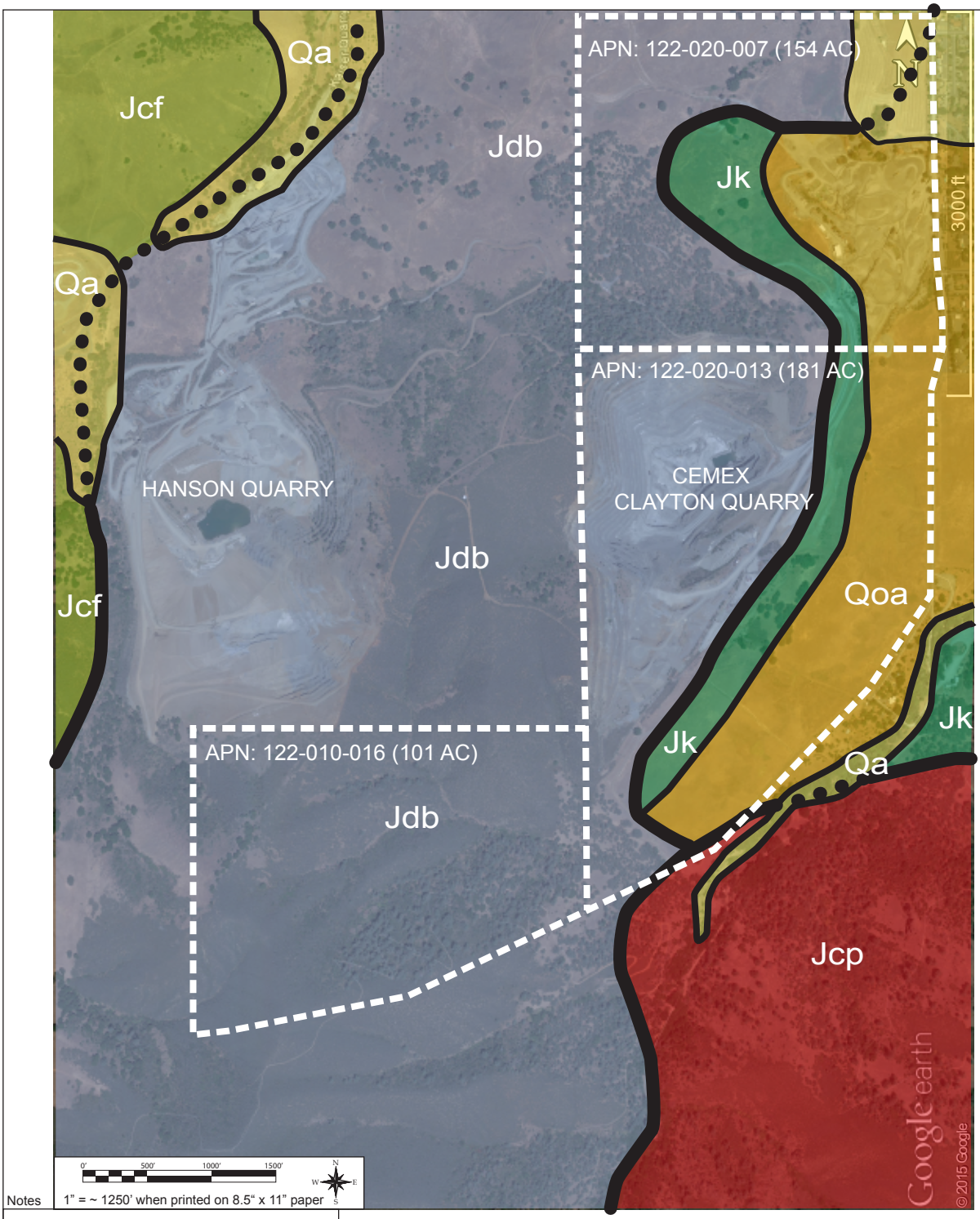
2020 RECLAMATION PLAN OVERVIEW

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

OCTOBER 2020

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 5



Notes

Aerial photo adapted from Google Earth Maps 6/9/2014
Geology adapted from Rogers 1972, Regional Geologic Map, CA Div. of Mines and Geology, San Jose Sheet: 1:250,000; and Golder Associates unpublished Geology Map: 1:24,000

Fault (inactive)
Fault Concealed
Contact

Qa Current alluvium
Qoa Older alluvium
Jk Knoxville Formation shale and sandstone
Jcf Basalt
Jdb Diabase
Jcp Pillow Basalt
Parcel Boundary

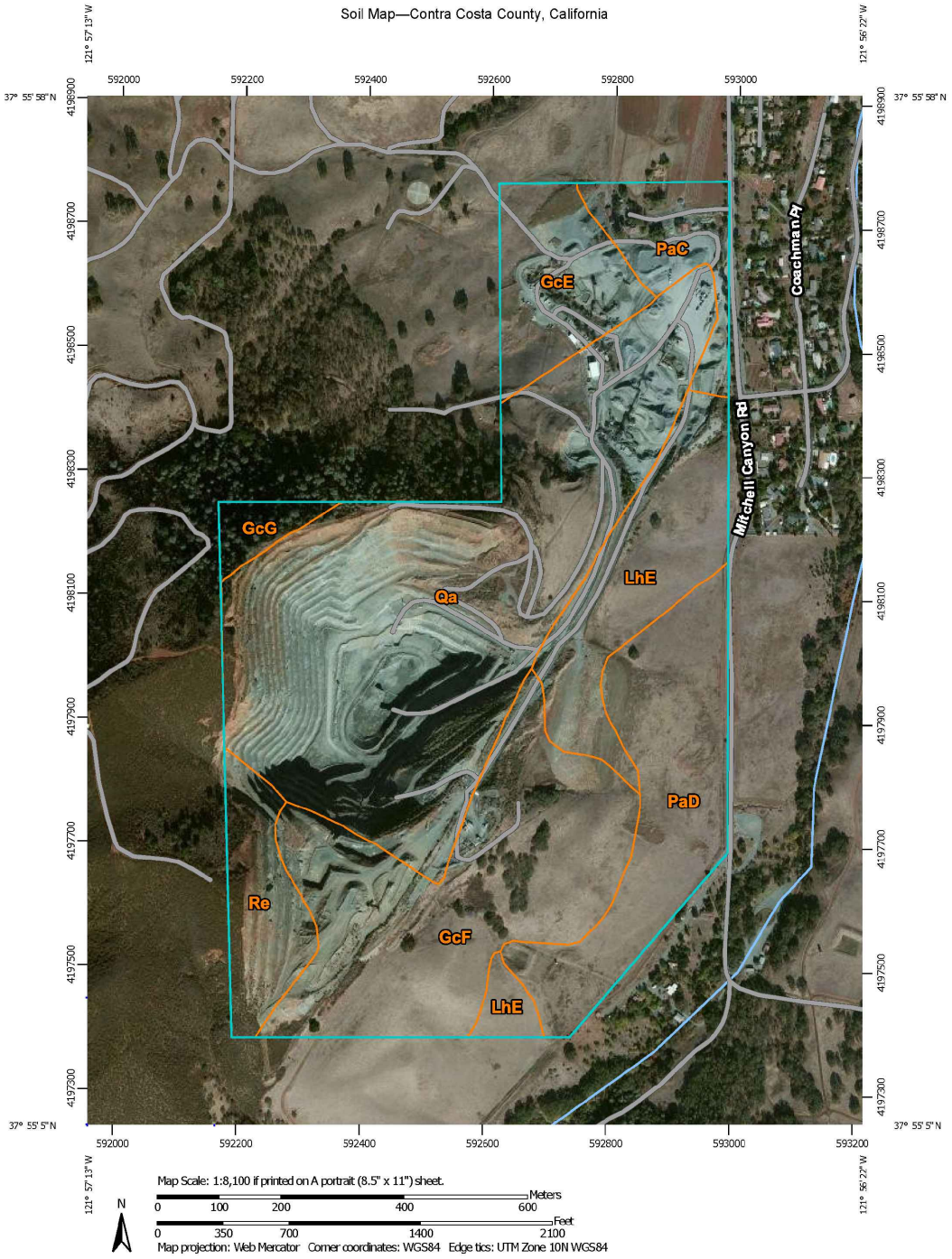
COMPASS LAND GROUP

SITE GEOLOGY MAP

CEMEX, Clayton Quarry Reclamation Plan
Contra Costa County, California

FIGURE 6

Date: 10/2020



SOURCE: USDA Natural Resource Conservation Service

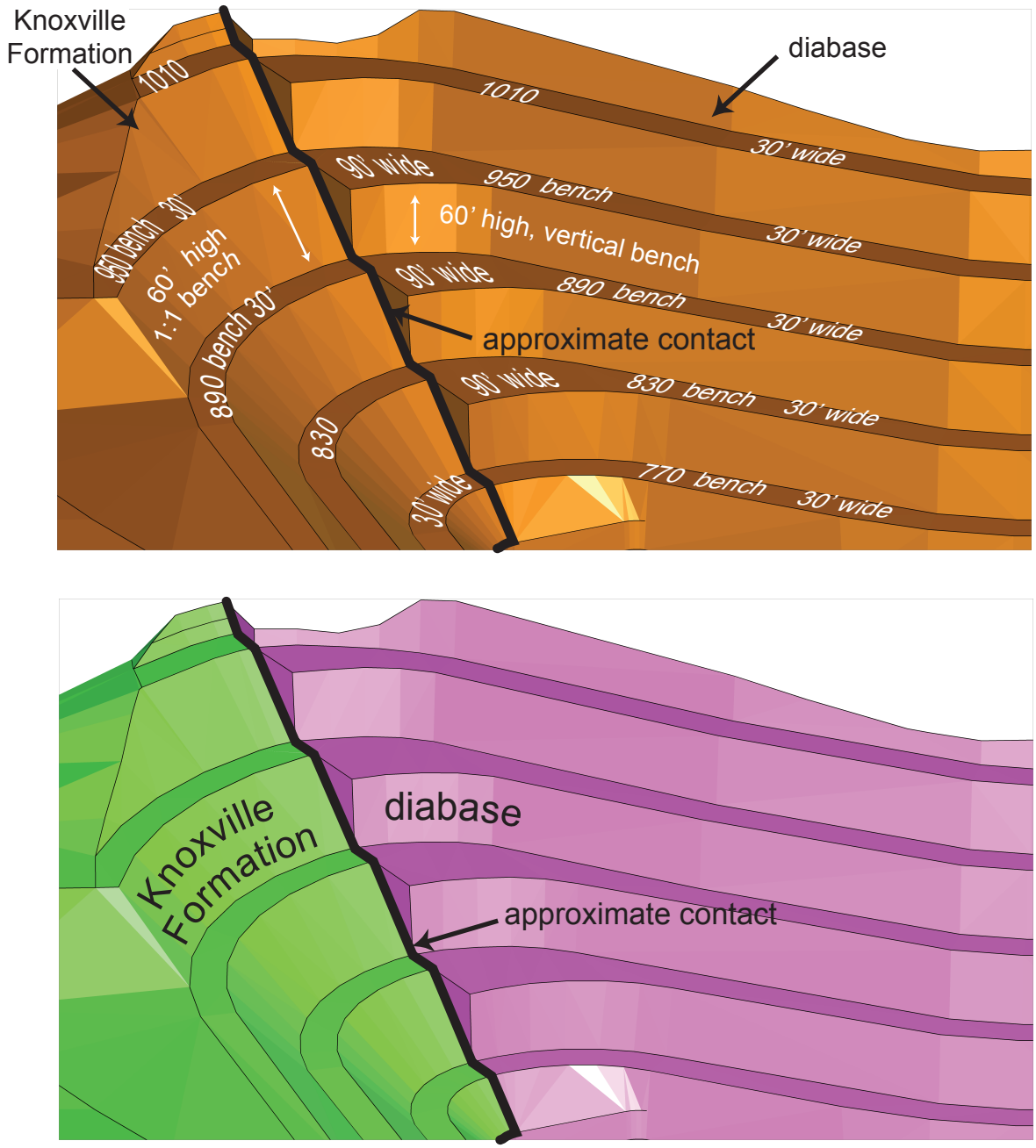
SITE NRCS SOILS MAP

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

OCTOBER 2020

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 7



	Bench Face Slope	Bench Height	Bench width	Overall Inter-ramp slope
Knoxville Formation	1H:1V, 45 degrees	60 feet	30 feet	1.33H:1V, 37 degrees
Diabase	Vertical, 90 degrees	60 feet	30 feet	0.5H:1V, 63 degrees

Recommended slope geometry from Golder Associates Geotechnical Report

Notes

Pit design work from Spinardi Associates 2015 and JLGC 2015

COMPASS LAND GROUP

Knoxville-Diabase Transition Concept
CEMEX, Clayton Quarry Reclamation Plan
Contra Costa County, California

FIGURE 8

Date: 10/2020

SHEETS

(Large sheets have been reprinted from 24x36" to 11x17"
and therefore are not printed to original scale.)

CEMEX
CLAYTON QUARRY
RECLAMATION PLAN
CONTRA COSTA COUNTY, CA

LEGAL DESCRIPTION:

122-020-007:

ALL THAT PORTION OF THE SOUTH 1/2 OF SECTION 14, TOWNSHIP 1 NORTH, RANGE 1 WEST, M.D.B. & M., CONTRA COSTA COUNTY, CALIFORNIA, LYING WEST OF THE FOLLOWING DESCRIBED LINE:

BEGINNING IN THE CENTER OF SECTION 14, SAID POINT BEING ON THE EAST LINE OF A COUNTY ROAD RUNNING NORTHERLY AND SOUTHERLY THROUGH SAID SECTION. AS SAID ROAD EXISTED IN NOVEMBER 1940 ON THE GROUND; THENCE FROM SAID POINT OF BEGINNING, ALONG THE EAST LINE OF SAID COUNTY ROAD, SOUTH 1° 2' WEST, 1192.58 FEET; SOUTH 3° 10' EAST, 522.43 FEET AND SOUTH 3° 35' EAST, 705.41 FEET, THENCE LEAVING SAID ROAD, SOUTH 4° 05' EAST, 245.62 FEET TO A POINT ON THE SOUTH LINE OF SECTION 14, WHICH BEARS SOUTH 88° 53' EAST ALONG SAID SOUTH LINE, 104.3 FEET FROM THE CENTER OF SAID ROAD.

EXCEPTING THEREFROM:

1. THE RIGHT, TITLE AND INTEREST CONVEYED IN THE DEED EXECUTED BY GEORGE MURCHIO, ET AL, TO CONTRA COSTA COUNTY, DATED JANUARY 17, 1941, RECORDED MAY 6, 1941, IN BOOK 589, PAGE 285 OF OFFICIAL RECORDS, FOR USE AS A PUBLIC HIGHWAY, AS TO THE 40 FOOT IN WIDTH STRIP OF LAND DESCRIBED THEREIN.
2. THE PARCEL OF LAND DESCRIBED AS PARCEL 1 IN THE DEED FROM GEORGE A. MURCHIO, ET AL, TO CONTRA COSTA WATER DISTRICT, RECORDED JULY 19, 1963, IN BOOK 4411, PAGE 500 OF OFFICAL RECORDS.

122-020-013:

ALL OF SECTION 23, TOWNSHIP 1 NORTH, RANGE 1 WEST, M.D.B. & M., CONTRA COSTA COUNTY, CALIFORNIA.

EXCEPTING THEREFROM:

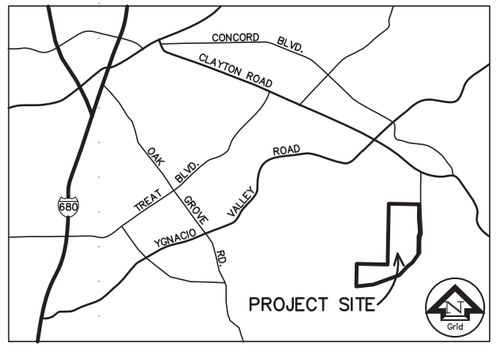
1. THE RIGHT, TITLE AND INTEREST CONVEYED TO THE COUNTY OF CONTRA COSTA, PER DEED DATED JANUARY 17, 1941, RECORDED MAY 6, 1941, IN BOOK 589, OFFICIAL RECORDS, PAGE 285, RECORDER'S OFFICE OF CONTRA COSTA COUNTY, FOR USE AS A PUBLIC HIGHWAY AS TO THE 10 FOOT IN WIDTH STRIP OF LAND DESRIBED THEREIN.
2. THAT PORTION OF SAID SECTION 23, T. 1 N., R. 1 W., M.D.B. & M., DESCRIBED IN THE DEEDS TO THE STATE OF CALIFORNIA, RECORDED NOVEMBER 21, 1975, BOOK 7690, PAGES 218, 236, 240, 243, 248 AND 252, OFFICIAL RECORDS OF CONTRA COSTA COUNTY, CALIFORNIA.

GENERAL NOTES

1. Aerial photography provided by AeroTech Mapping, Inc. Date of flight was Nov. 5, 2015. Horizontal datum is based on California State Plane Coordinate System (Zone 3), NAD83. Vertical datum is based on NAVD88, Geoid 12B.
2. Benchmark:

	NORTHING	EASTING	ELEVATION
HVP7	2162221.393	6145780.657	596.094
	2165804.078	6142883.805	746.560
HVP9	2165892.905	6145829.520	526.663

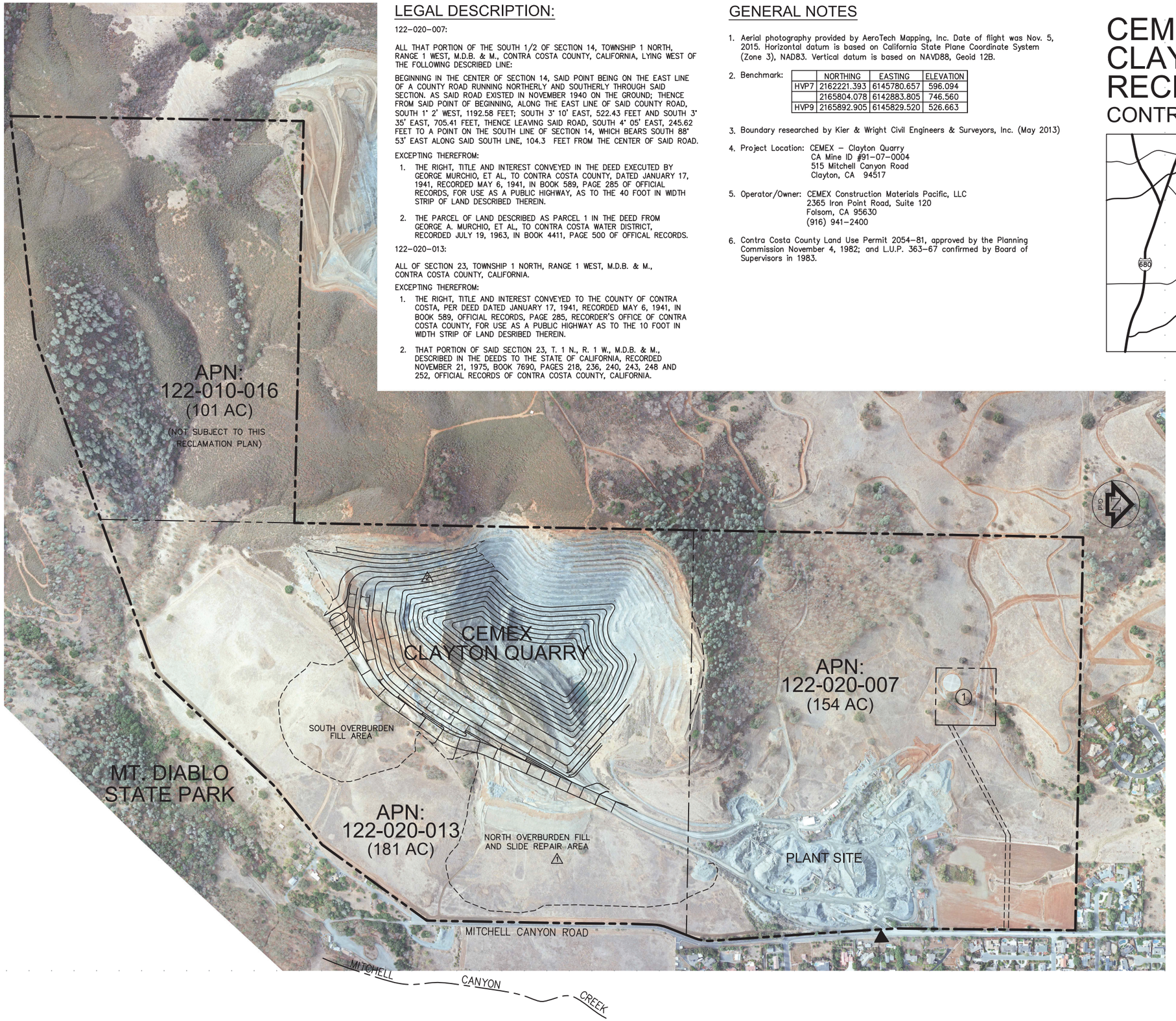
3. Boundary researched by Kier & Wright Civil Engineers & Surveyors, Inc. (May 2013)
4. Project Location: CEMEX – Clayton Quarry
   CA Mine ID #91-07-0004
   515 Mitchell Canyon Road
   Clayton, CA 94517
5. Operator/Owner: CEMEX Construction Materials Pacific, LLC
   2365 Iron Point Road, Suite 120
   Folsom, CA 95630
   (916) 941-2400
6. Contra Costa County Land Use Permit 2054-81, approved by the Planning Commission November 4, 1982; and L.U.P. 363-67 confirmed by Board of Supervisors in 1983.



LOCATION MAP
NOT TO SCALE

SPECIFIC NOTES

(1) Contra Costa County Water District
APN 122-020-006-5



LEGEND

- PROPERTY BOUNDARY (WITHIN RECLAMATION PLAN) 335 AC.
- CREEK
- INGRESS/EGRESS
- PRIOR DISTURBANCE; TO BE INCLUDED IN AMENDED RECLAMATION PLAN

SHEET INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SITE PLAN
3	CLAYTON QUARRY PLAN
4	CONCEPTUAL HAUL ROAD
5	CROSS SECTIONS A-A, B-B
6	CROSS SECTIONS 0+00 TO 6+00
7	CROSS SECTIONS 8+00 TO 14+00
8	CROSS SECTION 16+00
9	CROSS SECTIONS 18+00 TO 22+00
10	RECLAMATION PLAN
11	RECLAMATION PLAN CROSS SECTIONS
12	RECLAMATION PLAN DETAILS
13	TREE REMOVAL PLAN
14	SLOPE FACE DRAINAGE & EROSION CONTROL

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

TITLE SHEET
CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

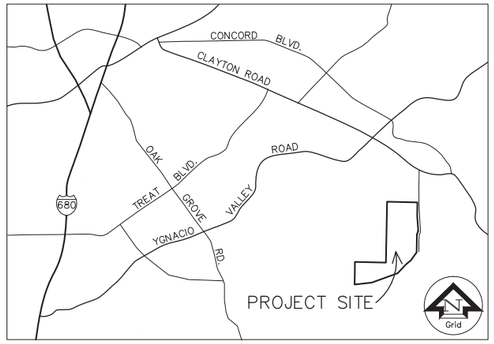
SCALE:	AS SHOWN					
DATE:	MAY 2017					
DESIGN BY:	KDS/DAR					
DRAWN BY:	KDS					
CHECKED BY:	DAR					
	KDS					

REV.	DATE	DESCRIPTION	BY
2	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS
1	06/2020	NORTH OVERBURDEN FILL/ SLIDE REPAIR	

SHEET NUMBER
1
OF 14 SHEETS

JOB NUMBER
164.00

CEMEX
CLAYTON QUARRY
CONTRA COSTA COUNTY, CA



VICINITY MAP
NOT TO SCALE

GENERAL NOTES

1. Topographic survey and aerial photography provided by AeroTech Mapping, Inc. Date of flight was Nov. 5, 2015. Horizontal datum is based on California State Plane Coordinate System (Zone 3), NAD83. Vertical datum is based on NAVD88, Geoid 12B.
2. Boundary researched by Kier & Wright Civil Engineers & Surveyors, Inc. (May 2013)
3. Project Location: CEMEX – Clayton Quarry
   CA Mine ID #91–07–0004
   515 Mitchell Canyon Road
   Clayton, CA 94517
4. Operator/Owner: CEMEX Construction Materials Pacific, LLC
   2365 Iron Point Road, Suite 120
   Folsom, CA 95630
   (916) 941–2400
5. Contra Costa County Land Use Permit 2054–81, approved by the Planning Commission November 4, 1982; and L.U.P. 363–67 confirmed by Board of Supervisors in 1983.
6. No water wells on site.
7. Disturbed Area = 190 acres± (Quarry Pit = 85 acres±, Fill Area = 53 acres±, Processing Plant & Haul Road = 52 acres±)

SPECIFIC NOTES

1. Pre–SMARA disturbance (no mining since)
2. Owned by Contra Costa Water District (not included in Reclamation Plan Boundary)
3. Haul Road will remain
4. Topsoil Stockpile (proposed)
5. Revegetation Test Plots (proposed location)

LEGEND

- PROPERTY BOUNDARY
- RECLAMATION PLAN BOUNDARY (190 ACRES)
- SCREENING BERM
- CREEK
- EPHEMERAL DRAINAGE
- ONSITE DRAINAGE DITCH
- RETENTION/DETENTION BASIN
- (P) POWER
- (A/3) SECTION NUMBER / SHEET NUMBER
- PRE SMARA DISTURBANCE
- CULVERTS (EX.)

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

SITE PLAN
CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE: AS SHOWN
DATE: MAY 2017
DESIGN BY: KDS/DAR
DRAWN BY: KDS
CHECKED BY: DAR / KDS / BY

REV.	DATE	DESCRIPTION
3	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS
2	06/2020	MODIFY RECLAMATION PLAN BOUNDARY
1	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA

SHEET NUMBER 2
OF 14 SHEETS
JOB NUMBER 164.00

Scale: 1" = 200' Contour Interval: 10'
200 0 200 400 600 FEET

RECLAMATION PLAN BOUNDARY MATCHES PROPERTY LINE, NO SETBACK

SLOPE TRANSITION FROM DIABASE TO KNOXVILLE. SEE DETAIL 1 ON SHT. 5

BENCH 6: EL 1130

BENCH 7: EL 1070
BENCH 8: EL 1010
BENCH 9: EL 950
BENCH 10: EL 890
BENCH 11: EL 830
BENCH 12: EL 770
BENCH 13: EL 710
BENCH 14: EL 650
BENCH 15: EL 590
BENCH 16: EL 530
BENCH 17: EL 470
BENCH 18: EL 410
BENCH 19: EL 350
BENCH 20: EL 290
BENCH 21: EL 230
BENCH 22: EL 170
110

QUARRY PIT

75' WIDE EAST RIM ACCESS ROAD

SOUTH OVERBURDEN FILL AREA

NORTH OVERBURDEN FILL AREA / SLIDE REPAIR AREA

N 30° E STRIKE

KEY

Scale: 1" = 100' Contour Interval: 10'

100 0 100 200 300 FEET

GENERAL NOTES

1. Topographic survey and aerial photography provided by AeroTech Mapping, Inc. Date of flight was Nov. 5, 2015. Horizontal datum is based on California State Plane Coordinate System (Zone 3), NAD83. Vertical datum is based on NAVD88, Geoid 12B.
2. Final mining footprint, slopes and depth may vary depending on field conditions, accessibility of product, ability of operator to mine, and market demand.
3. Geocontact plane between Diabase and Knoxville formation was visually located in the field by CEMEX and that information was used to map the N 30° E strike and 61° Dip geocontact plane.
4. Steepest slope in fill areas is 2 1/2:1 (horizontal to vertical) per Golder Associates, Inc. geotechnical recommendations.
5. Work shall conform to Chapter 88–11, Surface Mining and Reclamation, of Contra Costa County code; the project conditions of approval; Stormwater Pollution Prevention Plan (SWPPP); OSHA; MSHA; and other applicable local, state, and feredal regulations.

SPECIFIC NOTES

(1) Construct a buttress keyway at base of the permanent fill area per Golder Associates geotechnical recommendations, with subdrains if necessary.

(2) Place salvaged topsoil in stockpile, grade to drain.

(3) Remove and replace trees in this area pursuant to Contra Costa County code requirements. See Sheet 13.

(4) Pre–SMARA disturbance

LEGEND

- PROPERTY BOUNDARY
- RECLAMATION PLAN BOUNDARY
- 770 PROPOSED CONTOUR
- DISTURBANCE
- OVERBURDEN FILL
- (3) SPECIFIC NOTE
- Kx/DIABASE MINING SURFACE CONTACT LINE

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

CLAYTON QUARRY PLAN

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE:	AS SHOWN
DATE:	FEB., 2020
DESIGN BY:	KDS/DAR
DRAWN BY:	DAR
CHECKED BY:	KDS

REV.	DATE	DESCRIPTION	BY
2	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS
1	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA	

SHEET NUMBER 3
OF 14 SHEETS
JOB NUMBER 164.00

GENERAL NOTES

1. Topographic survey and aerial photography provided by AeroTech Mapping, Inc. Date of flight was Nov. 5, 2015. Horizontal datum is based on California State Plane Coordinate System (Zone 3), NAD83. Vertical datum is based on NAVD88, Geoid 12B.
2. Final mining footprint, slopes and depth may vary depending on field conditions, accessibility of product, ability of operator to mine, and market demand.
3. Geocontact plane between Diabase and Knoxville formation was visually located in the field by CEMEX and that information was used to map the N 30° E strike and 61° Dip geocontact plane.
4. Steepest slope in fill areas is 2 1/2:1 (horizontal to vertical)
5. Work shall conform to Chapter 88–11, Surface Mining and Reclamation, of Contra Costa County code; the project conditions of approval; Stormwater Pollution Prevention Plan (SWPPP); OSHA; MSHA; and other applicable local, state, and feredal regulations.
6. Haul road to pit bottom shown in approximate location.

SPECIFIC NOTES

(1) Place salvaged topsoil in stockpile, grade to drain.

75' WIDE EAST RIM ACCESS ROAD

PIT BOTTOM

SOUTH OVERBURDEN FILL AREA

NORTH OVERBURDEN FILL AREA / SLIDE REPAIR AREA

HAUL ROAD 60' WIDE, 10% GRADE

N 30° E STRIKE

KEY

Scattered brush

Scale: 1" = 100' Contour Interval: 10'

100 0 100 200 300 FEET

LEGEND

- PROPERTY BOUNDARY
- 770 PROPOSED CONTOUR
- HAUL ROAD
- (3) SPECIFIC NOTE

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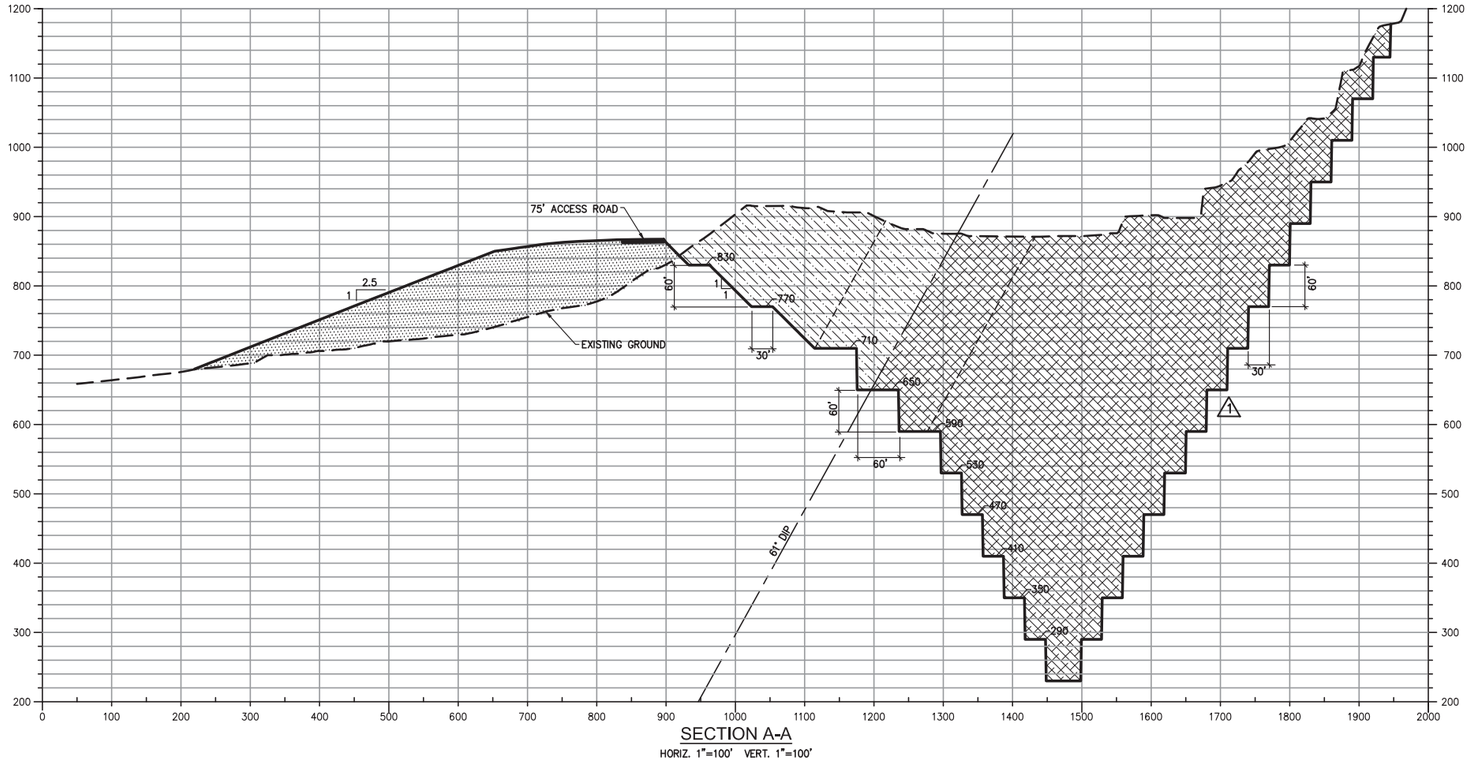
CONCEPTUAL HAUL ROAD

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

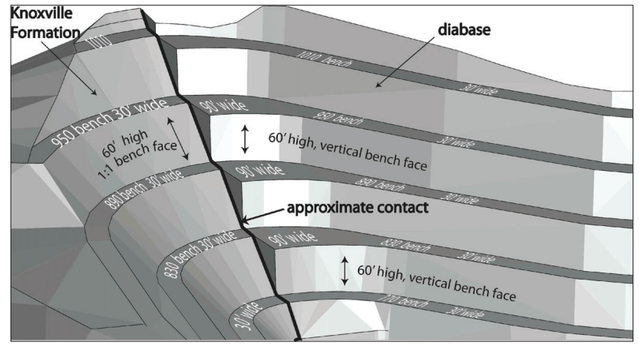
SCALE: AS SHOWN
DATE: FEB., 2020
DESIGN BY: KDS/DAR
DRAWN BY: DAR
CHECKED BY: KDS

REV.	DATE	DESCRIPTION	BY
2	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS
1	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA	

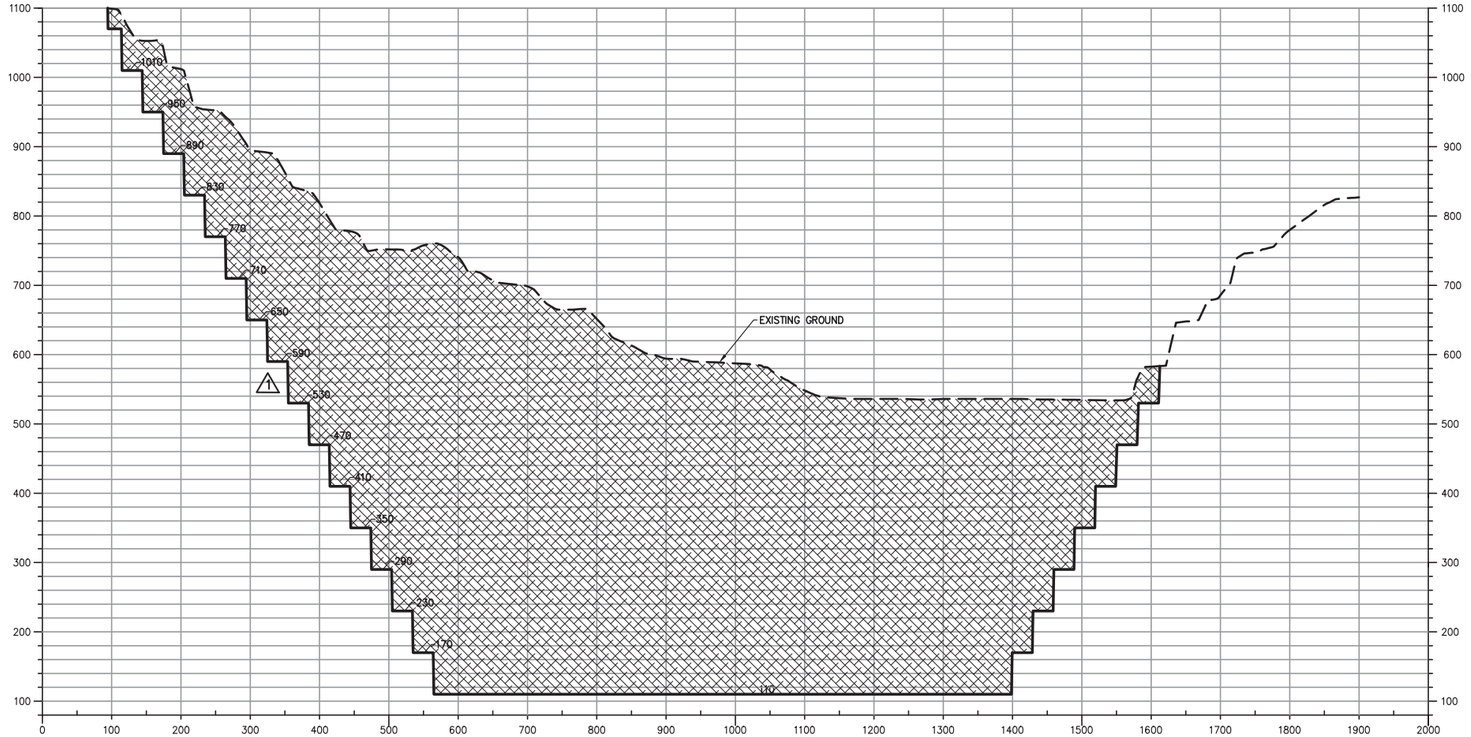
SHEET NUMBER 4
OF 14 SHEETS
JOB NUMBER 164.00



SECTION A-A
HORIZ. 1"=100' VERT. 1"=100'



DETAIL 1
DIABASE TO KNOXVILLE TRANSITION



SECTION B- B
HORIZ. 1"=100' VERT. 1"=100'

NOTES

1. THE GEOCONTACT PLANE BETWEEN THE DIABASE AND KNOXVILLE FORMATION WAS LOCATED IN THE FIELD BY CEMEX REPRESENTATIVES. THIS OBSERVATION WAS USED TO MAP THE N 30°E STRIKE AND 61° DIP PLANE.
2. THE STEEPEST SLOPE IN FILL AREAS IS 2.5:1 (H:V).

LEGEND

- EXISTING GROUND
- PROPOSED GROUND SURFACE
- KNOXVILLE TO DIABASE CONTACT ZONE (APPROX.)
- DIABASE/KNOXVILLE INTERFACE
- 830 APPROX. BENCH ELEVATION
- Jcd Diabase
- JK Knoxville
- FILL

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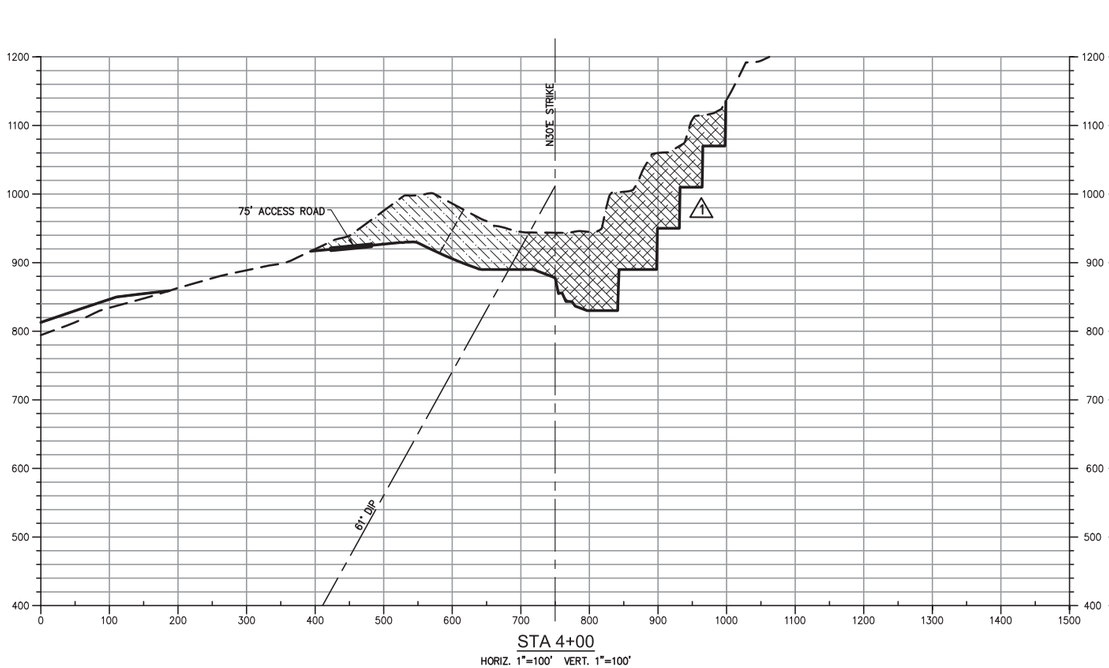
CROSS SECTIONS A-A & B-B

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE:	AS SHOWN
DATE:	MAY 2017
DESIGN BY:	KDS/DAR
DRAWN BY:	DAR
CHECKED BY:	KDS

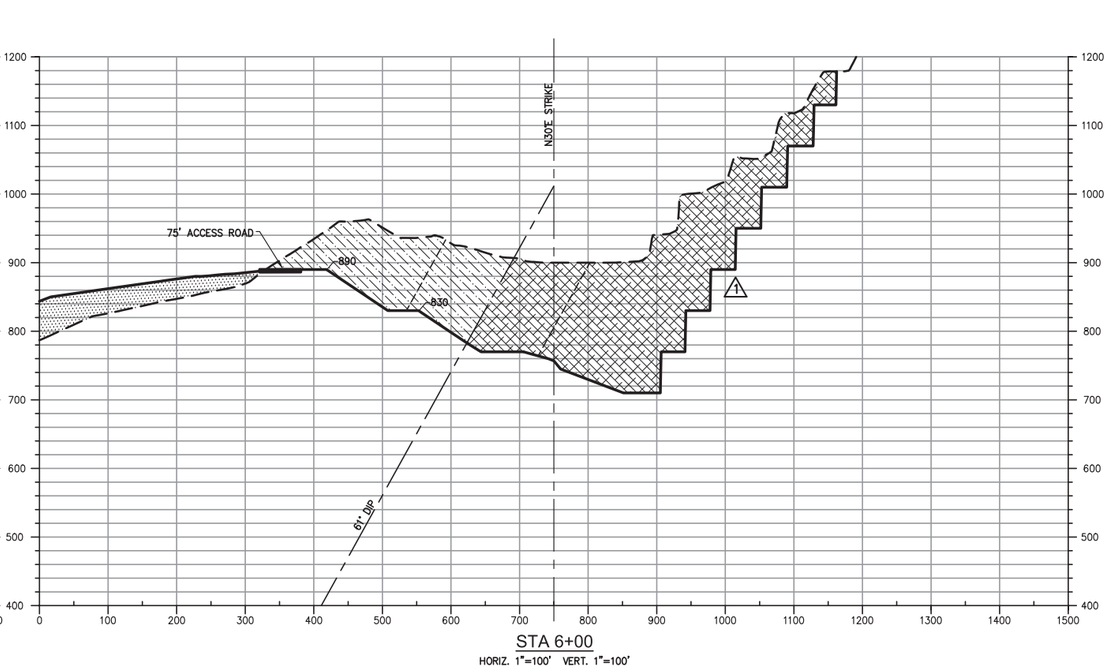
REV.	DATE	DESCRIPTION	BY
1	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS

SHEET NUMBER 5 OF 14 SHEETS
JOB NUMBER 164.00



STA 4+00

HORIZ. 1"=100' VERT. 1"=100'



STA 6+00

HORIZ. 1"=100' VERT. 1"=100'

NOTES

1. THE GEOCONTACT PLANE BETWEEN THE DIABASE AND KNOXVILLE FORMATION WAS LOCATED IN THE FIELD BY CEMEX REPRESENTATIVES. THIS OBSERVATION WAS USED TO MAP THE N 30°E STRIKE AND 61° DIP PLANE.
2. THE STEEPEST SLOPE IN FILL AREAS IS 2.5:1 (H:V).

LEGEND

- EXISTING GROUND
- PROPOSED GROUND SURFACE
- KNOXVILLE TO DIABASE CONTACT ZONE (APPROX.)
- DIABASE/KNOXVILLE INTERFACE
- 830 APPROX. BENCH ELEVATION
- Jcd Diabase
- JK Knoxville
- FILL

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CROSS SECTIONS 0+00 TO 6+00

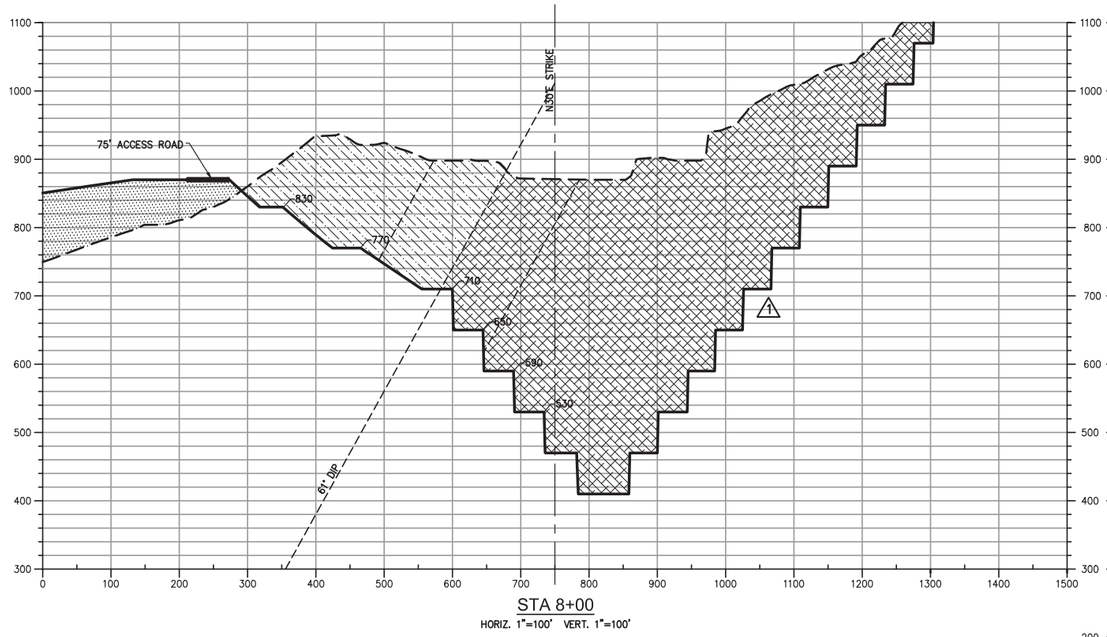
CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE: AS SHOWN
DATE: MAY 2017
DESIGN BY: KOS/DAR
DRAWN BY: DAR
CHECKED BY: KOS

REV.	DATE	DESCRIPTION	BY
1	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KOS

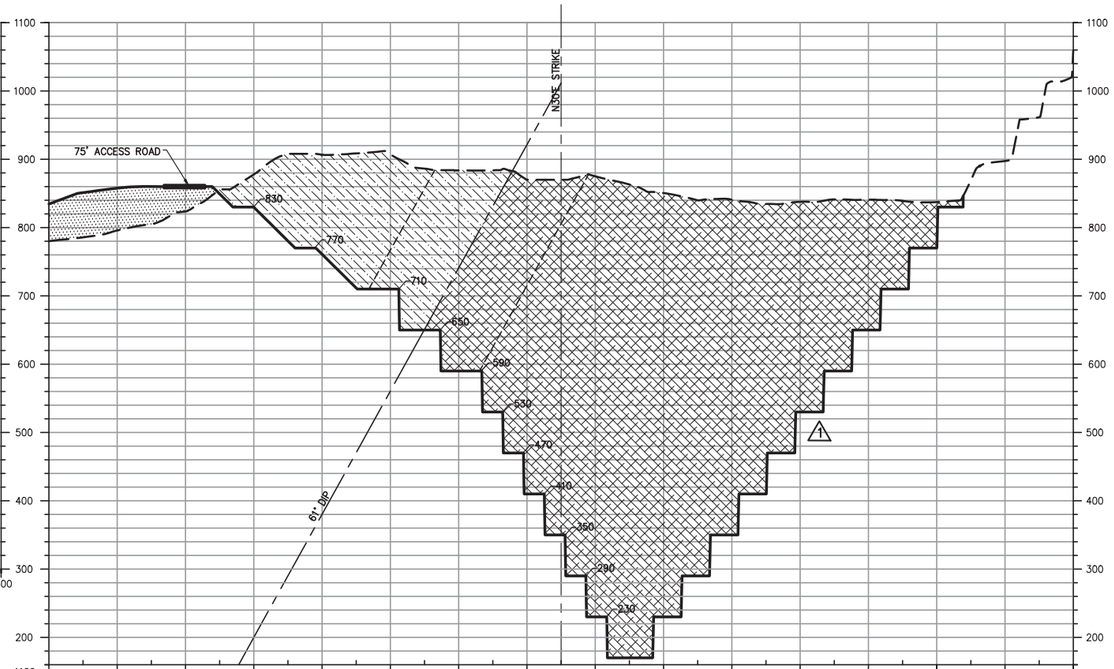
SHEET NUMBER 6 OF 14 SHEETS

JOB NUMBER 164.00



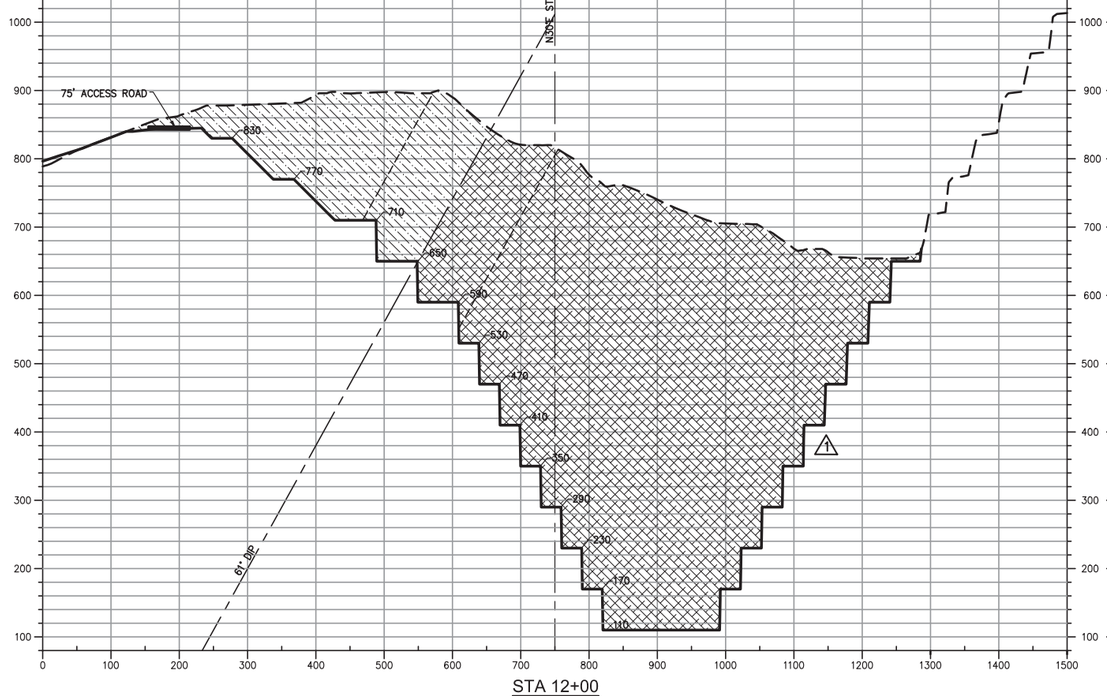
STA 8+00

HORIZ. 1"=100' VERT. 1"=100'



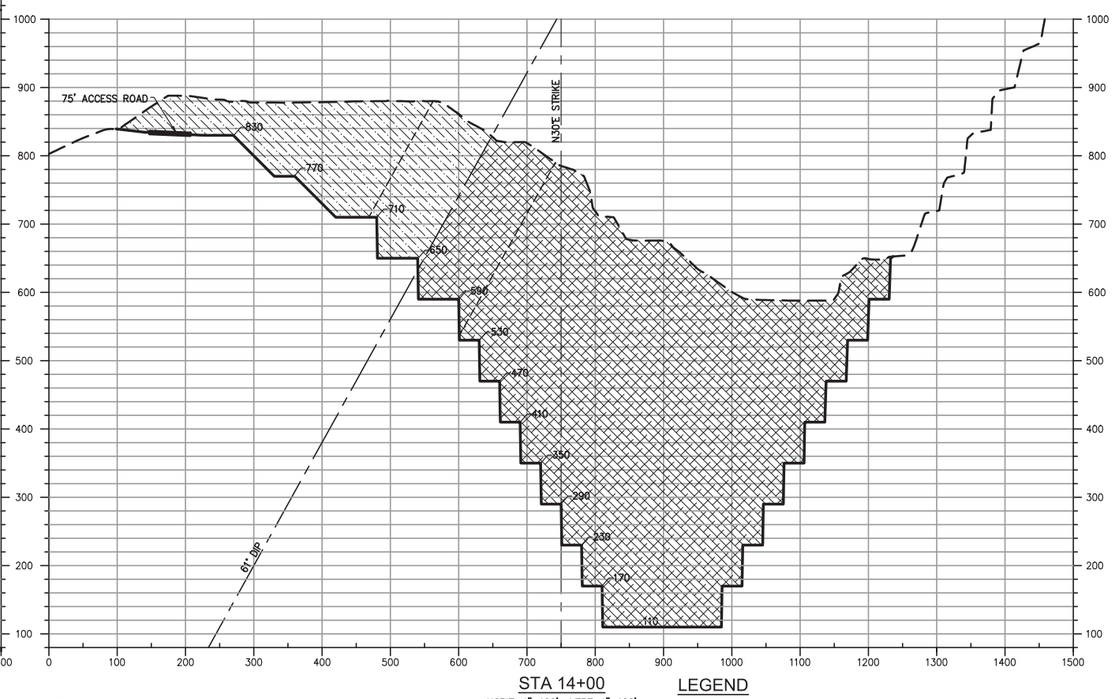
STA 10+00

HORIZ. 1"=100' VERT. 1"=100'



STA 12+00

HORIZ. 1"=100' VERT. 1"=100'



STA 14+00

HORIZ. 1"=100' VERT. 1"=100'

NOTES

1. THE GEOCONTACT PLANE BETWEEN THE DIABASE AND KNOXVILLE FORMATION WAS LOCATED IN THE FIELD BY CEMEX REPRESENTATIVES. THIS OBSERVATION WAS USED TO MAP THE N 30°E STRIKE AND 61° DIP PLANE.
2. THE STEEPEST SLOPE IN FILL AREAS IS 2.5:1 (H:V).

LEGEND

- EXISTING GROUND
- PROPOSED GROUND SURFACE
- KNOXVILLE TO DIABASE CONTACT ZONE (APPROX.)
- DIABASE/KNOXVILLE INTERFACE
- 830 APPROX. BENCH ELEVATION
- Jcd Diabase
- JK Knoxville
- FILL

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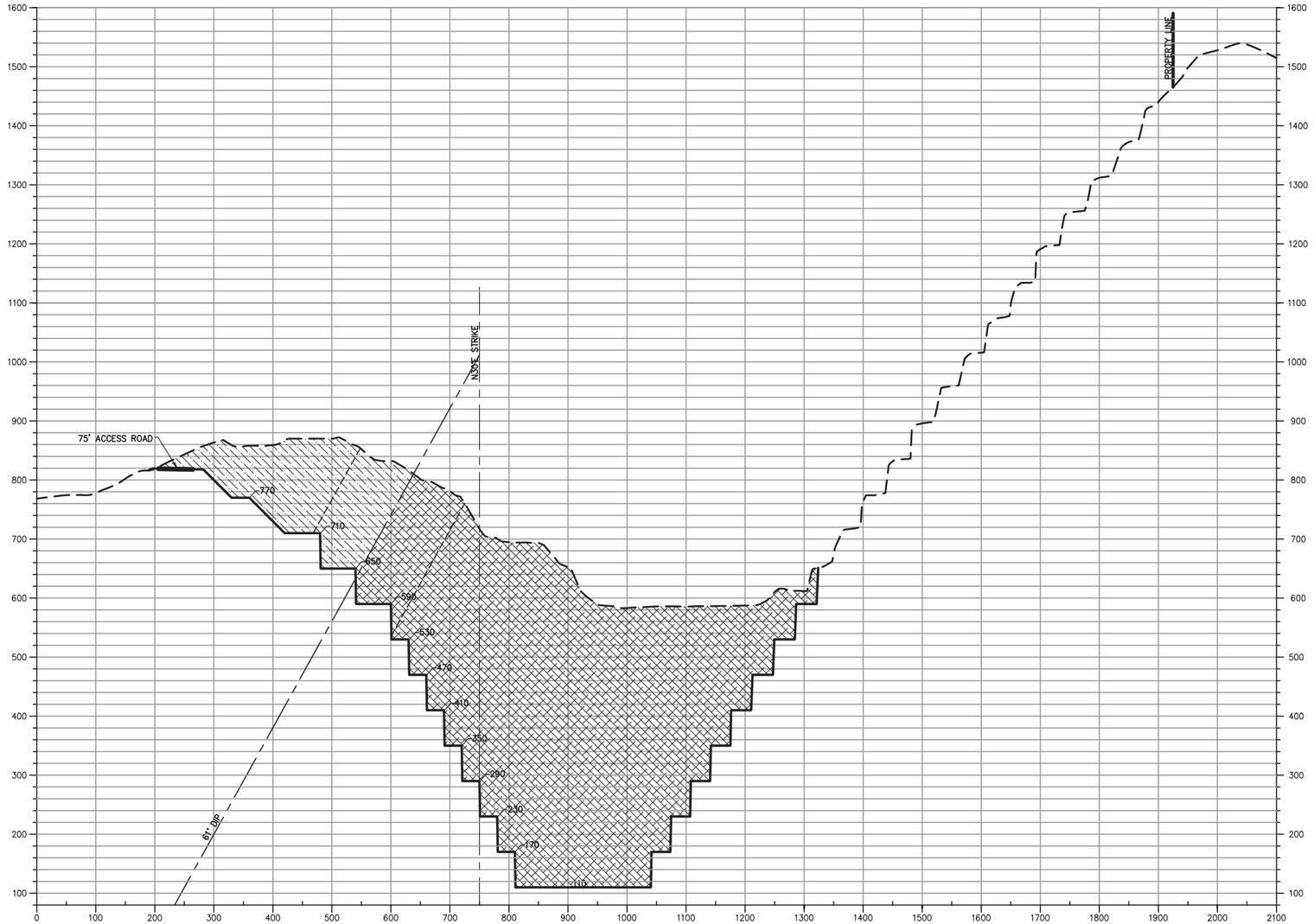
CROSS SECTIONS 8+00 TO 14+00

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE:	AS SHOWN
DATE:	MAY 2017
DESIGN BY:	KDS/DAR
DRAWN BY:	DAR
CHECKED BY:	KDS

REV.	DATE	DESCRIPTION	BY
1	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS

SHEET NUMBER 7
OF 14 SHEETS
JOB NUMBER 164.00



STA 16+00

HORIZ. 1"=100' VERT. 1"=100'

NOTES

1. THE GEOCONTACT PLANE BETWEEN THE DIABASE AND KNOXVILLE FORMATION WAS LOCATED IN THE FIELD BY CEMEX REPRESENTATIVES. THIS OBSERVATION WAS USED TO MAP THE N 30°E STRIKE AND 61° DIP PLANE.
2. THE STEEPEST SLOPE IN FILL AREAS IS 2.5:1 (H:V).

LEGEND

- EXISTING GROUND
- PROPOSED GROUND SURFACE
- KNOXVILLE TO DIABASE CONTACT ZONE (APPROX.)
- DIABASE/KNOXVILLE INTERFACE
- 830 APPROX. BENCH ELEVATION
- Jcd Diabase
- JK Knoxville
- FILL

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CROSS SECTIONS 16+00

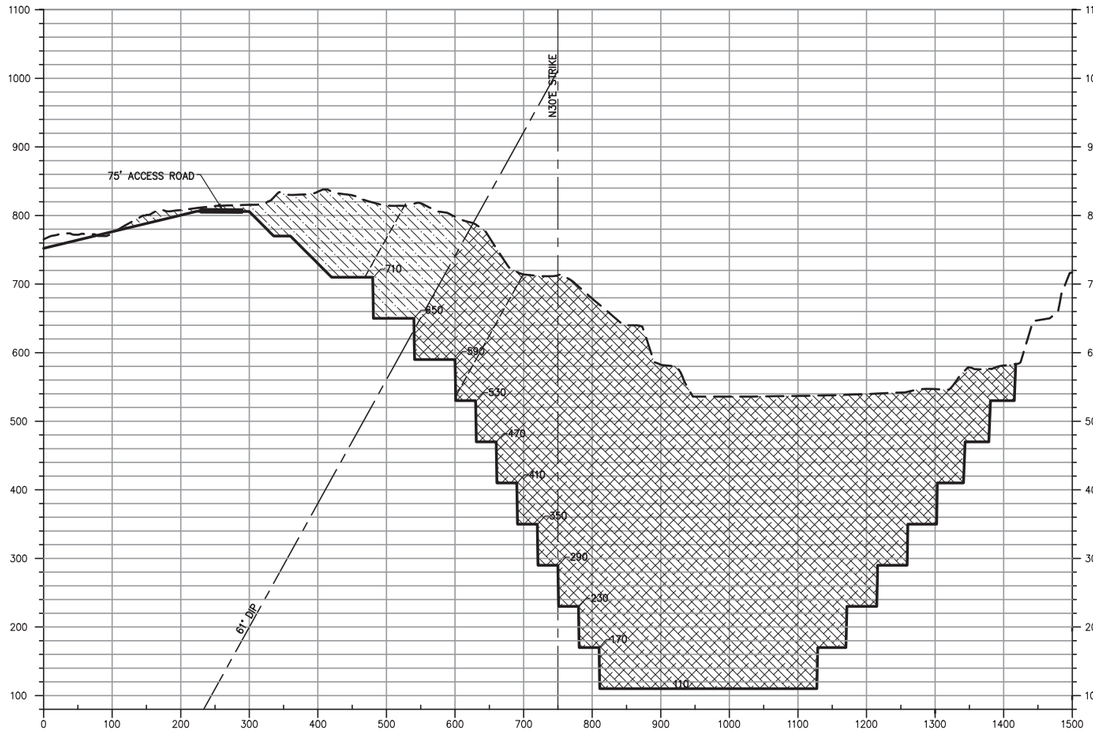
CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE: AS SHOWN
DATE: MAY 2017
DESIGN BY: KDS/DAR
DRAWN BY: DAR
CHECKED BY: KDS

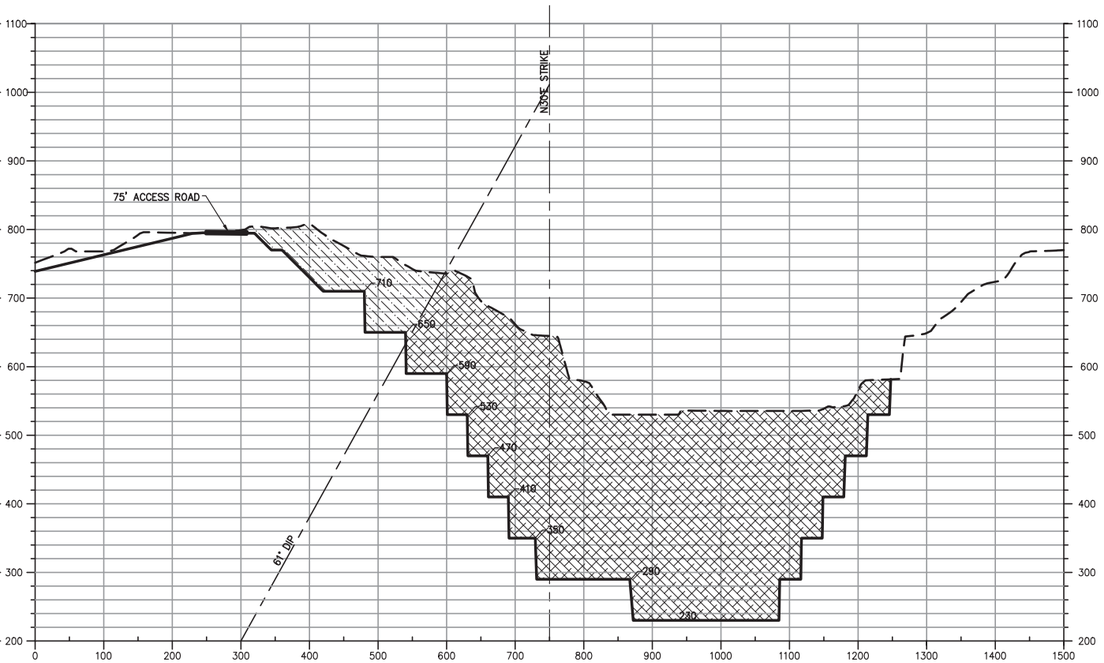
REV.	DATE	DESCRIPTION	BY

SHEET NUMBER 8 OF 14 SHEETS

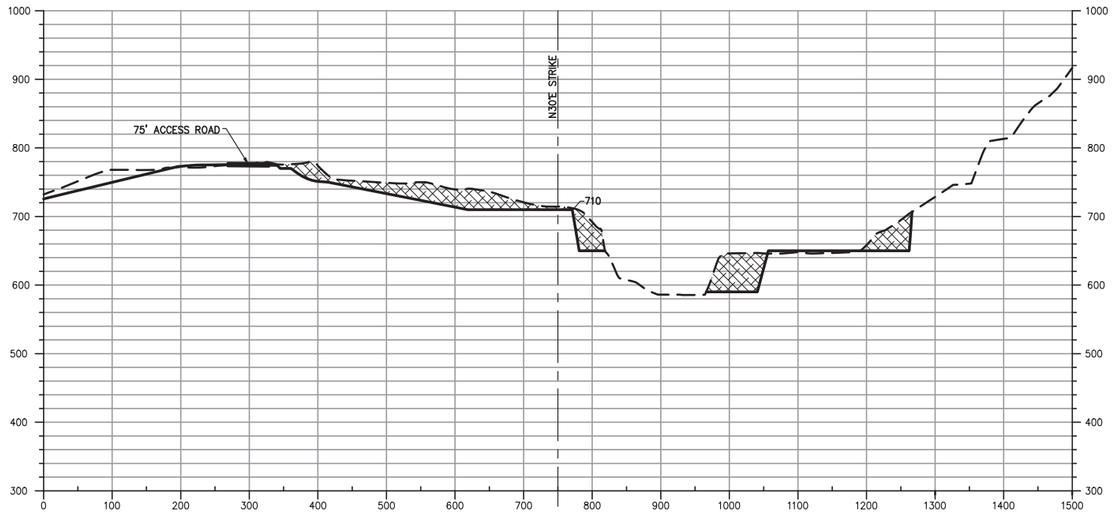
JOB NUMBER 164.00



STA 18+00
HORIZ. 1"=100' VERT. 1"=100'



STA 20+00
HORIZ. 1"=100' VERT. 1"=100'



STA 22+00
HORIZ. 1"=100' VERT. 1"=100'

NOTES

1. THE GEOCONTACT PLANE BETWEEN THE DIABASE AND KNOXVILLE FORMATION WAS LOCATED IN THE FIELD BY CEMEX REPRESENTATIVES. THIS OBSERVATION WAS USED TO MAP THE N 30°E STRIKE AND 61° DIP PLANE.
2. THE STEEPEST SLOPE IN FILL AREAS IS 2.5:1 (H:V).

LEGEND

- EXISTING GROUND
- PROPOSED GROUND SURFACE
- KNOXVILLE TO DIABASE CONTACT ZONE (APPROX.)
- DIABASE/KNOXVILLE INTERFACE
- 830 APPROX. BENCH ELEVATION
- Jcd Diabase
- JK Knoxville
- FILL

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CROSS SECTIONS 18+00 TO 22+00

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE: AS SHOWN
DATE: MAY 2017
DESIGN BY: KDS/DAR
DRAWN BY: DAR
CHECKED BY: KDS

REV.	DATE	DESCRIPTION	BY

SHEET NUMBER 9 OF 14 SHEETS
JOB NUMBER 164.00

CEMEX
APN 122-010-016
(101 AC)

CEMEX
APN 122-020-007
(154 AC)

CEMEX
APN 122-020-013
(181 AC)

RECLAMATION PLAN BOUNDARY
MATCHES PROPERTY LINE, NO SETBACK

CEMEX OWNS
ADJACENT PROPERTY

EAST RIM ACCESS ROAD

SOUTH OVERBURDEN FILL AREA

HAUL ROAD
(TO REMAIN FOR ACCESS)

OUTLET
INV=735

MANHOLE
INV=729

NORTH OVERBURDEN FILL AREA/
SLIDE REPAIR AREA

OUTLET STRUCTURE PLAN VIEW
SHEET 12

MANHOLE
INV=630

EX. BERM TO REMAIN

BUILDINGS
TO REMAIN

CCWD EASEMENT

SCREENING BERM

MITCHELL CANYON ROAD

CONNECT TO EX. 18"DIA.
STORM DRAIN PIPE

EXISTING
INGRESS/EGRESS

EXISTING ACCESS
DRIVE (NO HAUL
TRUCKS)

LEGEND

- PROPERTY BOUNDARY
- RECLAMATION PLAN BOUNDARY
- FINAL ELEVATIONS
- SLOPE BANK
- PIPELINE & MANHOLE
- ACCESS/FIRE ROAD (TO REMAIN)
- FENCELINE (NEW & EXISTING)
- DETENTION PONDS
- DRAINAGE
- OVERBURDEN FILL
- CULVERTS (EX.)
- SCREENING BERM

RECLAMATION SPECIAL NOTES

1. Remove all stockpiles, equipment, structures, buildings, foundations, and utilities, except buildings shown to remain for use in agricultural property management. Grade disturbed areas to drain to ponds. Place topsoil/growth media as needed, hydroseed area, and return land to open space.
2. Future quarry lake will be maintained by Cemex or their assignees.
3. Pre-SMARA disturbance.
4. Overburden fill placed in quarry. (optional)
5. Haul roads to remain for Maintenance and Emergency access road.
6. Contra Costa Water District

GENERAL NOTES

1. Final elevations dependant upon amount of reserves found in the field, ability to access the material, and the extent of mining.
2. Work shall conform to Chapter 88-11, Surface Mining and Reclamation, of Contra Costa County code; the project conditions of approval; Stormwater Pollution Prevention Plan (SWPPP); OSHA; MSHA; and other applicable local, state, and feredal regulations.
3. All fire/access roads to remain (typical). Plant tree screen along eastside of East Rim Access Road.
4. Reclamation End Use:
   Open Space = 190 Acres
   Quarry Lake Water Surface (Ultimate) Elev. 735 msl =32 Acres

Scale: 1" = 200' Contour Interval: 10'

200 0 200 400 600 FEET

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RECLAMATION PLAN

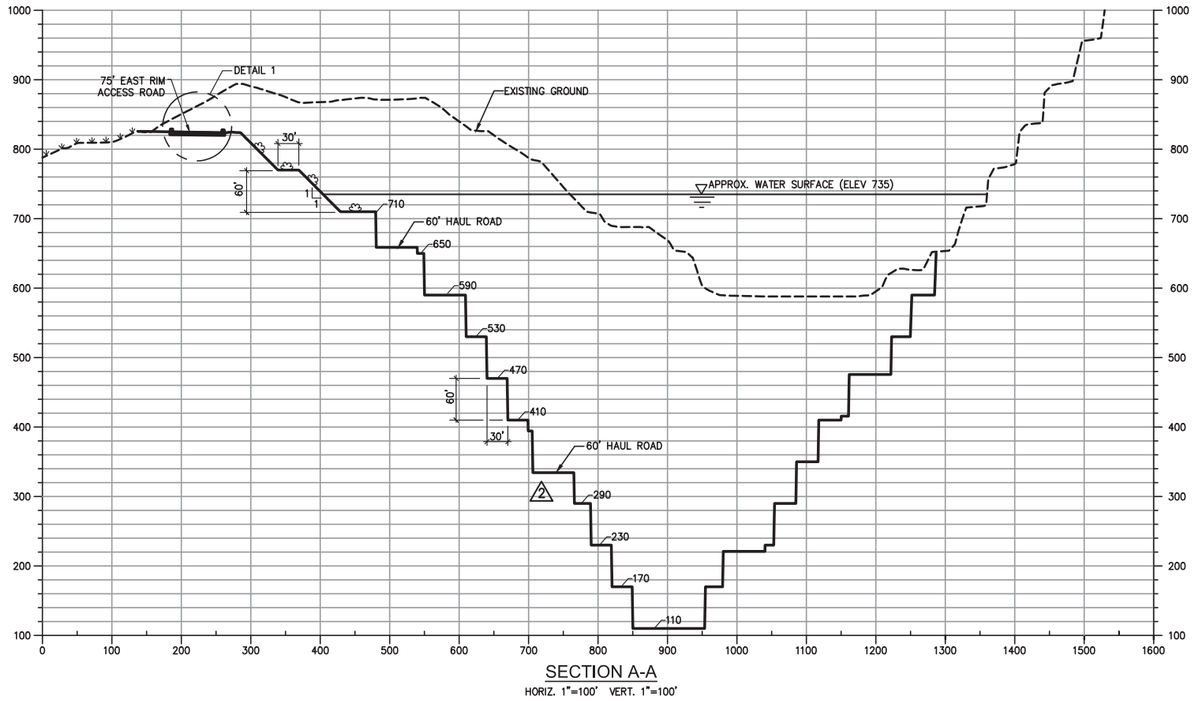
CLAYTON QUARRY
CEMEX

CONTRA COSTA COUNTY CALIFORNIA

REV.	DATE	DESCRIPTION	BY
5	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS
4	06/2020	REALIGN STORM DRAIN	KDS
3	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA	KDS
2	06/2020	MODIFY RECLAMATION PLAN BOUNDARY	DAR
1	06/2020	REMOVE ALTERNATE SITE ACCESS	KDS

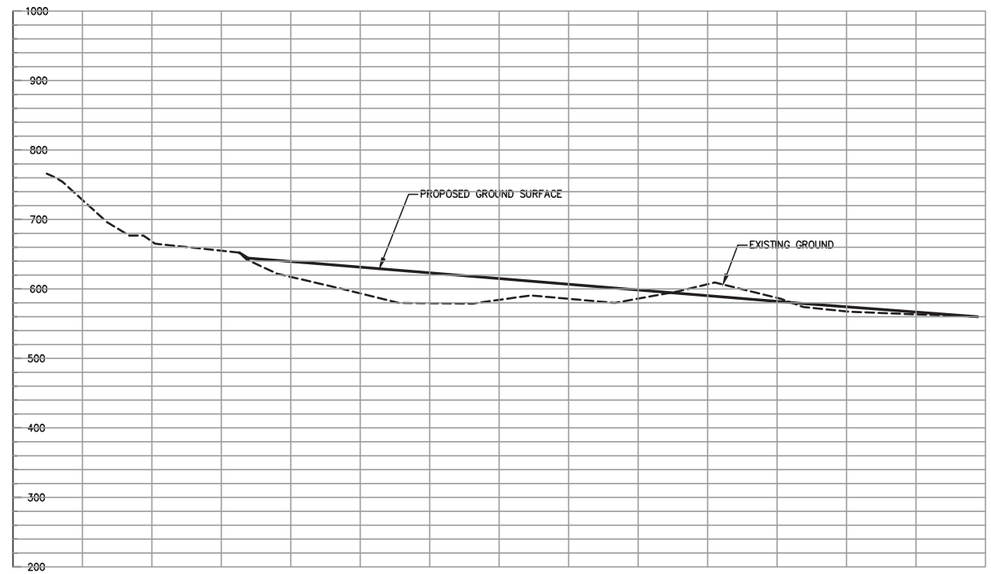
SCALE: AS SHOWN
DATE: MAY 2017
DESIGN BY: KDS
DRAWN BY: KDS/DAR
CHECKED BY: DAR

SHEET NUMBER
10
OF 14 SHEETS
JOB NUMBER
164.00



SECTION A-A

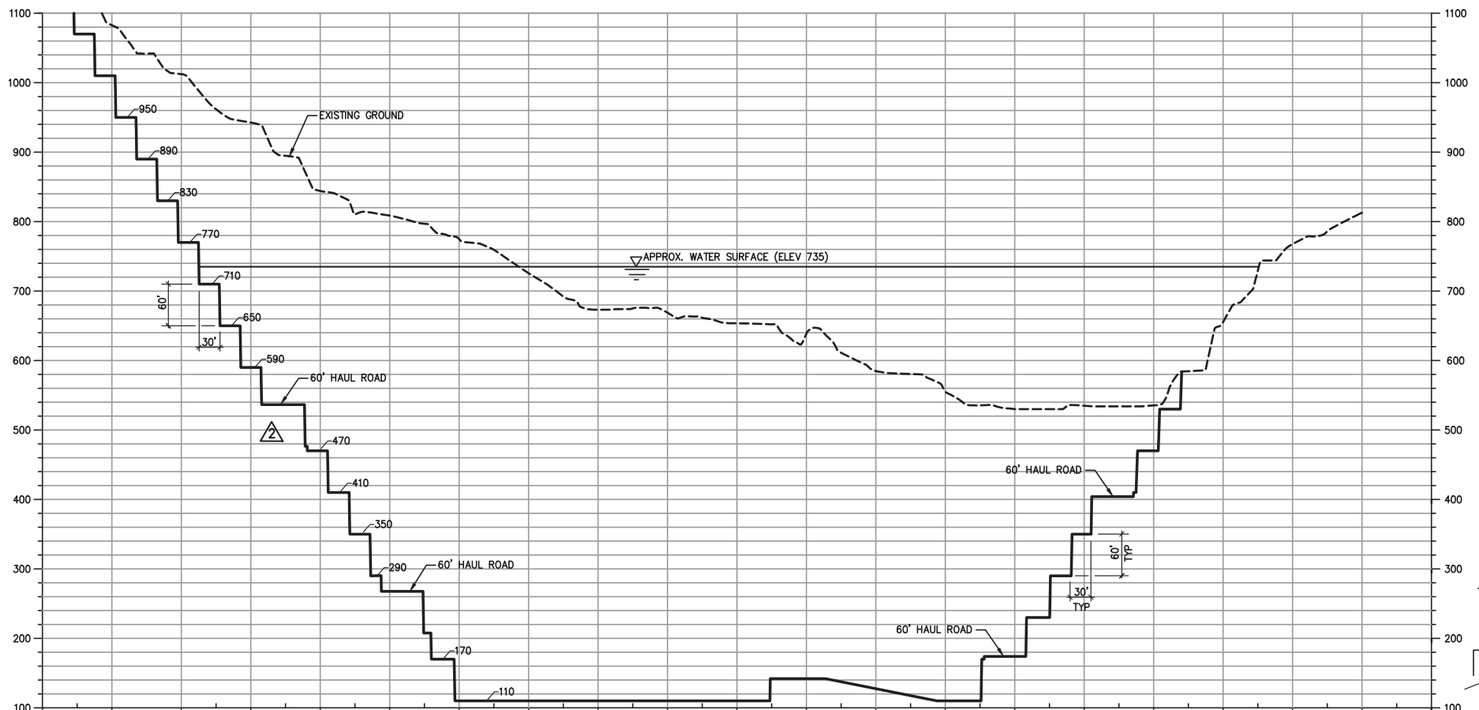
HORIZ. 1"=100' VERT. 1"=100'



PLANT SITE CROSS SECTION

SECTION C-C

HORIZ. 1"=100' VERT. 1"=100'



SECTION B- B

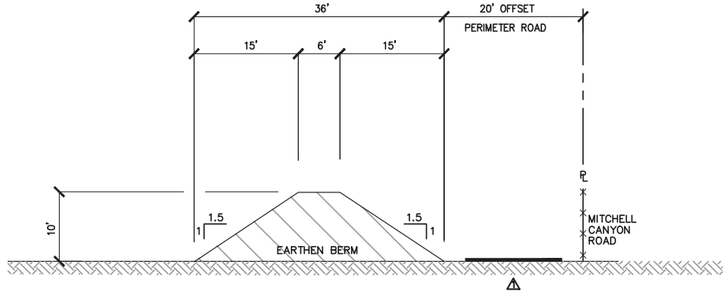
HORIZ. 1"=100' VERT. 1"=100'

LEGEND

OPEN SPACE (CHAPARRAL COVER)

OPEN SPACE (GRASSLAND)

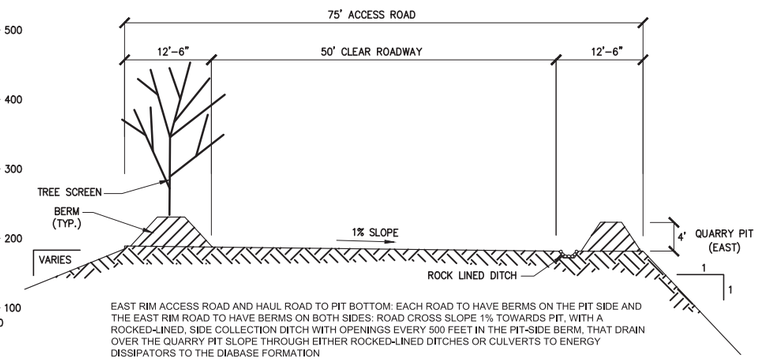
APPROXIMATE WATER SURFACE LEVEL



SECTION D-D - SCREENING BERM

HORIZ. 1"=10', VERT. 1"=10' SHEET 10

NOTE 1: LEAVE OPENING IN SCREENING BERM FOR ALTERNATE SITE ACCESS ROAD AND ROADWAY EASEMENT TO CONTRA COSTA COUNTY WATER DISTRICT PROPERTY.



EAST RIM ACCESS ROAD AND HAUL ROAD TO PIT BOTTOM: EACH ROAD TO HAVE BERMS ON THE PIT SIDE AND THE EAST RIM ROAD TO HAVE BERMS ON BOTH SIDES: ROAD CROSS SLOPE 1% TOWARDS PIT, WITH A ROCKED-LINED, SIDE COLLECTION DITCH WITH OPENINGS EVERY 500 FEET IN THE PIT-SIDE BERM, THAT DRAIN OVER THE QUARRY PIT SLOPE THROUGH EITHER ROCKED-LINED DITCHES OR CULVERTS TO ENERGY DISSIPATORS TO THE DIABASE FORMATION

DETAIL 1 - EAST RIM ACCESS ROAD

HORIZ. 1"=10', VERT. 1"=10'

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RECLAMATION CROSS SECTIONS

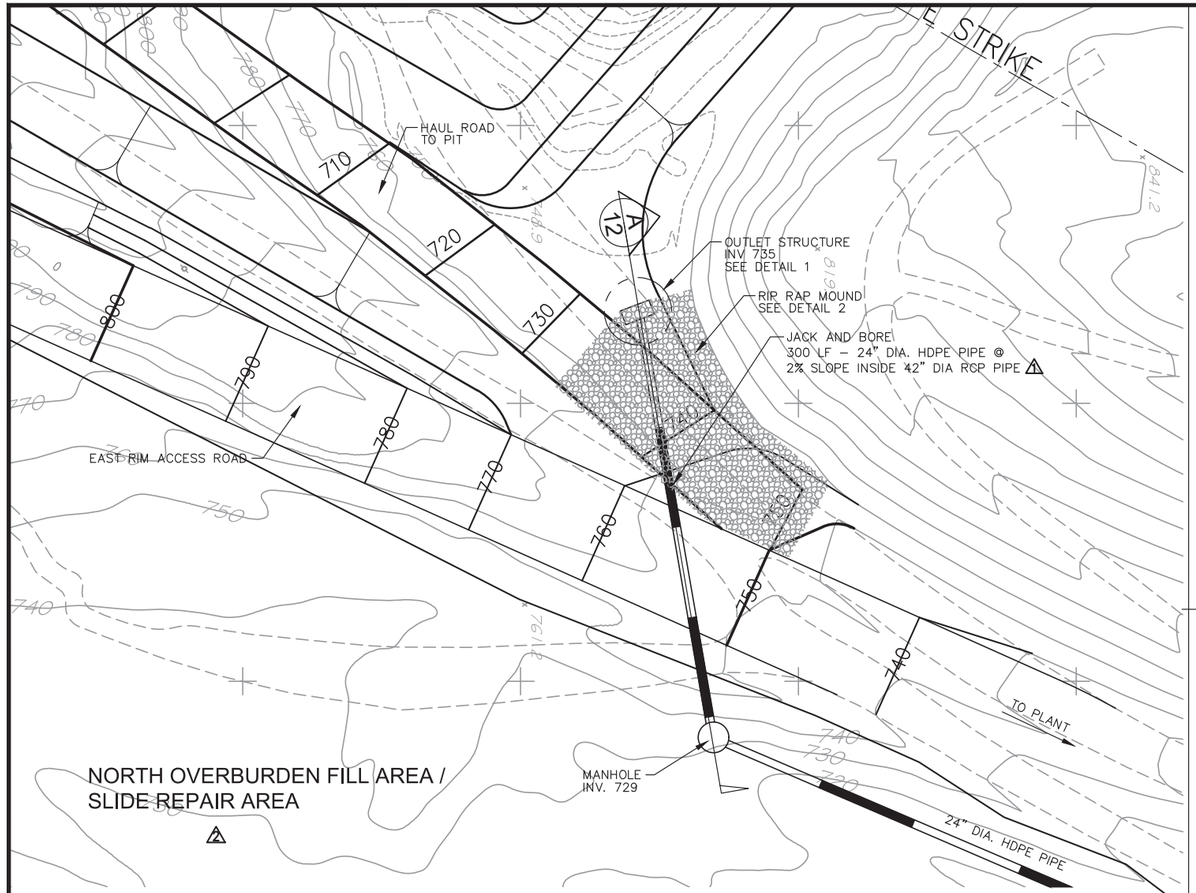
CLAYTON QUARRY
CEMEX

CONTRA COSTA COUNTY CALIFORNIA

SCALE:	AS SHOWN				
DATE:	MAY 2017				
DESIGN BY:	KDS/DAR				
DRAWN BY:	DAR				
CHECKED BY:	KDS				
REV.	DATE	DESCRIPTION	BY		
2	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS		
1	06/2020	LOWER SCREENING BERM			

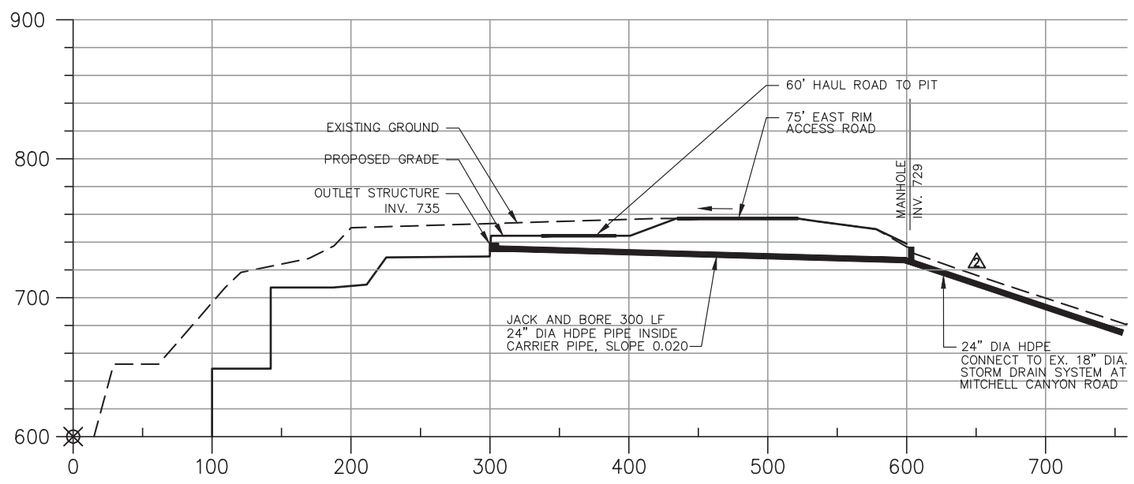
SHEET NUMBER 11 OF 14 SHEETS

JOB NUMBER 164.00



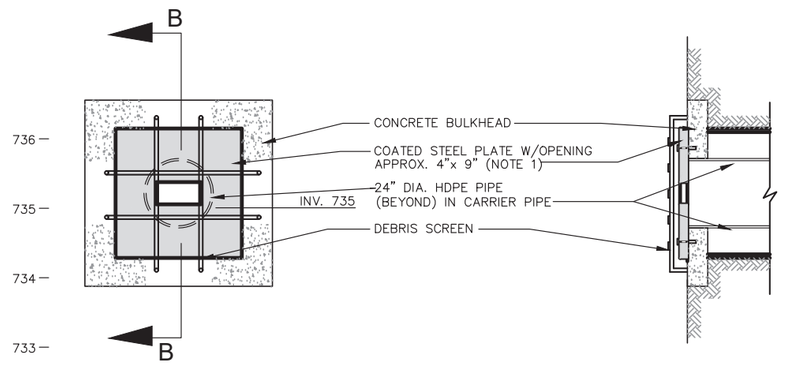
DRAINAGE PIPE OUTLET STRUCTURE PLAN VIEW

1" = 50'



PROFILE A-A'

HORIZ. 1" = 50' VERT. 1" = 50'



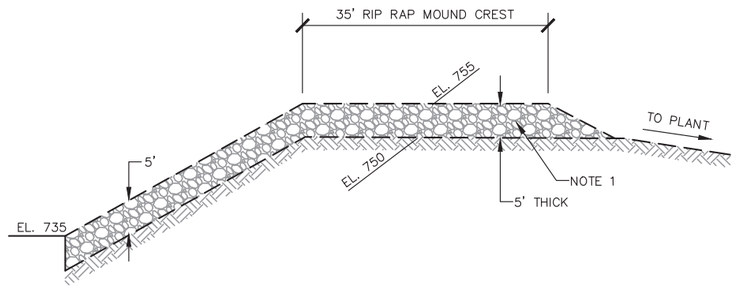
DETAIL 1 OUTLET STRUCTURE FRONT VIEW

HORIZ. 1" = 1' VERT. 1" = 1'

SECTION B-B SIDE VIEW

HORIZ. 1" = 1' VERT. 1" = 1'

NOTE 1: FINAL DESIGN AND DIMENSIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BASED ON FINAL QUARRY PIT GRADES.



DETAIL 2 - RIP RAP MOUND

HORIZ. 1" = 10' VERT. 1" = 10'

NOTE 1: CONSTRUCT ROCK RIP RAP MOUND PRIOR TO QUARRY FILLING WITH WATER.

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Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

RECLAMATION DETAILS

CLAYTON QUARRY

CEMEX

CONTRA COSTA COUNTY CALIFORNIA

SCALE:	AS SHOWN				
DATE:	MAY 2017				
DESIGN BY:	KDS/DAR				
DRAWN BY:	DAR				
CHECKED BY:	KDS				
REV.	DATE	DESCRIPTION	BY		
2	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA INCREASE PIPE 12" TO 24" DIA.	KDS		
1	01/2019		KDS		

SHEET NUMBER 12 OF 14 SHEETS

JOB NUMBER 164.00

NOTE: Work shall conform to the Arborist Report by LSA, dated June 2015 and the Contra Costa County Tree Ordinance Chapter 816-6: Tree Protection and Preservation.

TREES TO REMAIN

TREE#	TYPE	CONDITION	DBH	HEIGHT
144	Blue oak	Good	32	15
142	Blue oak	Good	60	35
140	Blue oak	Good	36	20
141	Blue oak	Good	32	25
143	Blue oak	Good	36	35
137	Blue oak	Good	36	35
136	Blue oak	Good	24	40
134	Live oak	Fair	52	30
135	Blue oak	Good	48	35
133	Valley oak	Good	18	40
26	Blue oak	Good	36	45
32	Blue oak	Good	6	20
31	Blue oak	Good	18	25
30	Blue oak	Good	12	15
29	Blue oak	Good	18	25
33	Blue oak	Good	24	40
28	Blue oak	Good	12	40
27	Blue oak	Good	24	40
23	Blue oak	Good	10	30
21	Blue oak	Good	30	25
22	Blue oak	Good	48	30
24	Blue oak	Good	30	40
34	Blue oak	Good	24	35
25	Blue oak	Good	48	40
20	Blue oak	Good	30	25
19	Blue oak	Good	30	35
18	Blue oak	Good	48	30
17	Blue oak	Good	48	45
15	Blue oak	Good	30	25
16	Blue oak	Good	36	45
14	Blue oak	Good	36	45
13	Blue oak	Good	24	40
11	Blue oak	Good	12	15
12	Blue oak	Good	24	35
9	Valley oak	Good	30	40
8	Valley oak	Good	24	40
10	Blue oak	Good	30	25
4	Valley oak	Good	60	45
5	Valley oak	Good	72	45
6	Blue oak	Good	30	15
3	Blue oak	Good	60	50
2	Blue oak	Good	12	25
1	Blue oak	Fair	62	40
7	Juniper	Good	12	10

TREES TO BE REMOVED

TREE#	TYPE	CONDITION	DBH	HEIGHT
129	Blue oak	Good	52	45
130	Blue oak	Good	24	40
128	Blue oak	Good	36	40
68	Blue oak	Good	30	45
69	Blue oak	Good	30	35
70	Blue oak	Good	18	30
72	Blue oak	Good	48	40
71	Blue oak	Good	30	40
67	Blue oak	Good	72	40
66	Blue oak	Good	30	45
64	Blue oak	Good	36	30
65	Blue oak	Good	36	45
63	Blue oak	Good	12	30
62	Blue oak	Good	24	40
149	Valley oak	Good	52	45
87	Valley oak	Good	60	55
86	Valley oak	Good	48	50
88	Elderberry	Good	30	40
85	Buckeye	Fair	36	20
84	Buckeye	Good	48	25
83	Buckeye	Good	48	35
82	Buckeye	Fair	52	25
81	Buckeye	Good	18	25
80	Buckeye	Good	24	25
79	Buckeye	Good	52	35
78	Buckeye	Good	10	12
90	Blue oak	Good	36	35
89	Live oak	Good	48	40
77	Blue oak	Good	52	50
73	Blue oak	Good	36	45
74	Blue oak	Good	48	45
75	Blue oak	Good	48	50
76	Blue oak	Good	18	25
148	Blue oak	Fair	48	40
147	Blue oak	Good	48	45
145	Blue oak	Good	36	40
139	Blue oak	Good	48	40
146	Live oak	Poor	24	15
138	Blue oak	Good	60	45
132	Blue oak	Good	48	35
37	Blue oak	Good	42	40
131	Blue oak	Good	36	40
40	Blue oak	Good	24	40
39	Blue oak	Good	12	40
41	Blue oak	Good	18	45
42	Blue oak	Good	30	35
38	Blue oak	Good	24	35
127	Blue oak	Good	18	35
100	Blue oak	Good	12	35
99	Blue oak	Good	24	35
98	Blue oak	Good	24	35
94	Blue oak	Good	10	35
96	Blue oak	Good	18	30
95	Blue oak	Good	24	30
91	Blue oak	Good	48	30
93	Blue oak	Good	10	30
92	Blue oak	Good	24	40
97	Blue oak	Good	10	30
56	Blue oak	Good	36	35
61	Blue oak	Good	18	40
59	Blue oak	Good	18	35
60	Blue oak	Good	12	35
57	Blue oak	Good	24	35
58	Blue oak	Good	18	35
53	Blue oak	Good	12	25
54	Blue oak	Good	24	40
55	Blue oak	Good	14	35
50	Blue oak	Good	48	25
49	Blue oak	Poor	10	15
51	Blue oak	Good	8	25
52	Blue oak	Good	24	30
48	Blue oak	Good	18	25
47	Blue oak	Good	30	40
46	Blue oak	Good	6	25
44	Blue oak	Good	30	35
43	Blue oak	Good	10	15
45	Blue oak	Good	12	40
36	Blue oak	Good	6	25
35	Blue oak	Good	18	40

SOUTH OVERBURDEN FILL AREA

KEY

TYPICAL TREE DESIGNATION

Grid N

Scale: 1" = 50' Contour Interval: 10'

50 0 50 100 150 FEET

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

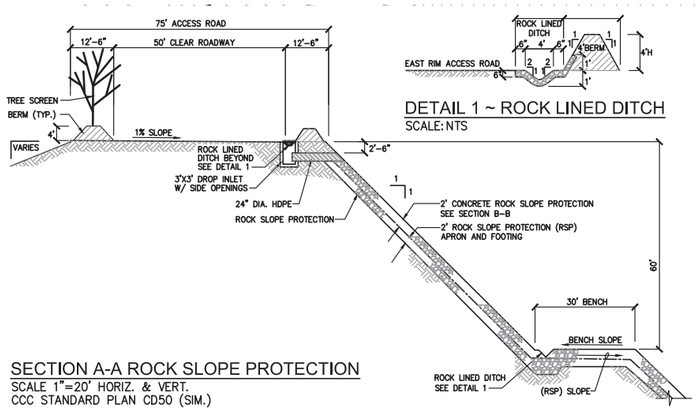
TREE REMOVAL PLAN

CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE:	AS SHOWN		
DATE:	MAY 2017		
DESIGN BY:	KDS/DAR	DRAWN BY:	DAR
		CHECKED BY:	KDS

REV.	DATE	DESCRIPTION	BY
1	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA	

SHEET NUMBER 13
OF 14 SHEETS
JOB NUMBER 164.00

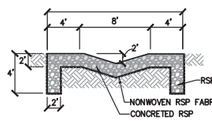


SECTION A-A ROCK SLOPE PROTECTION

SCALE 1"=20' HORIZ. & VERT.
CCC STANDARD PLAN CD50 (SIM.)

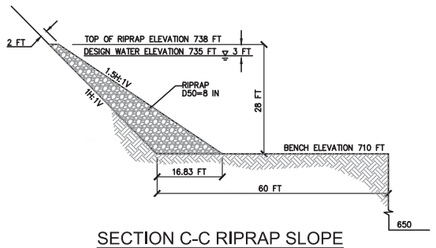
DETAIL 1 ~ ROCK LINED DITCH

SCALE: NTS



SECTION B-B CONCRETED ROCK SLOPE PROTECTION SWALE

SCALE: NTS



SECTION C-C RIPRAP SLOPE

SCALE: NTS

LEGEND

- PROPERTY BOUNDARY
- 770 PROPOSED CONTOUR
- 12'-6"WIDE, 4'HIGH EARTHEN BERM
- HP HIGH POINT
- DIRECTION OF FLOW
- ROCK SLOPE PROTECTION
- DROP INLET
- ROCK RIPRAP SLOPE PROTECTION

NOTES

1. SLOPE THE EAST RIM ACCESS ROAD 1% TOWARD THE QUARRY AND COLLECT DRAINAGE INTO THE 4-FT WIDE, ROCKED LINED DITCH.
2. APPROXIMATELY EVERY 600-FT ALONG THE EAST RIM ACCESS ROAD, THE ROCK LINED DITCH DRAINS TO A 3'X3' SIDE ENTRY DROP INLET, AND DISCHARGES INTO THE PIT THROUGH A 24-INCH HDPE PIPE UNDER THE ROAD BERM.
3. SLOPE THE 30-FT WIDE KNOXVILLE BENCHES 1% BACK TOWARDS THE CUT SLOPE FACE. COLLECT DRAINAGE IN A ROCKED LINED DITCH AT THE TOE OF THE SLOPE AND DRAIN TO THE ROCK SLOPE PROTECTION OUTFALL (CONTRA COSTA COUNTY STANDARD PLAN DETAIL CD50) TOWARD THE PIT.

75' WIDE EAST RIM ACCESS ROAD

30' WIDE BENCH ELEV. 890

60' WIDE BENCH ELEV. 710

30' WIDE BENCH ELEV. 770

30' WIDE BENCH ELEV. 830

SOUTH OVERBURDEN FILL AREA

KEY

PIT BOTTOM

ROCK RIPRAP SLOPE PROTECTION

HAUL ROAD 60' WIDE, 10% GRADE

RIP RAP WAVE ATTENUATION PROTECTION

TO PLANT

NORTH OVERBURDEN FILL AREA / SLIDE REPAIR AREA

Scale: 1" = 100'
Contour Interval: 10'
100 0 100 200 300 FEET

Spinardi Associates
Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

SLOPE FACE DRAINAGE AND EROSION CONTROL PLAN
CLAYTON QUARRY
CEMEX
CONTRA COSTA COUNTY
CALIFORNIA

SCALE: AS SHOWN
DATE: MARCH 2019
DESIGN BY: KDS
DRAWN BY: MLWH
CHECKED BY: KDS

REV.	DATE	DESCRIPTION	BY
2	05/2021	MODIFY SOUTH QUARRY MINING CONTOURS	KDS
1	06/2020	NORTH OVERBURDEN FILL/SLIDE REPAIR AREA	

SHEET NUMBER 14 OF 14 SHEETS
JOB NUMBER 164.00

PLOT DATE 03/13/20

APPENDIX A

STATEMENT OF RECLAMATION RESPONSIBILITY

STATEMENT OF RESPONSIBILITY (SOR)

Reference SMARA 2772.C.10

In consideration of approval by the lead agency of this application for a Surface Mining Permit and/or Reclamation Plan, the undersigned, jointly and severally, hereby covenant with the lead agency and the Department of Conservation as follows:

MINE NAME: Clayton Quarry **CALIFORNIA MINE ID #:** 91- 07-0004

LEAD AGENCY: Contra Costa County **CONDITIONAL USE PERMIT #:** LUP#'s 363-67, 2054-81

I hereby acknowledge that all of the provisions of said permit and reclamation plan, and any and all conditions appended thereto shall be faithfully performed and completed by the undersigned within the time therein provided, or within any additional time as may be allowed pursuant to the Surface Mining Ordinance Code of the lead agency and with the applicable requirements of Articles 1 and 9 (commencing with section 3500 et seq., respectively) of chapter 8, division 2, title 14, of the California Code of Regulations, the Surface Mining and Reclamation Act of 1975 (SMARA), as amended (section 2710 et seq. of the Public Resources Code) which are incorporated herein by reference.

That the obligations of the undersigned to perform and complete the provisions of said permit and/or plan, including any and all conditions appended thereto, shall be subject to the provisions of said Ordinance Code and SMARA and the State Mining and Geology Board's implementing regulations and guidelines.

That the place of performance by the undersigned of the covenants herein, shall be the area managed by the lead agency in the State of California.

That, pursuant to Public Resources Code section 2774.1 (a) notice procedures, any notice required to be given, or otherwise given to the undersigned may be by personal service or by certified mail.

Owner of Operation Business Structure: (check one)

- [x] Corporation
- [ ] Limited Partnership
- [ ] Limited Liability Corporation
- [ ] Individual
- [ ] General Partnership

Check one:

[x] **I have** posted an adequate financial assurance mechanism pursuant to Public Resources Code section 2773.1 that is equal to or greater than the lead agency approved financial assurance cost estimate. **Date Posted:** _____

Mechanism Type (check one)

- [x] Surety Bond
- [ ] Certificate of Deposit
- [ ] Letter of Credit
- [ ] Other: _____

Or

[ ] **I will** post an adequate financial assurance mechanism, pursuant to Public Resources Code section 2773.1 that is equal to or greater than the lead agency approved financial assurance cost estimate.

Mechanism Type (check one)

- [x] Surety Bond
- [ ] Certificate of Deposit
- [ ] Letter of Credit
- [ ] Other: _____

Dated this 1st **day of** June, **20** 17

OSCAR FRIAS

Printed Name of Owner of Operation

Signature of Owner of Operation
(to be acknowledged by a Notary Public)

FOR DEPARTMENT USE ONLY
(completed by staff after approval of project)

SMARA Database Entry Date _____ Analyst Initials _____

STATEMENT OF RESPONSIBILITY (SOR)

INSTRUCTIONS FOR AN EXISTING MINING OPERATION

Surface mining operations are subject to the requirements of the Surface Mining and Reclamation Act (Public Resources Code 2710 et seq., California Code of Regulations, title 14, section 3500 et seq.) and applicable administrative regulations as well as lead agency (LA) ordinance requirements. When a new mine site operator is going to assume legal and operational responsibility for an existing mining operation in California, it is required to file a Statement of Responsibility (SOR). (Reference PRC section 2772(c)(10)). This statement formally notifies the LA and the State Department of Conservation (Department) that a new individual and/or company is assuming all permitted responsibility for operating the mining site in compliance with the LA-approved Surface Mining Permit and Reclamation Plan, local ordinances, the Surface Mining and Reclamation Act of 1975 (SMARA), associated regulations, and guidelines. If the mining operation will be assumed by someone other than the legal landowner of the property, written authorization from the property owner(s) of record is also required.

The attached forms include places to provide the LA and the Department with the pertinent contact information for the new mine site operator and other information related to the mine site. The SOR form should be signed and acknowledged by a Certified Public Notary and returned, together with the other requested information, to the LA. Once a determination is made by LA staff that the forms have been properly filled out and executed, the LA will notify the Department of the change, and copy the new mine site operator.

Before filing a SOR to assume legal and operational responsibility for a mining operation, the new mine site operator should secure a copy of the approved surface mining permit and reclamation plan from the current or previous property owner and become thoroughly familiar with the requirements that the LA has imposed with respect to the affected mine site.

Additionally, the new mine site operator should request the property owner provide a copy of the latest Surface Mining Inspection Report (MRRC-1) prepared by the LA's Mining Inspector and a copy of the latest State Mining Operation Annual Report (MRRC-2) filed with the Department and the LA.

Once the new mine site operator has received written confirmation that this filing has been satisfactorily completed, a new financial assurance mechanism must be submitted to the lead agency and reviewed by the Department before existing financial assurance instruments of the previous mine operator can be released by the LA and the Department. (Reference: CCR section 3805.5)

In order to ensure that the required forms have been properly executed, please include the following appropriate documentation with your submittal:

1) If the mining operation has been acquired through a change in ownership, the signatures of all the legal owners of record for that property must be included on the SOR.

2) If the new or current property owners will be allowing mining operations to be assumed by a third party, a separate letter of authorization to assume this mining operation, signed by each new owner of record, shall be submitted.

3) If the person filing the SOR is acting on behalf of a corporation, a resolution from the corporation's board of directors should be submitted which provides authority for this filing and which indicates who has the ability to execute the statement on behalf of the corporation. A minimum of two (2) signatures are required.

4) If the person filing the SOR is acting on behalf of a Limited Liability Company, a copy of the company's Articles of Organization must be submitted which clearly indicate who has authority to execute the statement on behalf of the company.

5) If the person filing the SOR is acting on behalf of a General Partnership, verification is required to ensure that the signatory is a current partner.

6) If the person filing the SOR is acting on behalf of a Limited Partnership, a copy of the partnership agreement must be submitted which indicates who is designated as a general partner within the partnership. Only a general partner may sign the SOR on behalf of the partnership.

APPENDIX B

SITE LEGAL DESCRIPTION

DESCRIPTION

074723

UNINCORPORATED AREA

PARCEL ONE:

ALL THAT PORTION OF THE SOUTH 1/2 OF SECTION 14, TOWNSHIP 1 NORTH, RANGE 1 WEST, M.D.B. & M., CONTRA COSTA COUNTY, CALIFORNIA, LYING WEST OF THE FOLLOWING DESCRIBED LINE:

BEGINNING IN THE CENTER OF SECTION 14, SAID POINT BEING ON THE EAST LINE OF A COUNTY ROAD RUNNING NORTHERLY AND SOUTHERLY THROUGH SAID SECTION, AS SAID ROAD EXISTED IN NOVEMBER 1940 ON THE GROUND; THENCE FROM SAID POINT OF BEGINNING, ALONG THE EAST LINE OF SAID COUNTY ROAD, SOUTH 1° 2' WEST, 1192.58 FEET; SOUTH 3° 10' EAST, 522.43 FEET AND SOUTH 3° 35' EAST, 705.41 FEET; THENCE LEAVING SAID ROAD, SOUTH 4° 05' EAST, 245.62 FEET TO A POINT ON THE SOUTH LINE OF SECTION 14, WHICH BEARS SOUTH 88° 53' EAST ALONG SAID SOUTH LINE, 104.3 FEET FROM THE CENTER OF SAID ROAD.

EXCEPTING THEREFROM:

1. THE RIGHT, TITLE AND INTEREST CONVEYED IN THE DEED EXECUTED BY GEORGE MURCHIO, ET AL, TO CONTRA COSTA COUNTY, DATED JANUARY 17, 1941, RECORDED MAY 6, 1941, IN BOOK 589, PAGE 285 OF OFFICIAL RECORDS, FOR USE AS A PUBLIC HIGHWAY, AS TO THE 40 FOOT IN WIDTH STRIP OF LAND DESCRIBED THEREIN.

2. THE PARCEL OF LAND DESCRIBED AS PARCEL 1 IN THE DEED FROM GEORGE A. MURCHIO, ET AL, TO CONTRA COSTA WATER DISTRICT, RECORDED JULY 19, 1963, IN BOOK 4411, PAGE 500 OF OFFICIAL RECORDS.

PARCEL TWO:

ALL OF SECTION 23, TOWNSHIP 1 NORTH, RANGE 1 WEST, M.D.B. & M., CONTRA COSTA COUNTY, CALIFORNIA.

EXCEPTING THEREFROM:

1. THE RIGHT, TITLE AND INTEREST CONVEYED TO THE COUNTY OF CONTRA COSTA, PER DEED DATED JANUARY 17, 1941, RECORDED MAY 6, 1941, IN BOOK 589, OFFICIAL RECORDS, PAGE 285, RECORDER'S OFFICE OF CONTRA COSTA COUNTY, FOR USE AS A PUBLIC HIGHWAY AS TO THE 40 FOOT IN IDTH STRIP OF LAND DESCRIBED THEREIN.

2. THAT PORTION OF SAID SECTION 23, T. 1 N., R. 1 W., M.D.B. & M., DESCRIBED IN THE DEEDS TO THE STATE OF CALIFORNIA, RECORDED NOVEMBER 21, 1975, BOOK 7690, PAGES 218, 236, 240, 243, 248 AND 252, OFFICIAL RECORDS OF CONTRA COSTA COUNTY, CALIFORNIA.

PARCEL THREE:

THE SOUTHEAST QUARTER OF SECTION 22, TOWNSHIP 1 NORTH, RANGE 1 WEST, M.D.B. & M.

EXCEPTING THEREFROM:

DESCRIPTION

THAT PORTION OF THE SOUTHEAST QUARTER OF SECTION 22, T. 1 N., R. 1 W., M.D.B. & M., ACQUIRED BY THE STATE OF CALIFORNIA, BY DEEDS RECORDED NOVEMBER 21, 1975, IN BOOK 7690, PAGES 218, 236, 240, 243, 248 AND 252, OFFICIAL RECORDS, CONTRA COSTA COUNTY, CALIFORNIA.

ASSESSOR'S PARCEL NOS. 122-020-007 (AFFECTS PARCEL ONE)
122-020-013 (AFFECTS PARCEL TWO)
122-010-016 (AFFECTS PARCEL THREE)

074723

END OF DOCUMENT

APPENDIX C

CLEAN WATER ACT JURISDICTIONAL DELINEATION

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix E-3, "Clean Water Act Jurisdictional Delineation," of this DEIR.)

APPENDIX D

BIOLOGICAL RESOURCES ASSESSMENT

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix E-3, "Biological Resources Assessment," of this DEIR.)

APPENDIX E

ARBORIST REPORT

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix E-2, "Arborist Report," of this DEIR.)

APPENDIX F

GEOTECHNICAL EVALUATION

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix F-1, "Geotechnical Evaluations for Revised Reclamation Plan," of this DEIR.)

APPENDIX G

HYDROLOGY AND WATER QUALITY EVALUATION

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix G-1, "Hydrology and Water Quality Evaluation Report," of this DEIR.)

APPENDIX H

RUNOFF FROM OVERBURDEN FILL AREAS

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762-3772
(916)718-5511
akopania@sbcglobal.net

MEMORANDUM

April 24, 2017

To: Debbie Haldeman, CEMEX

Cc: Pat Mitchell, Mitchell Chadwick
Yasha Saber, Compass Land Group
Karen Spinardi, Spinardi Associates

From: Andy Kopania

Subject: Runoff from Overburden Fill Areas
CEMEX Clayton Quarry

At your direction, I have prepared an evaluation of the potential runoff from the Overburden Fill Areas at the Clayton Quarry. The Overburden Fill Areas are depicted on Figure 5 and Sheet Number 2 of the Reclamation Plan. The general parameters for the Overburden Fill Areas include:

- North Overburden Fill Area
  - Area = 22 acres
  - Maximum elevation = 850 feet above mean sea level (ft msl)
  - Minimum elevation = 590 ft msl
  - Maximum runoff length = 1,200 ft
- South Overburden Fill Area
  - Area = 13 acres
  - Maximum elevation = 970 feet above mean sea level (ft msl)
  - Minimum elevation = 660 ft msl
  - Maximum runoff length = 1,000 ft

The peak runoff from each of the Overburden Fill Areas was calculated based on the standards and other information developed by Contra Costa County Flood Control and Water Conservation District (CCCFCD) (http://ca-contracostacounty2.civicplus.com/2455/Hydrology-Standards and http://www.cccounty.us/530/Documents-and-Standards). The standards and methods used for this evaluation are consistent with those described in the *Hydrology Analysis Report, April 2017, CEMEX Clayton Quarry, Clayton, Contra Costa County, California*, prepared by EMKO Environmental, Inc. Runoff from the Overburden Fill Areas will not be retained onsite, but will be conveyed to existing drainage courses. Therefore,

CCCFCD recommendations for detention basin sizing are not applicable and the design storm is the 20-yr, 1-hr event in accordance with SMARA Section 3706(d).

Peak runoff at the time of concentration for the 20-yr, 1-hr storm event was calculated based on an average annual rainfall of 19.00 inches, identified from CCCFCD Drawing B-166. Rainfall intensities were obtained from CCCFCD Precipitation-Frequency-Duration-Depth curves for recurrence intervals of 10 years, 25 years, and 100 years (Drawings B-159, B-160, and B-162, respectively) and interpolated to identify the appropriate conditions for the 20-yr, 1-hr storm event at the quarry site. CCCFCD documents, as cited above, were used to select the runoff coefficient (C), to determine the adjusting factor (f), and for estimating rainfall intensity at the time of concentration (i). The parameters used are shown in Table 1.

TABLE 1
Peak Storm Runoff from Overburden Storage Areas
CCCFCD Rational Method Parameters

North Overburden Storage Area			Tc =	18.6 min	
Runoff Calc		Q(cfs) = C x f x i(in/hr) x A(acres)			
	C	f	i	A	Q
10-yr	0.4	1	1.55	22	14
20-yr	0.4	1.07	1.66	22	16
25-yr	0.4	1.1	1.71	22	17
100-yr	0.4	1.25	2.10	22	23

South Overburden Storage Area			Tc =	16.2 min	
Runoff Calc		Q(cfs) = C x f x i(in/hr) x A(acres)			
	C	f	i	A	Q
10-yr	0.4	1	1.56	13	8
20-yr	0.4	1.07	1.70	13	9
25-yr	0.4	1.1	1.78	13	10
100-yr	0.4	1.25	2.26	13	15

As indicated in Table 1, the peak runoff from a 20-yr, 1-hr storm event from the North and South Overburden Fill Areas would be 16 cubic feet per second (cfs) and 9 cfs, respectively. The runoff may potentially be conveyed northward to the storm sewers in either Drainage Area 71A or Drainage Area 96, or could potentially be routed directly to Mitchell Creek. Runoff from the areas that would become the Overburden Fill Areas currently flows to Mitchell Creek to the south of the existing storm sewers in Drainage Area 71A. The drainage areas and related storm sewers are discussed in the April 2017 *Hydrology Analysis Report*.

Actual drainage facilities will be designed and constructed to the physical extents and

dimensions of the overburden fill areas at the time of their construction. For the north overburden fill area, drainage facilities will be installed under the direction of the geotechnical engineer during installation of the slope stabilization buttress. Golder's recommended criteria for controlling erosion and sedimentation are summarized in Section 2.6.2 of the Revised Reclamation Plan, and in the plan's geotechnical report appendix.

To further support the environmental review of the Reclamation Plan Amendment, a discussion of the type of feature that could convey the runoff from the Overburden Fill Areas is provided here. For example, a two-foot deep rock-lined ditch with 2:1 side slopes and a one-foot wide bottom, sloped at one percent, is capable of conveying approximately 30 cfs at a flow velocity of 3 feet per second. Flow velocities of less than 6 feet per second are generally prescribed to prevent erosion of earth-lined ditches, so the flow velocity of 3 feet per second in the example rock-lined ditch easily meets this criterion. It is unclear whether the runoff from both Overburden Fill Areas would potentially be combined in a single conveyance ditch. If so, the combined peak flow of up to 25 cfs[1] would be readily accommodated by the example rock-lined ditch. This example conveyance ditch demonstrates that the runoff from the Overburden Fill Areas can be readily managed within the project area and topography, meeting the requirements of SMARA Section 3706(d).

1 The two Overburden Fill Areas have slightly different times of concentration. Therefore, the peak flows may not occur at the same time and the resulting combined peak flow in a single ditch may never reach 25 cfs.

APPENDIX I

RUNOFF FROM EAST RIM ACCESS ROAD

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762-3772
(916)718-5511
akopania@sbcglobal.net

MEMORANDUM

April 18, 2017

To: Debbie Haldeman, CEMEX

Cc: Pat Mitchell, Mitchell Chadwick
Yasha Saber, Compass Land Group
Karen Spinardi, Spinardi Associates

From: Andy Kopania

Subject: Runoff from East Rim Access and Upper Quarry Haul Roads
CEMEX Clayton Quarry

At your direction, I have prepared an evaluation of the potential runoff from the East Rim Access Road that will exist along the crest of the east rim of the excavation after mining is completed at the Clayton Quarry and the upper part of the Quarry Haul Road where it is located on the Knoxville Formation. The location of the East Rim Access Road and the Quarry Haul Road is shown Sheet Number 4 of the Reclamation Plan Amendment application. Roadway details are shown on Sheet Number 11. The general parameters for both road segments are comparable. Therefore, an analysis of the East Rim Access Road was conducted and the findings were then applied to the upper part of the Quarry Haul Road over the Knoxville Formation.

The general parameters for the East Rim Access Road include:

- Roadway width (including crest of safety berms) = 66 ft[1]
- Roadway length south of haul road = 2,250 ft
- Maximum elevation = 950 feet above mean sea level (ft msl)
- Minimum elevation = 750 ft msl
- Area = 3.41 acres

The peak runoff for the East Rim Access Road was calculated based on the standards and other information developed by Contra Costa County Flood Control and Water Conservation District (CCCFCD) (http://ca-contracostacounty2.civicplus.com/2455/Hydrology-Standards and

1 While the total roadway width will be 75 feet, the outer four to five feet of each safety berm will be sloped to drain away from the roadway. Thus, the width of the roadway that drains internally will be 66 feet, per Sheet Number 8.

http://www.cccounty.us/530/Documents-and-Standards). The standards and methods used for this evaluation are consistent with those described in the *Hydrology Analysis Report, April 2017, CEMEX Clayton Quarry, Clayton, Contra Costa County, California*, prepared by EMKO Environmental, Inc. Runoff from the East Rim Access Road will not be retained onsite, but will be conveyed to the reclaimed quarry pit. Therefore, CCCFCD recommendations for detention basin sizing are not applicable and the design storm is the 20-yr, 1-hr event in accordance with SMARA Section 3706(d).

Peak runoff at the time of concentration for the 20-yr, 1-hr storm event was calculated based on an average annual rainfall of 19.00 inches, identified from CCCFCD Drawing B-166. Rainfall intensities were obtained from CCCFCD Precipitation-Frequency-Duration-Depth curves for recurrence intervals of 10 years, 25 years, and 100 years (Drawings B-159, B-160, and B-162, respectively) and interpolated to identify the appropriate conditions for the 20-yr, 1-hr storm event at the quarry site. CCCFCD documents, as cited above, were used to select the runoff coefficient (C), to determine the adjusting factor (f), to calculate the time of concentration (Tc), and to estimate rainfall intensity at the time of concentration (i). The parameters used are shown in Table 1.

TABLE 1

Peak Storm Runoff from East Rim Access Road Above 750 ft msl

CCCFCD Rational Method Parameters

East Rim AccessRoad			Tc =	7.4	min
Runoff Calc		Q(cfs) = C x f x i(in/hr) x A(acres)			
	C	f	i	A	Q
10-yr	0.8	1	2.27	3.41	6
20-yr	0.8	1.07	2.54	3.41	7
25-yr	0.8	1.1	2.68	3.41	8
100-yr	0.8	1.25	3.32	3.41	11

As indicated in Table 1, the peak runoff from a 20-yr, 1-hr storm event from the entire length of the East Rim Access Road would be approximately seven cubic feet per second (cfs). While the average slope of the roadway is 10 percent, the slope varies from four percent to 14 percent locally. As indicated on Sheet Number 11, the roadway surface would have a one-percent cross slope toward the west (quarry pit side) with a drainage ditch located along the west side of the roadway, adjacent to the safety berm.

A one-foot deep, rock-lined v-ditch with 2:1 side slopes, with an average slope of 10 percent, will convey up to 11 cfs at a flow velocity of 5.5 feet per second, which is more than adequate to convey the runoff from the roadway without the potential for erosion within the ditch. Due to the variation in slope along the East Rim Access Road, it is recommended that culverts or side channels be located every ±500 feet along the roadway to divert the flow into the quarry pit. The culverts or channels should extend

downward across the exposed Knoxville Formation in the east wall of the quarry and discharge onto the diabase, at an elevation of approximately 625 ft msl or lower, to prevent erosion of the Knoxville Formation below the roadway.

The upper part of the Quarry Haul Road has a slope of 10 percent and a width that is comparable to the East Rim Access Road, as indicated on Sheet Number 4. Therefore, the drainage structures, dimensions, and spacing discussed above are also appropriate for the upper part of the Quarry Haul Road, where Knoxville Formation is present. Where the Quarry Haul Road is located on diabase, the potential for erosion is effectively non-existent, so specific drainage features are not needed.

Actual runoff conveyance facilities will be designed and constructed to the physical extents and dimensions of the East Rim Access Road at the time of their construction, and therefore may vary from the concept outlined in this memorandum. However, the information provided in this memorandum is sufficient to support the environmental review of the Reclamation Plan Amendment, and to demonstrate that the roadway features, as shown on Sheet Numbers 4 and 8, meet the requirements of SMARA Section 3706(d).

APPENDIX J

REVEGETATION PLAN

(This appendix was removed from the Reclamation Plan for brevity and is included as Appendix B-2, "Revegetation Plan," of this DEIR.)

APPENDIX K

RECLAMATION RELATED CONDITIONS OF APPROVAL

[RESERVED]

APPENDIX B-2
REVEGETATION PLAN

CEMEX CLAYTON QUARRY
REVEGETATION PLAN

LSA

May 2017

CEMEX CLAYTON QUARRY
REVEGETATION PLAN

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May 2017

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 REVEGETATION METHODOLOGY 2

2.1 REVEGETATION OF RECLAMATION UNITS 2
2.1.1. Quarry Pit - Diabase 2
2.1.2. Quarry Pit East Rim - Knoxville Formation 3
2.1.3. Overburden Fill Areas 5
2.1.4. Quarry East Rim – Tree Screen 7
2.1.5. Plant Site 8

3.0 PERFORMANCE CRITERIA AND MONITORING 10

3.1 CHAPARRAL PERFORMANCE CRITERIA 10
3.2 GRASSLAND PERFORMANCE CRITERIA 10
3.3 TREE SCREEN PERFORMANCE CRITERIA 10
3.4 MONITORING PROCEDURE 11
3.5 2009 SPOIL REVEGETATION TEST PLOTS 12
3.6 2017 TEST PLOTS 13

4.0 MAINTENANCE 15

4.1 EROSION AND ROCKFALL 15
4.2 WEED CONTROL 15
4.3 BROWSING/PLANT PROTECTION MEASURES 15

FIGURES

Figure 1: Cemex Clayton Quarry – Revegetation Plan 16
Figure 2: Typical Tree Planting Detail 17

TABLES

Table A: Chaparral Revegetation Seed Mix 5
Table B: Grassland Revegetation Seed Mix 6

1.0 INTRODUCTION

This Revegetation Plan has been prepared for the Cemex Clayton Quarry (Quarry), which is owned and operated by Cemex Construction Materials Pacific, LLC (Cemex). The Quarry is located in western Clayton, south of Pine Hollow Road. The quarry is on the northwestern flank of Mount Zion, a 1,600-foot-high foothill of Mount Diablo. This plan is intended to satisfy the substantive requirements for re-soiling and revegetation as set forth in the Surface Mining and Reclamation Act (SMARA) and its implementing regulations, including appropriate performance standards for the quarry's potential end uses.

This plan is an update of the Quarry's existing revegetation plan, which was approved by Contra Costa County (County) in May, 1983 as a component of Reclamation Plan LUP #2054-81, and has not been formally updated since that time. This updated plan will become effective only upon County approval of the proposed Clayton Quarry Reclamation Plan Amendment application. The 1983 revegetation plan specified planting of native trees and broadcast seeding of locally-collected chaparral brush species on finished quarry benches. This revised plan is written to comply with SMARA regulations and brings more focus on revegetating the remainder of the quarry, including overburden fill areas; haul roads, and the grounds of the gravel processing plant. The plan presented here will be implemented in stages over time as Cemex suspends operations in different parts of the quarry.

This plan proposes to restore soil cover to mined areas, reduce erosion potential, and promote long-term soil fertility. The plan introduces a tree screen along the quarry east rim and adds new provisions for soil replacement, seeding, and seed application methods. A maintenance and monitoring program is also proposed that will ensure that the revegetation proceeds satisfactorily.

2.0 REVEGETATION METHODOLOGY

The goal of this revegetation plan is to restore native plant communities such as chaparral where it is safe, practicable, and consistent with the proposed end use to do so. The revegetation methods described below are considered by LSA to be the most effective for the conditions present at the Quarry. These methods were developed in consultation with restoration and erosion control professionals at Cemex and Pacific Coast Seed Company. These methods may be adjusted periodically as necessary to improve revegetation performance. All adjustments will be reported to the County on an annual basis. Additionally, Cemex anticipates that it will begin a test of the proposed revegetation treatments at a location on Quarry property in fall, 2017.

2.1 REVEGETATION OF RECLAMATION UNITS

Specific revegetation methodology is detailed below for each reclamation unit (Quarry Pit - Diabase, Quarry Pit East Rim - Knoxville, Quarry East Rim Tree Screen, Overburden Fill Areas, and Plant Site). Please see Figure 1, Revegetation Plan, for a map of the reclamation units.

2.1.1. Quarry Pit - Diabase

Revegetation of the completed quarry mining face according to the original revegetation plan has been ongoing since 1983, but the current plantings only date to 1998. In that year the quarry instituted a new mining plan that re-initiated mining from the topmost bench on down. Since 1998 LSA has revegetated each bench after mining was complete, with benches being completed at a rate of approximately one bench every two years over that period. To date 7 benches have been planted, starting with the topmost bench and working downward in sequence. At present, the existing tree and shrub plantings on the benches meet the quantitative performance standard of the 1983 plan, which is 10 surviving native trees per 100 feet of bench.

LSA does not believe the plantings have substantially improved the aesthetic appearance of the quarry face, nor has fully functional woodland or chaparral cover been established on the benches. The primary factor limiting the success of the plantings is the height of the re-worked benches in relation to the relatively short stature of the foothill pine (*Pinus sabiniana*). The foothill pine is the tallest of the local native trees and normally would be as tall as the benches at maturity, but the thin soil substrate on the benches does not allow the planted trees to reach normal height. Cemex was largely able to meet their commitment of spreading up to 3 feet of quarry overburden substrate on the mined benches, but three feet of soil is not deep enough to allow the foothill pine to fully develop. After more than fifteen years of growth the tallest trees are only 15 feet high, which isn't nearly tall enough to screen approximately 60 foot high benches. While the tree cover appears substantial when standing amongst them, it makes little impression on an observer viewing the quarry from afar.

Apart from the aesthetic effect, the revegetation has also only been partially successful in establishing chaparral or woodland habitat values on the benches. While the addition of the overburden substrate to the benches has allowed for herbaceous and shrub species to grow on the benches, the resulting plant community is sparse in comparison to surrounding undisturbed plant communities. There is a reasonable variety of species growing on the benches, but this is due in part

to the plantings and also to a large component of non–native grasses and weeds. The sparse cover is caused by a combination of the thin, gravelly soil substrate and the exposed nature of the quarry benches.

The effort put forth to date to spread soil substrate on the benches poses undue safety hazard for quarry equipment operators and Cemex's geotechnical consultants have expressed concerns that the tree roots may weaken the structural integrity of the finished benches. LSA has also observed that as the benches age small slides and talus falls accumulate that progressively reduce the length of bench that can be safely accessed and monitored.

LSA recommends that the bench plantings be discontinued, as they are not achieving the desired goals, are difficult and unsafe to establish and maintain, and are potentially detrimental to the goal of stabilizing the quarry face. Justification for eliminating the requirement to revegetate the quarry's diabase benches is also provided in the Reclamation Plan narrative under Section 2.9, Revegetation (addressing SMARA CCR §3705).

With the exception of the Quarry Pit East Rim (discussed below), the quarry pit will not be re-vegetated because it is intended to develop into a permanent waterbody over time as the quarry bottom fills with stormwater runoff.

2.1.2. Quarry Pit East Rim - Knoxville Formation

The Knoxville formation in the Quarry Pit East Rim is too coarse and has too little water-holding capacity to restore grassland cover. Even following seeding, these areas rarely support more than patchy grass or forb cover. Knoxville materials can and do support chaparral cover, as can be observed on decades-old deposits located throughout the quarry. In light of these factors, the seed mix presented in Table A, below, is selected to provide sufficient chaparral cover to provide long-term stabilization and revegetation.

Substrate Preparation. Prior to seeding, the Knoxville surface will be scarified as necessary to relieve compaction and remove rills or other surface irregularity. Scarification may consist of disking, ripping, deep ripping, or a combination of these methods depending on the extent of compaction. Where slopes are too steep to rip without causing slides, then a bulldozer may be used to track-walk the slope vertically in order to roughen the surface. The track-walking will create cavities that will reduce the threat of later rilling, as well as capture seed and rainfall.

Re-soiling. Re-soiling will not be conducted on the east rim as there is no topsoil available to cover these areas. The original quarry topsoil was removed and comingled with other overburden materials long before soil conservation became a standard measure at quarries. Cemex has no other source of topsoil in the quarry vicinity short of stripping topsoil from undisturbed chaparral or grasslands, which would be counter-productive for conservation purposes. Denuding adjacent areas of their soils is also discouraged under CCR §3503(f).

Lacking topsoil, the current Knoxville-derived substrate in the Quarry Pit East Rim is probably the best available substrate material in the quarry. Knoxville-derived substrates have been observed by LSA to promote better tree, shrub and herbaceous growth than diabase-derived substrates, presumably because the Knoxville formation weathers more readily, contains more mineral nutrients, and the Knoxville substrate contain a higher proportion of fine material than the diabase.

Hydro-seeding. Following substrate preparation, a chaparral seed mix will be applied via mechanical hydro-seeding. Hydro-seed methodology will be similar to that proposed for the Fill Area. The hydro-mulch mix should contain the following components (or similar):

Component	Application Rate
Seed	As specified in Table A
Wood-fiber mulch	1,500 lbs. per acre
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre

The Operator should consider applying components in consecutive layers rather than all at once. For example, the first pass could contain all of the compost. The second pass could contain 500 lbs./acre of wood-fiber mulch, fertilizer, and seed. The third pass could contain 1,000 lbs. /acre wood-fiber mulch. The last pass could apply the tackifier over the surface of the mulch. This base prescription is subject to adjustment based on the circumstances of the area to be treated and may be revised by Cemex or its restoration contractors over time to improve performance.

Compost is recommended for the Quarry Pit East Rim because there is no topsoil cover and the quarry spoils are coarse and lack an organic component. Organic matter in soils provides a long-term source of nutrients, increases water-holding capacity, and improves the texture of the soil. The development of an organic duff layer similar to that present underneath undisturbed chaparral cover adjacent to the property will promote chaparral species reproduction. Application of compost would provide a head-start towards developing this organic duff horizon.

Seed Mix. The East Rim will be revegetated with the native seed mix presented in Table A below. This mix includes chaparral species that are common in the chaparral communities that surround the quarry and which are deemed to be suitable for the substrate conditions on the East Rim based on LSA's 20 years of monitoring of both passive natural and active revegetation at the quarry. The chaparral seed mix in Table A contains a wide variety of plant species because chaparral species have varying germination requirements and not all species are expected to germinate in any given year. The mix includes species that are common dominants in mature chaparral communities in the quarry vicinity (sticky monkeyflower, black sage, coastal sage) as well as chaparral species that are known to have successfully established at disturbed locations within the Quarry and at other restoration sites in the vicinity of Mt. Diablo (sticky-monkeyflower, deerweed, and buckwheat).

The chaparral seed mix also includes several species that are listed as dominants in a plant community designated as "the Summit Society" in The Flowering Plants and Ferns of Mount Diablo, California (Ertter and Bowerman, California Native Plant Society, 2002). This plant community is

described as a rocky grassland community that occurs on the upper slopes of Mount Diablo; species in this community are as well suited to the post-reclamation quarry substrate as chaparral species.

Chaparral brush species such as coastal sage, sticky monkeyflower, or black sage may benefit from pre-treatment prior to dispersal. Pre-treatment measures may be tested if initial germination rates in the test plots or for the revegetation effort itself are poor. The treatments would vary by species, and might include stratification, scarification, heat, or smoke.

Table A: Chaparral Revegetation Seed Mix

Plant Species[1]	Common Name	Application Rate (lbs./acre PLS[2])
Artemisia californica	Coastal Sage	0.5
Eriogonum nudum	Nakedstem Buckwheat	0.25
Eriophyllum confertifolium	Golden Yarrow	0.5
Grindelia camporum	Gumplant	1.5
Lotus scoparius[3]	Deerweed[3]	5.0
Lupinus albifrons	Silverbush Lupine	3.0
Melica californica	Onion Grass	1.5
Mimulus aurantiacus	Sticky Monkeyflower	0.15
Nasella lepida	Foothill Needlegrass	1.5
Salvia mellifera	Black Sage	1.5
	Total	**15.4**

1 Seed mix for Clayton Quarry recommended by LSA, with input from Pacific Coast Seed (Livermore, CA). Modifications to this seed mix may be appropriate based on availability from suppliers and cost. Substitutions may be made as long as the plant species is found in chaparral plant communities and is native to the San Francisco Bay Area.
2 PLS = pure live seed.
3 Legume seed shall be pellet-inoculated as per Cal-Trans Standard Specs and as per Bulletin 1842, Range-Legume Inoculation and Nitrogen Fixation by Root-Nodule Bacteria.

2.1.3. Overburden Fill Areas

Substrate Preparation. Prior to re-soiling, the fill area surface will be scarified as necessary to relieve compaction and remove rills, ruderal vegetation, or other surface irregularity. Scarification may consist of disking, ripping, deep ripping, or a combination of these methods depending on the condition of the spoil surface.

Re-soiling. The overburden fill areas presently consist of mostly non-native grassland. Prior to depositing any new overburden in the fill areas, Cemex will divide the areas into sub-compartments measuring approximately one-quarter to one-half acre in size. Prior to placement of spoils in any particular sub-compartment, the topsoil will be salvaged to a depth of 18 inches and used to cover a previously completed sub-compartment.

Hydro-seeding. Following substrate preparation a seed mix will be applied via mechanical hydro-seeding. Revegetated areas will be seeded with mulch. The hydro-mulch mix should contain the following components (or similar):

Component	Application Rate
Seed	As specified in Table A
Wood-fiber mulch	2,000 lbs. per acre
Tackifier	200 lbs. per acre
Fertilizer	Biosol 7-2-3 at 300 lbs. per acre

The operator should consider applying components in consecutive layers rather than all at once. For example, the first pass could contain 500 lbs./acre of wood-fiber mulch, fertilizer, and seed. The second pass could contain 1,500 lbs./acre wood-fiber mulch. The third pass could apply the tackifier. This base prescription is subject to adjustment based on the circumstances of the area to be treated and may be revised by Cemex or its restoration contractors over time to improve performance.

The wood fiber mulch provides a medium to bind the other ingredients, protects the soil surface, and provides some water holding capacity.

Commercial fertilizers intended for agricultural or ornamental applications are inappropriate for chaparral restoration because they provide a strong flush of nutrients at concentrations rarely present in nature. The typical result is rapid growth of weedy grasses and herbs, which then may out-compete slower-growing chaparral species for sunlight and soil water. Biosol fertilizer is a slow-release fertilizer designed for restoration objectives, and provides a steady supply of major nutrients at relatively low concentrations. Other fertilizers may be used if needed.

To the extent feasible, hydro-seeding should take place in the first fall following the completion of re-soiling, before rains begin, and the seed should be allowed to germinate as a consequence of normal rainfall.

Seed-mix. The native topsoil applied to the surface of overburden materials is anticipated to be a suitable substrate for grassland, so an erosion control seed mix heavy in native grasses appropriate for the potential end use is proposed in Table B.

The compartment method should eliminate any need for soil stockpiling, but if salvaged topsoil cannot be used immediately it will be stockpiled discreetly from other materials and will not be disturbed until needed for reclamation. Any stockpile that is expected to be left unused over the wet season will be seeded in the preceding fall with an appropriate erosion control seed mixture as needed to prevent water and wind erosion and to discourage weed growth.

Table B: Grassland Revegetation Seed Mix

Plant Speices[1]	Common Name	Application Rate (lbs./acre)
Bromus carinatus	California Brome	25
Elymus glaucus	Blue Wildrye	10
Vulpia microstachys	Three Weeks Fescue	6
Trifolium ciliolatum	Foothill Clover	4

1 Seed mix for Clayton Quarry recommended by LSA with input from Pacific Coast Seed (Livermore, CA). Modifications to this seed mix may be appropriate based on availability from suppliers, cost, and species determined most suitable at the time seeding occurs.

The native topsoil will already contain a full seedbank of annual grasses, so the pre-existing species are also likely to re-establish. Adding the additional seed mix to the surface just provides insurance that there will be an initial flush of growth to protect the soil surface early in the wet season. The species chosen for inclusion in the seed mixes are, however, capable of being self-sustaining without dependence on irrigation or ongoing applications of soil amendments or fertilizers.

2.1.4. Quarry East Rim – Tree Screen

At the suggestion of the County's reclamation consultant (Darwin Myers), Cemex is proposing to plant foothill pine along the crest of the Quarry East Rim in order to screen the quarry from viewers on Mitchell Canyon Road. The location of the proposed screen is shown on Figure 1. These plantings will also serve as mitigation for an existing stand of trees that may be removed from the Fill Area to allow for spoils deposit there (refer to Reclamation Plan Sheet 13).

Trees Removed. LSA completed an arborist report of the proposed overburden fill areas that identifies the following trees:

1 coast live oak (*Quercus agrifolia*)
8 California buckeye (*Aesculus californica*)
3 valley oak (*Quercus lobata*)
21 blue oak (*Quercus douglasii*)
33 – Total

All of these trees are native species and all are mature. They are mostly gathered in a stand of trees centered on the existing ravine that passes through the center of the south overburden fill area.

Mitigation Ratio. The County does not specify a standard replacement rate for trees removed by construction, but has indicated to Cemex that they would like to see all trees impacted by quarry operations to be replaced at an appropriate ratio.

Cemex has offered to replace the trees at a ratio of three trees established for every existing tree removed, in recognition that the trees being removed are mature and the new trees will take several years to reach the size of the trees removed. This would result in a mitigation goal of 99 established trees.

The number of trees required to create a full screen along the crest of the East Rim, a distance of approximately 2,400 feet, would be at least 200 if the trees are planted in a single row at an average spacing of 12 feet. This would correspond to a 6 to 1 ratio.

Screen Planting Specifications. While 200 trees would be sufficient to create a continuous screen, LSA recommends twice as many trees so that that they can be distributed in natural-appearing clusters along the East Rim crest while still maintaining a continuous screen. A total of 400 trees would represent a replacement ratio of more than 12 to 1. The trees would be located in clusters of 2 to 4 trees, with a spacing of 6 to 10 feet between trees in the same cluster. The spacing between clusters would be 12 to 20 feet.

Foothill pine is the only species proposed for planting, as this is the only species that Cemex has successfully grown on quarry Knoxville substrate. While Cemex would like to attempt to replace the lost trees in-kind, the oak species now present in the overburden fill area are not suitable for replacement on the Quarry East Rim or anywhere else within the reclaimed quarry. Oaks prefer fine-textured soil with high water holding capacity, completely unlike the spoils substrate. Also, in the vicinity of Mount Diablo oaks and other broadleaf species prefer sheltered locations such as north-facing slopes and ravines, while chaparral dominates elsewhere. Based on these factors, the Knoxville-covered crest of the east quarry rim is not a suitable location for oaks.

Foothill pine are more suited to thin, rocky soils and exposed hillsides. Cemex's previous revegetation efforts have shown that foothill pine can be planted in quarry Knoxville substrate and can survive on quarry benches while blue oak and other species have struggled in those circumstances, even when irrigated. Also, foothill pine is a taller and much faster-growing tree than the oak species and thus much more suitable for the screening function.

LSA recommends planting foothill pine in one gallon pots according to the specifications presented in Figure 2. It is recommended that the pines be raised from pine nuts gathered locally (i.e., central Contra Costa County).

No irrigation of the trees is proposed at this time. If there is unacceptable loss of seedlings to summer drought, then Cemex may provide irrigation once a month consisting of at least 10 gallons per tree (or sufficient to saturate entire root zone to a 30 inch depth). Irrigation will commence May 1and end November 1 each year. The means of irrigation (water truck, drip system, pump from quarry pond, etc.) would be determined by Cemex.

2.1.5. Plant Site

Cemex intends to remove all existing structures from the Plant Site and restore it to open space function. Lacking a source of topsoil, however, the plant site will be re-soiled with available quarry Knoxville materials.

Substrate Preparation. Cemex will first remove quarry buildings, sheds, and processing equipment from the plant site and dispose of the debris off-site. Remaining gravel will then be scraped from the site and used for fill elsewhere on the site. Gravel removal will include scraping graveled surfaces down to mineral soil. Once the soil is exposed, it will be ripped and disked as necessary to de-compact the subsoil. During the scraping and ripping process Cemex will also level-off steep embankments and attempt to smoothen the topography across the plant site.

Re-soiling. Following removal of the gravel and ripping and disking of the underlying soil, the plant site will be evaluated by a soil scientist to determine whether the resulting substrate is suitable for seeding as is. If not, Cemex will import Knoxville from the quarry or fill areas to use as planting medium. The spoils would be spread to a depth of 18 inches over the entire site.

If spoils are imported, they will be augmented with accumulated wash fines generated by the quarry's gravel processing operation (if wash fines are available). Incorporation of fine textured material with the coarse overburden spoils will substantially enhance the water-holding and nutrient-holding character of the spoils, and thus improve their fertility. The ratio of fines to spoils will likely depend on how much fine material is available, but the ratio will not go higher than a one to one ratio of fines to spoils. In other words, wash fines will constitute no more than 50 percent of the final substrate by volume.

Hydro-seeding. The specifications for hydro-seeding the Plant Site are the same as specified for the Quarry Pit East Rim - Knoxville.

Seed-Mix. If, according to the soil scientist, suitable mineral subsoil is exposed at the Plant Site, then the grassland seed mix presented in Table B will be applied. If augmented spoils must be applied to the surface, then the chaparral mix presented in Table A will be used instead.

3.0 PERFORMANCE CRITERIA AND MONITORING

3.1 CHAPARRAL PERFORMANCE CRITERIA

These criteria apply to the East Rim – Knoxville and Plant Site reclamation units.

Chaparral Cover. No cover standard is proposed because chaparral shrub species and the shrub community as a whole are slow to mature. The canopy dimensions of 3 year old shrubs are generally just a fraction of what the eventual mature dimensions will be, and the relationship between the young community cover total and the mature, 10 to 20 year-old community cover total is difficult to quantify. A correspondence between the developing cover in the reclaimed units and the mature cover in the reference plots can be more effectively achieved by monitoring plant density (stems per acre) and species richness, as is proposed below.

Chaparral Density. Chaparral revegetation will be considered successful if the per-acre density of native shrub species expressed in terms of stems per acre within the treated portion of the reclamation unit exceeds 70 percent of the average native shrub density in undisturbed stands of chaparral, as determined at reference plots. It is reasonable to expect that this standard can be met within the first three years.

Chaparral Species Richness. At least four native chaparral species, which may include species contained in the seed mix as well as natural regeneration, must each constitute at least 10 percent of the total plant cover.

3.2 GRASSLAND PERFORMANCE CRITERIA

These criteria apply to the overburden fill areas and Plant Site (if the plant site is revegetated with a grassland mix).

Grassland Cover. Grassland revegetation will be considered successful if cover exceeds 75 percent of the treated surface. Final cover may include seeded species as well as any non-invasive species that occur in the existing grassland plant community adjacent to the fill areas.

Grassland Species Richness. Grassland revegetation will be considered successful if at least three herbaceous, non-invasive species each exceed 10 percent of the total cover.

3.3 TREE SCREEN PERFORMANCE CRITERIA

Tree Establishment. The tree screen will be considered successful if there are a total of at least 200 established trees along the crest of the East Rim after three years. Trees must be healthy and at least two years old to be considered established.

Screen Continuity. The tree screen will not be considered successful if there are one or more gaps in the screen. A gap is defined as a span of 100 feet or more between established trees.

3.4 MONITORING PROCEDURE

Qualified conservation biologists or botanists will monitor re-vegetated areas annually for a minimum of three years after seeding to assess whether revegetation is proceeding successfully. Revegetation success will be judged pursuant to the performance standards presented above. Performance standards will only be considered to be met if the plantings required no human intervention during the preceding two years. If intervention is necessary after the second year of monitoring, then remedial measures will be implemented and monitoring will continue until such time as the performance standards can be met or this plan is modified.

Chaparral Reference Plots. Prior to revegetation, a qualified biologist will establish 4 reference plots within representative chaparral cover on the un-mined west-facing slope in the east rim of the quarry. Each plot will be a circle 5 meters in diameter. Plot centers will be staked with rebar or other durable material and their location will be recorded on GPS equipment capable of at least 1 meter accuracy. The following data will be taken at each plot:

- A complete species list, including herbaceous species.
- Total number of shrub individuals, quantified by species.
- Total overall shrub canopy cover and total herbaceous cover (if any).
- A photograph of each plot will be taken from the northern plot edge.

The plot data will be specifically used to establish a chaparral plant density baseline and generally used to provide chaparral community characteristics for comparison with reclaimed areas.

Qualitative Monitoring. Under most circumstances the success or failure of revegetated areas in relation to established performance standards should be immediately evident. In these circumstances, qualitative monitoring is sufficient documentation of the condition and cover of the revegetated areas. Qualitative monitoring consists of a visual determination of the percentage of cover of each plant species in each restoration area, accompanied by multiple photographs of the revegetated area. Statistical determination will not be used.

Quantitative Monitoring. Quantitative monitoring will only be conducted if revegetation monitors have significant doubt as to whether a particular area meets the standards outlined above. In each year that quantitative monitoring is conducted, square meter plots will be randomly placed in each reclamation unit (i.e., quarry pit, Fill Area, plant site). No less than 20 randomly located plots will be distributed across each site, and additional plots will be established as necessary to reach the 80 percent confidence interval. Where cover differs markedly within a particular reclamation unit, monitors will stratify the unit into different cover types and sample within each type until 80 percent confidence is reached. The locations of each plot will be recorded on a map or will be recorded using a GPS receiver.

Unequal cover class intervals will be used in the sampling. Such intervals allow for an easier estimation of species cover-to-area relationships than do equal class intervals. Moreover, the less abundant species or species with small areal cover sometimes have an important diagnostic significance, which requires a finer breakdown in the lower scale values as compared to the larger

scale values (Mueller-Dombois and Ellenberg, 1974). Herbaceous areal cover will be estimated by absolute cover class (<5 percent, 5-15 percent, 16-25 percent, 26-50 percent, 51-75 percent, 76-100 percent) for each species (native and non-native). Additionally, an annual list will be made of all plant species observed in each reclamation unit.

Annual Reports. During reclamation, a restoration biologist will monitor the revegetated areas and provide an annual report to Cemex in September. The annual report will specifically assess the following parameters:

- Composition, condition, and extent of brush and herbaceous cover, including a species list and either qualitative or quantitative estimates of density and cover within each reclamation unit.
- Overall progress toward a stable, natural plant community; and towards meeting performance standards.
- Noxious weed growth.
- Number of surviving trees in tree screen.
- Average size and general condition of trees in the tree screen.

The annual report will describe all actions taken during the preceding year, and will include recommendations for actions to be taken in the upcoming planting season. The report will include recent photographs of each reclamation unit.

3.5 2009 SPOIL REVEGETATION TEST PLOTS

Goals and Methods. On December 3, 2009, three informal test plots were established on a fresh mass of Knoxville-derived overburden that was deposited on the east rim of the quarry to gauge the ability of the spoils to support and respond to grassland revegetation efforts. These spoils were in the area identified on Figure 1 as the East Rim – Knoxville Formation. The goal of the test plots was to determine which species and revegetation method (i.e., planting versus seeding) performed best on the Knoxville materials.

The test plots consisted of three one-third acre plots, each with different soil conditions. Test Plot 1 was established in higher quality soil (composed of one-quarter fine-textured Knoxville, one quarter sediment pond fines, and two-quarters standard gravelly materials), Test Plot 2 was established in medium quality soil (composed of one-quarter finer-textured Knoxville and three-quarters mixed diabase materials), and Test Plot 3 was established in the poorest quality soil (100 percent mixed diabase materials). Soil quality was judged according to texture, with soils higher in silt and clay content presumed to be superior to soils with predominantly sandy and gravelly texture.

Half of each test plot was broadcast by hand with a native grassland seed mix and half was broadcast with a non-native grassland seed mix containing species that were dominant in the non-native grassland surrounding the spoils field. The species seeded were as follows:

Native Mix
California brome (*Bromus carinatus*)
three-weeks fescue (*Vulpia microstachys*)
tomcat clover (*Trifolium wildenovii*)
purple needlegrass (*Nassella pulchra*)
California oniongrass (*Melica californica*)
pygmy-leaf lupine (*Lupinus bicolor*)
California poppy (*Eschscholzia californica*)

Non-native Mix
Blando brome (*Bromus hordeaceous*)
Zorro fescue (*Vulpia myuros*)
Rose clover (inoculated)(*Trifolium hirtum*)

In addition to the native and non-native grass seed, native shrub seed collected by LSA on and near the quarry was broadcast throughout each plot. A total of 11 deerweed, 11 black sage, and 11 sticky monkey-flower seedlings were also planted in each test plot.

2012 Results Summary. The test plots were monitored by LSA through 2012, after which that area was re-graded by Cemex. LSA's conclusions were:

- Planted shrubs were successful without irrigation. Survival of the container shrubs was high in all three test plots, with 94 percent surviving in Test Plot 1 with the higher quality soil, 85 percent surviving in Test Plot 2 with the medium quality soil, and 82 percent surviving in Test Plot 3 with the lower quality soil.

- Shrubs Established Slowly from Seed. Cover of shrubs germinated by broadcasted seed was low to begin, but low densities of most of the local chaparral species did establish (10-20 individuals and about 5 percent cover per plot each for the dominant shrub species such as black sage after two years). This result is consistent with observations LSA has made of old overburden deposits elsewhere in the quarry and at the nearby Hanson Clayton Quarry. Initial development of the chaparral cover is slow, but over time native chaparral species will come to dominate quarry spoils.

- Grass and Herbaceous Plant Cover Establishes Poorly on Coarse Materials. Herbaceous cover was very low (less than 5 percent) and about the same in all three test plots. Grass cover was much higher, however, within the planting basins of the container shrub plants due to the fertilizer and mulch that were applied to the shrubs at installation.

- Untreated Substrate Materials are Vulnerable to Invasive Species. Cover of summer mustard (*Hirschfeldia incana*) and stinkwort (*Dittrichia graveolens*) was high in all three plots. Yellow star-thistle (*Centaurea solstitialis*) and several other invasives were also present.

Mechanical treatments such as hydro-seeding and hydro-mulching were not tested in 2009 because the test plots were meant to be applicable to bench reclamation where such measures are not practical.

3.6 2017 TEST PLOTS

Beginning in 2017, as a component of quarry reclamation, disturbed slopes that have reached their final configuration and will not be further disturbed will serve as test plots for the respective

revegetation seed mixes. Planting procedures, species and success criteria will be updated, if necessary, in consultation with the Lead Agency following monitoring of the test plot.

Chaparral Plots. Cemex will establish two quarter-acre test plots on the Quarry East Rim by grading away accumulated vegetation and exposing a fresh substrate. One plot will be left untreated as a control if it is otherwise stabilized, while the other plot will be treated as specified above for chaparral revegetation (i.e., hydro-application of chaparral seed mix, mulch, and fertilizer).

Test plot monitored will consist of a 100 percent catalog of plant cover in the test plots as measured by areal canopy coverage and a 100 percent count of shrub individuals with basal diameter over one-half inch. The species tabulation and test plot status report would be provided to Cemex each September.

Depending on initial results, and in consultation with the monitoring biologist, Cemex may choose to test additional revegetation measures and modifications by adding additional test plots.

Grassland Methodology Trial (Mitchell Canyon Road Slide Revegetation). In 2016 Cemex prepared a slope stabilization plan for the slope just downhill from the north overburden fill area and just uphill from Mitchell Canyon Road. The stabilization plan largely involves excavation of previously mobilized slide materials and installation of a shear key (in the form of a gravity buttress) along the lower fringe of the slump.

LSA was asked to prepare a revegetation strategy for the stabilized slope and did so by simply applying the Overburden Fill Area/Grassland methodology described above. This work will thus serve as a useful test of that methodology since the work may be completed as early as 2018 and is taking place on the same slope and in the same grassland cover as the remainder of the overburden fill areas. Cemex will assess the success of the slope stabilization revegetation effort using the quantitative monitoring methodology discussed in Section 3.4.

4.0 MAINTENANCE

Cemex will maintain revegetated areas as necessary for them to develop and maintain the aesthetic and habitat values of a native plant community. Specific maintenance provisions are described below.

4.1 EROSION AND ROCKFALL

Cemex will address any substantial erosion or landslide problems that develop after final grading is complete and revegetation treatment has been applied. Substantial problems are generally those that would involve eventual movement of cubic yards of material, and/or substantially alter the ground contour if not addressed.

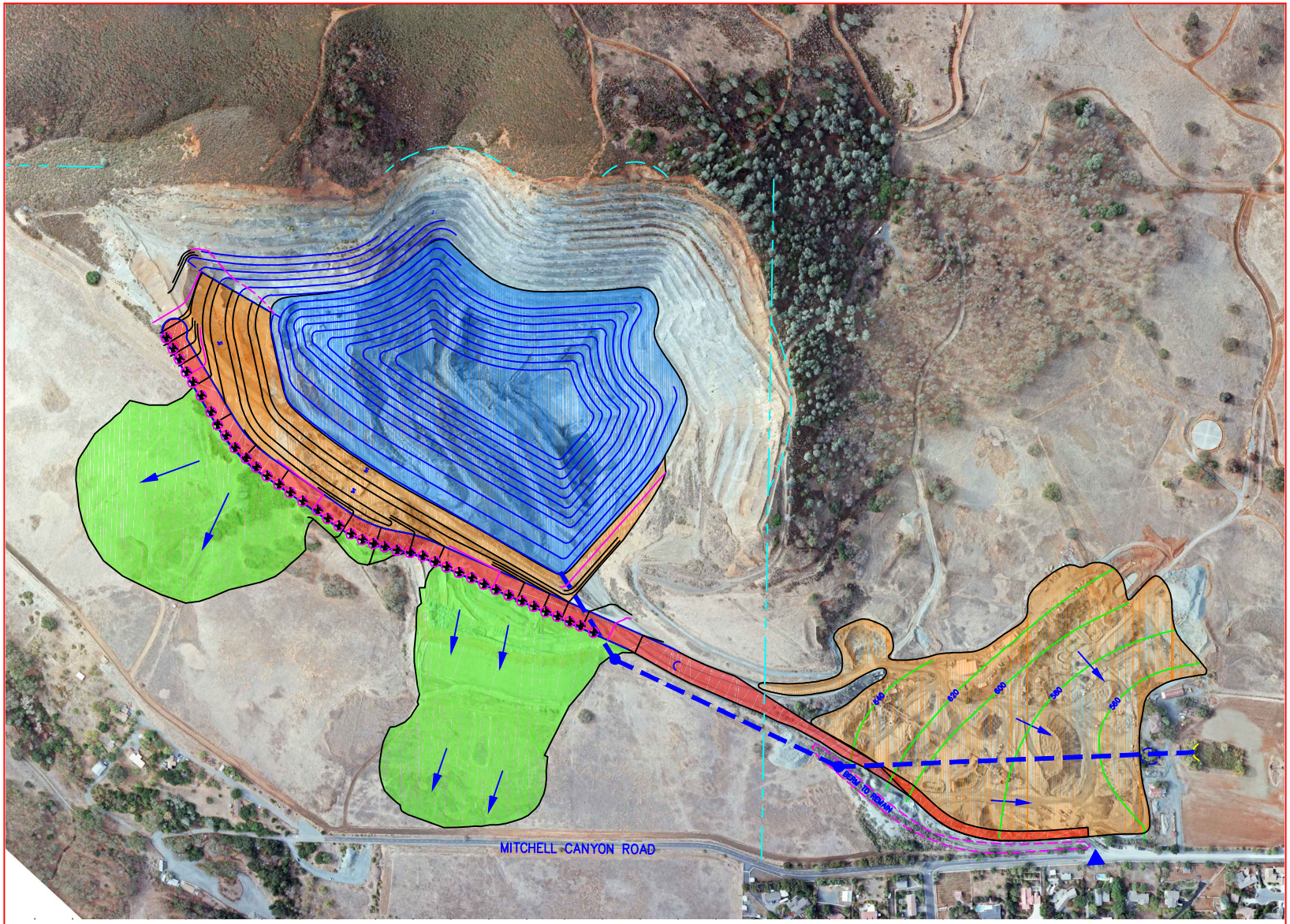
Substantial erosion problems would specifically include any smaller rill or gully that could potentially develop into a larger problem. Erosion maintenance will continue within each reclamation unit until that unit has met revegetation performance standards.

4.2 WEED CONTROL

During the revegetation establishment period, noxious weeds will be managed: (1) when they threaten the success of the proposed revegetation; (2) to prevent spreading to nearby areas; and (3) to eliminate fire hazard. Noxious weeds will be removed using a combination of herbicides, mechanical controls, and hand weeding. In some cases, complete eradication may not be feasible unless the weed-infested patches are small. Noxious weeds include all species classified as highly invasive by the California Exotic Pest Plant Council (CalEPPC).

4.3 BROWSING/PLANT PROTECTION MEASURES

Foothill pines are not browsed by deer or other animals, and most chaparral dominants are also unpalatable. No browsing controls (such as fencing or caging) are necessary or recommended.



LEGEND

- Property Boundary
- Contour Line
- Pipeline & Manhole
- Slope to Drain
- Ingress/Egress and Utilities
- Open Space (Seeded Grassland)
- Water Surface
- Open Space (Seeded Chaparral)
- Diabase
- Access Road
- Foothill Pine Tree Screen (Average Spacing 12 feet)

DISTURBED AREA

QUARRY	= 85 ACRES
FILL	= 35 ACRES
PLANT/ROAD	= 47 ACRES
DISTURBED AREA	= 167 ACRES

0 600'

Photo/Survey by: AeroTech Mapping
Photo Date: Nov. 5, 2015
Horizontal Datum: Cal Coord Zone III, NAD83
Vertical Datum: NAVD88

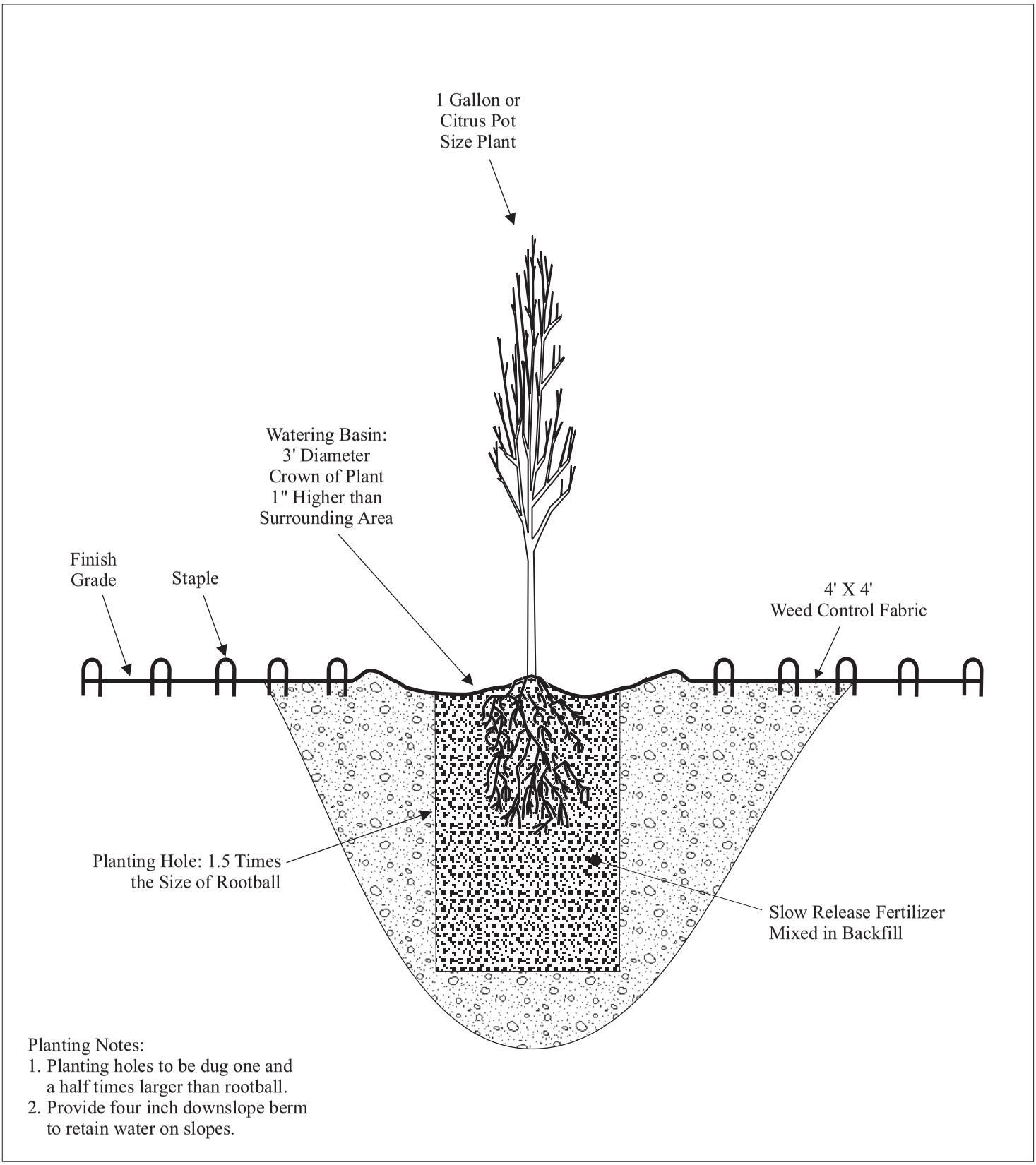
REVEGETATION PLAN (2017)

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

MARCH 2017

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 1



Planting Notes:
1. Planting holes to be dug one and a half times larger than rootball.
2. Provide four inch downslope berm to retain water on slopes.

LSA

FIGURE 2

Cemex Clayton Quarry
Contra Costa County, California

Typical Tree Planting Detail

APPENDIX C
VISUAL SIMULATIONS

COMPILATION OF VISUAL SIMULATIONS

CLAYTON QUARRY RECLAMATION



Simulations Produced By:

Eric Spikes, Rocket Red Media

Compiled and Annotated By:

Compass Land Group

3140 Peacekeeper Way, Suite 102

McClellan, CA 95652

COMPASS LAND GROUP

August 9, 2018

TABLE OF CONTENTS

Key Observation Point / Simulation **Page**

KOP 1: View from Mount Diablo State Park

Existing Conditions vs. 1983 Plan Implementation 1

Existing Conditions vs. 2017 Plan Proposal..... 2

1983 Plan Implementation vs. 2017 Plan Proposal 3

KOP 2: View from Clayton Community Park

Existing Conditions vs. 1983 Plan Implementation 4

Existing Conditions vs. 2017 Plan Proposal..... 5

1983 Plan Implementation vs. 2017 Plan Proposal 6

KOP 3: View from Marsh Creek Road

Existing Conditions vs. 1983 Plan Implementation 7

Existing Conditions vs. 2017 Plan Proposal..... 8

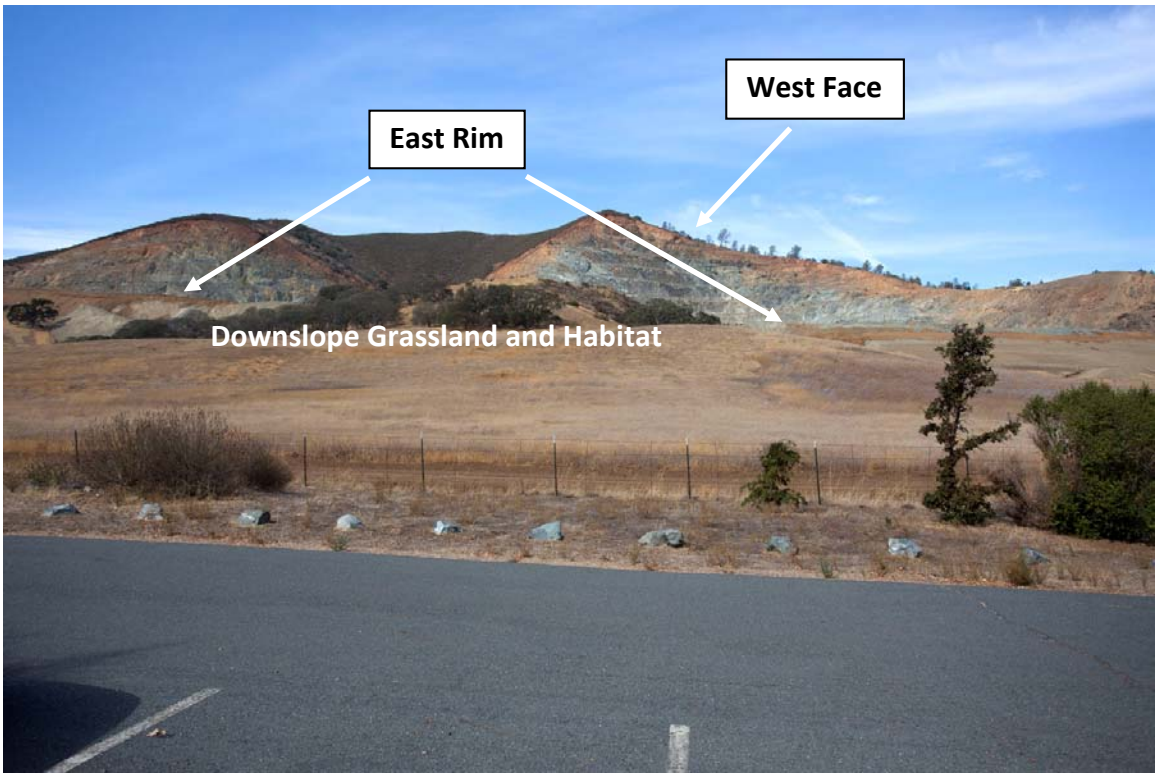
1983 Plan Implementation vs. 2017 Plan Proposal 9

KOP 4: View from Intersection of Marsh Creek Road and Easley Drive

Existing Conditions vs. 1983 Plan Implementation 10

Existing Conditions vs. 2017 Plan Proposal..... 11

1983 Plan Implementation vs. 2017 Plan Proposal 12



Existing Conditions Photograph Date: 10.13.2015

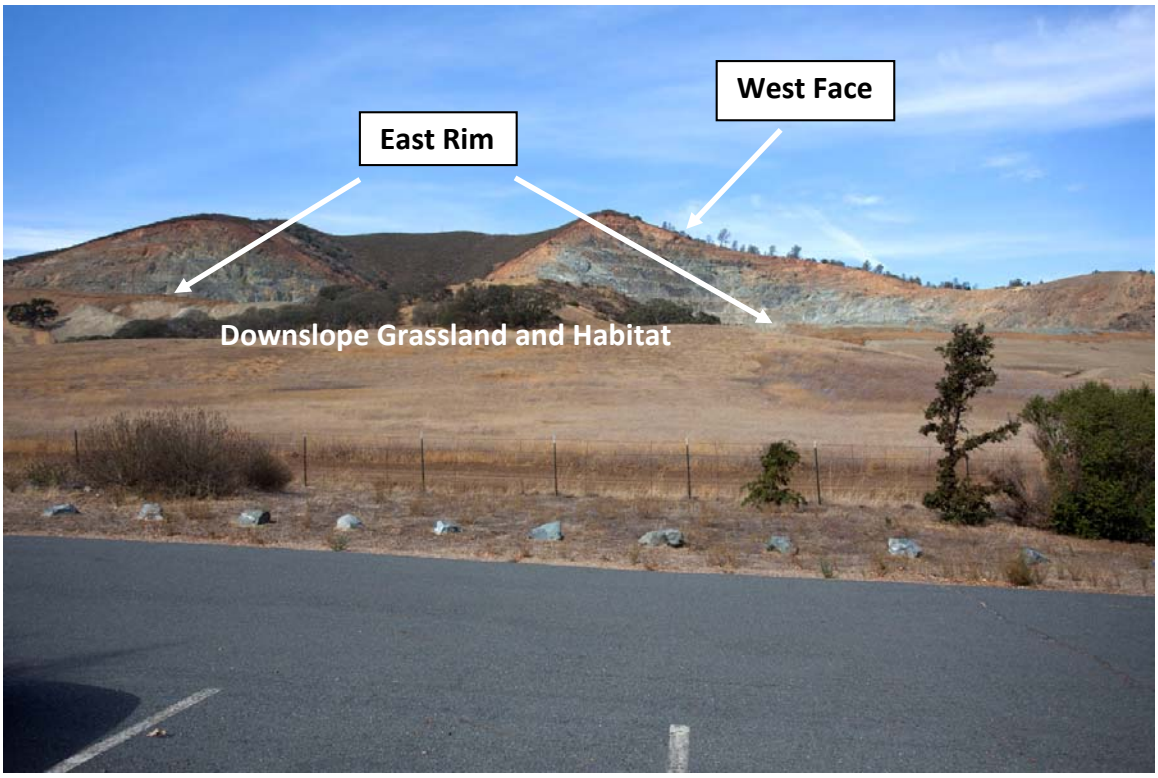


Final Conditions: 1983 Plan Implementation

KEY OBSERVATION POINT 1

VIEW FROM MOUNT DIABLO STATE PARK, LOOKING NORTHWEST

EXISTING CONDITIONS VS. 1983 PLAN IMPLEMENTATION



Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

KEY OBSERVATION POINT 1

VIEW FROM MOUNT DIABLO STATE PARK, LOOKING NORTHWEST



Final Conditions: 1983 Plan Implementation Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal



Existing Conditions Photograph Date: 10.13.2015



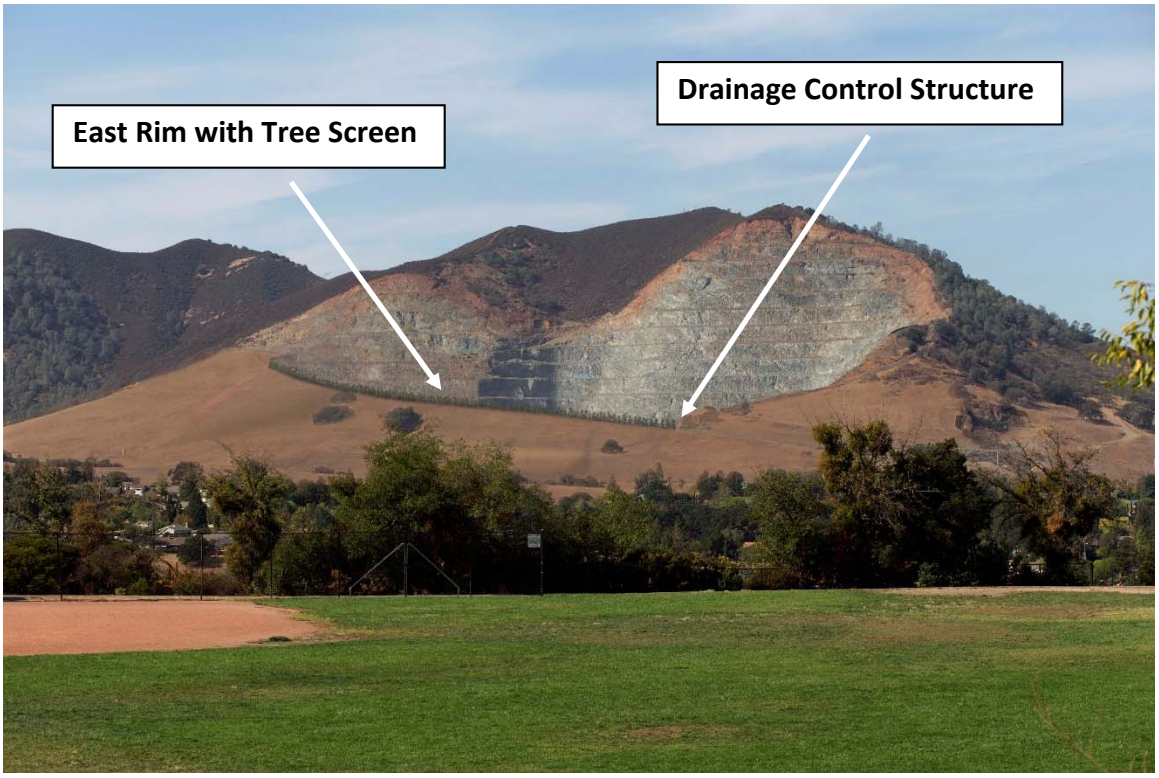
Final Conditions: 1983 Plan Implementation

KEY OBSERVATION POINT 2
VIEW FROM CLAYTON COMMUNITY PARK, LOOKING WEST

EXISTING CONDITIONS VS. 1983 PLAN IMPLEMENTATION



Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

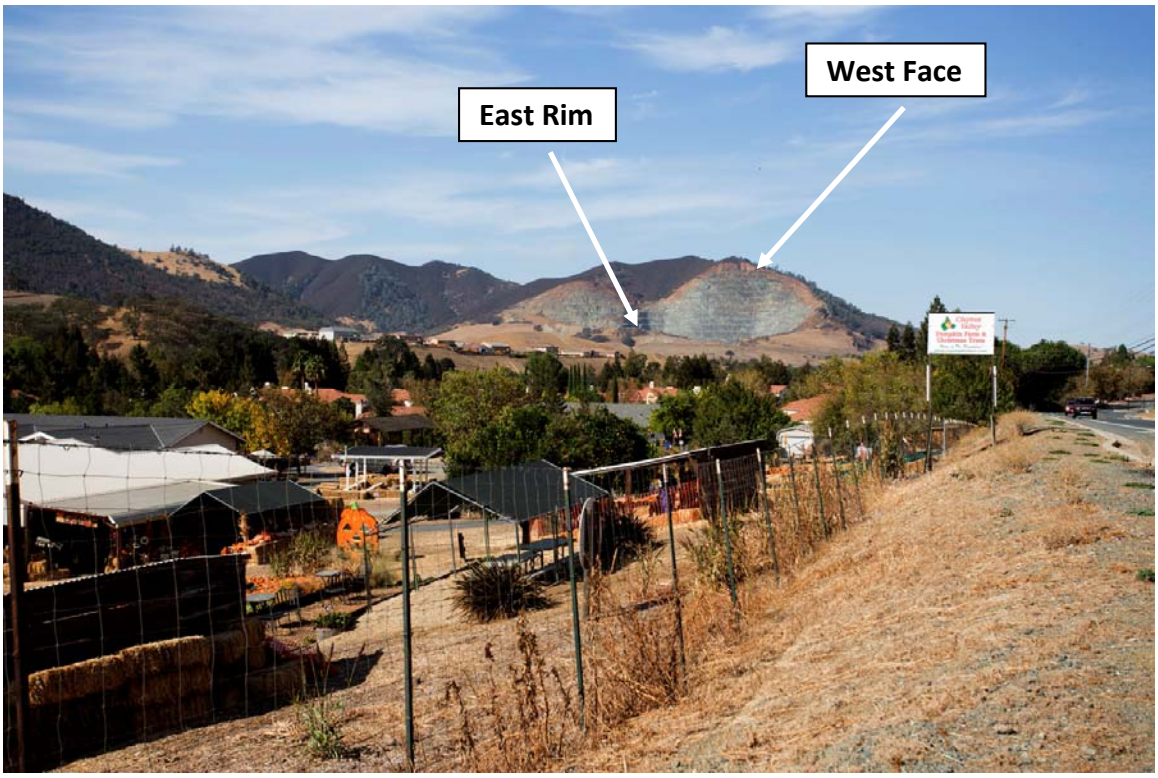
KEY OBSERVATION POINT 2
VIEW FROM CLAYTON COMMUNITY PARK, LOOKING WEST



Final Conditions: 1983 Plan Implementation Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

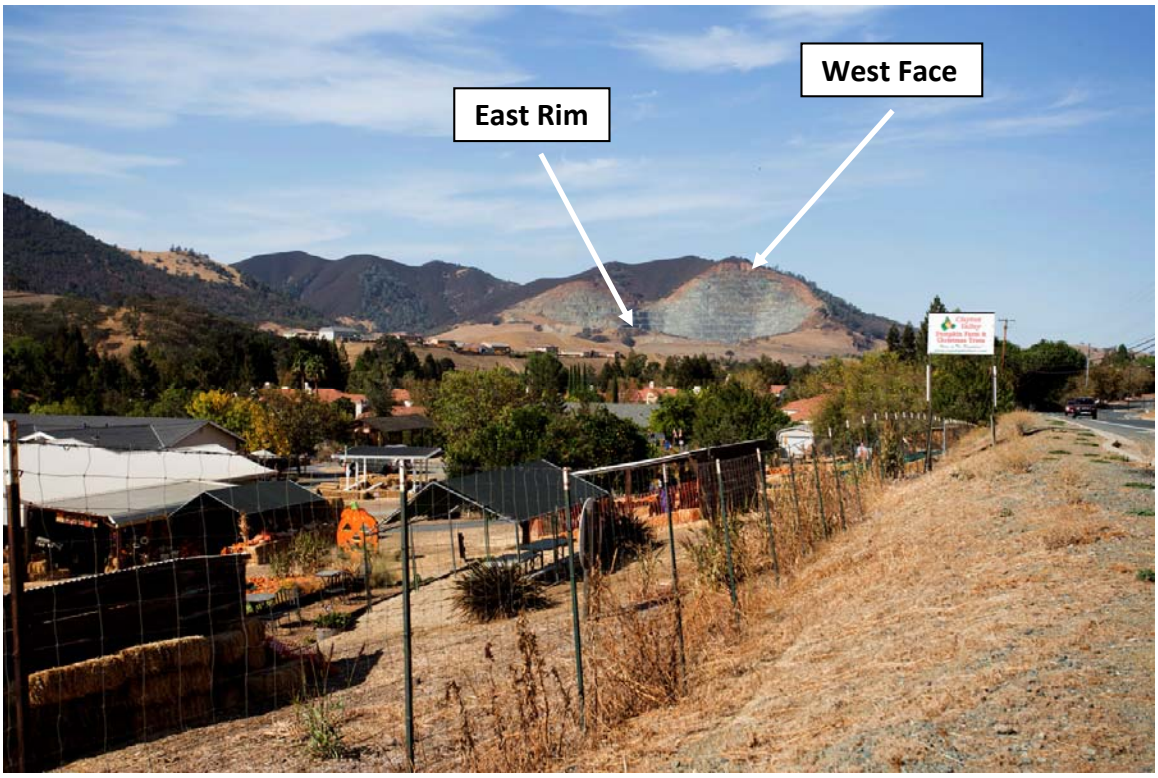


Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 1983 Plan Implementation

KEY OBSERVATION POINT 3
VIEW FROM MARSH CREEK ROAD, LOOKING WEST



Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

KEY OBSERVATION POINT 3
VIEW FROM MARSH CREEK ROAD, LOOKING WEST



Final Conditions: 1983 Plan Implementation Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal



Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 1983 Plan Implementation

KEY OBSERVATION POINT 4

VIEW FROM MARSH CREEK ROAD AND EASLEY DRIVE, LOOKING SOUTHWEST



Existing Conditions Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

KEY OBSERVATION POINT 4

VIEW FROM MARSH CREEK ROAD AND EASLEY DRIVE, LOOKING SOUTHWEST



Final Conditions: 1983 Plan Implementation Photograph Date: 10.13.2015



Final Conditions: 2017 Plan Proposal

APPENDIX D

AIR QUALITY, GHG, AND HEALTH RISK ASSESSMENT

APPENDIX D-1

AIR AND GREENHOUSE GAS EMISSIONS STUDY

CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC.

CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

AIR AND GREENHOUSE GAS EMISSIONS STUDY

PREPARED FOR:
CEMEX Construction Materials Pacific, LLC.
2365 Iron Point Road, Suite 120
Folsom, CA 95630

FOR SUBMITTAL TO:
Contra Costa County
Department of Conservation and Development
30 Muir Road
Martinez, California 94553

COMPASS LAND GROUP

JULY 2, 2020

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 1

2.0 PROJECT DESCRIPTION 1

2.1 Project Overview 1

2.2 Project Reclamation Schedule 2

3.0 METHODS AND ASSUMPTIONS 3

4.0 SIGNIFICANCE CRITERIA 5

5.0 RESULTS AND RECOMMENDED MITIGATION 7

5.1 Criteria Pollutant Emissions of ROG, NOx, PM10, and PM2.5 7

5.2 Carbon Monoxide (CO) Hotspots 8

5.3 Greenhouse Gas Emissions 10

5.4 Odors 12

TABLES

Table 1 Anticipated Reclamation Schedule and Duration 3

Table 2 BAAQMD Project Level Thresholds of Significance 6

Table 3 Daily Criteria Air Pollutants and Precursor Emissions Analysis (lb/day) 7

Table 4 Annual Criteria Air Pollutants and Precursor Emissions Analysis (tons/year) 7

Table 5 Greenhouse Gas Emissions Analysis (MT/year) 10

APPENDICES

Appendix A Proposed Project Models and Inputs

Appendix A-1 CalEEMod Modeling Assumptions

Appendix A-2 CalEEMod Modeling Results

1.0 PURPOSE AND SCOPE

Compass Land Group ("Compass") has prepared this Air and Greenhouse Gas Emissions Study ("Study") in support of the CEMEX Construction Materials Pacific, LLC. ("CEMEX") Clayton Quarry Reclamation Plan Amendment Project in unincorporated Contra Costa County, California ("Project"). This Study evaluates the potential air quality and greenhouse gas ("GHG") emissions from the proposed Project. Project reclamation emissions are compared against significance thresholds adopted by the Bay Area Air Quality Management District ("BAAQMD"). This Study also evaluates the potential odor impacts of the Project. This Study is intended to support the lead agency's evaluation of air quality and GHG impacts pursuant to the California Environmental Quality Act ("CEQA").

The sections that follow provide a description of the Project, methods for air quality and GHG emissions evaluation, BAAQMD significance thresholds, and emissions estimates for use in Project CEQA review.

2.0 PROJECT DESCRIPTION

2.1 Project Overview

CEMEX owns and operates the Clayton Quarry, a ±190-acre hardrock mining facility located south of the cities of Clayton and Concord, at 515 Mitchell Canyon Road in unincorporated Contra Costa County. CEMEX and its predecessors-in-interest have been continuously mining at Clayton Quarry since 1947. In addition to mining and reclamation, existing permitted and accessory uses at the Clayton Quarry include aggregate processing, stockpiling, load-out, sales, construction materials recycling, and equipment storage and maintenance. CEMEX's mining operations at the site are vested per the mining activities occurring since 1947, the California Surface Mining and Reclamation Act ("SMARA") and County Land Use Permit ("LUP") #363-67 (confirmed by the County in 1983). Surface mining reclamation activities at the site are currently conducted pursuant to Reclamation Plan LUP #2054-81, approved in 1983 ("1983 Reclamation Plan").

Under the proposed Project, CEMEX proposes an amendment to its 1983 Reclamation Plan through adoption of a Revised Reclamation Plan. The Project includes amendments to CEMEX's existing land use entitlements, LUP #363-67 (operating entitlement) and LUP #2054-81 (Reclamation Plan entitlement), to the extent needed to conform their conditions of approval to the Revised Reclamation Plan.

The Revised Reclamation Plan provides for updated final grading contours, a post-mining land use of open space that will provide for a future quarry lake, a final drainage plan for the quarry and plant site, an updated revegetation plan, and current State reclamation standards to be achieved during reclamation.

More specifically, the Revised Reclamation Plan provides for:

- Reclamation over an anticipated period of 50 years to a post-mining land use of open space;
- Reduction of the surface mining disturbance footprint that leaves the east rim of the quarry intact, providing visual buffer between the quarry and view sheds to the east;
- Permanent overburden fill areas;
- Final grading contours reflecting a maximum depth of excavation at elevation 110' msl with finish slope angles that achieve adequate factors of safety;
- A final drainage plan that provides for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow that conveys stormwater to natural drainage courses and man-made drainage facilities;
- Revegetation of the quarry east rim, overburden fill areas and processing plant site to a combination of chaparral and grassland habitats that feature California native seed mixes;
- Elimination of requirements to backfill, grade, and compact the quarry floor and benches, given that the planned open space end use will provide for a future quarry lake;
- Clarification of pre-1976 (pre-SMARA) disturbance areas, including any areas disturbed outside the boundaries of the 1983 Reclamation Plan;
- Removal of facilities, structures and equipment associated with mining; and
- Current State reclamation standards to be achieved during reclamation.

In addition, and in response to stakeholder input, CEMEX has incorporated into the Revised Reclamation Plan a new landscape screening berm between the existing processing plant site and residential communities to the north.

The Project is a modification of an approved reclamation plan project for a vested mining operation. Except as described above, CEMEX proposes no change to any fundamental element of the existing operation (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation). While providing for an increased depth of mining, the final quarry basin configuration proposed under the Revised Reclamation Plan will actually disturb less surface acreage than allowed under the 1983 Reclamation Plan. A more complete description of the proposed Project is contained in CEMEX's Project Description, Revised Reclamation Plan, and other application materials provided to the County.

2.2 Project Reclamation Schedule

An estimated time schedule for Project reclamation construction activity is provided in Table 1, Anticipated Reclamation Schedule and Duration. This anticipated sequence and schedule is dependent upon many factors such as securing regulatory entitlements, fluctuations in market demands, and need for specific aggregate products.

TABLE 1
ANTICIPATED RECLAMATION SCHEDULE AND DURATION

Area	Reclamation Year	Reclamation Duration
1. Overburden Fill Areas		
a. Finish slopes and drainage	2022	~2 weeks
b. Revegetation	2022	~1 week
2. Quarry Pit Area		
a. Contour final Knoxville slopes	2025	~2 weeks
b. Rip-rap on Knoxville slope faces	2025	~3 weeks
c. Drainage for east rim haul road	2025	~1 week
d. Drainage rock slope protection	2025	~3 weeks
e. Tree screen along east rim access road	2025	~3 weeks
f. Drainage outlet structure and pipeline	2068	~5 weeks
g. Fencing and gates	2068	~1 week
h. Revegetation (hydroseed)	2068	~1 week
3. Off-Site Drainage Improvement Area		
a. Storm drain replacement at Mitchell Canyon Rd. and Diablo Downs	2068	~2 weeks
4. Processing Plant Area		
a. Landscape screening berm	2022	~1 week
b. Processing plant removal	2068	~3 months
a. Contour grading and resoiling	2068	~3 weeks
b. Revegetation (hydroseed)	2068	~1 week

Notes:
1. Anticipated progression is approximate only. Actual timelines will vary depending on market and geologic conditions and quarry production. The reclamation schedule is based on an anticipated average production of 500,000 tons per year from the quarry.

3.0 METHODS AND ASSUMPTIONS

This Study evaluates the potential air quality and GHG emissions for the proposed Project. Project reclamation emissions are compared against significance thresholds adopted by BAAQMD. If requested by the County, the emissions from existing operations (i.e., mining and processing activities that are outside the scope of the Project) can be estimated and presented separately for informational purposes.

The CEQA baseline used for purposes of this Study is existing conditions; however, there is currently no reclamation activity for which baseline emissions would be measured or evaluated. Reclamation activity would occur in the future after mining and processing activities are completed in the different areas at the Project site as shown in Table 1, above.

Compass used the latest version of the California Emissions Estimator Model ("CalEEMod") version 2016.3.2 to quantify emissions for Project reclamation activities. CalEEMod is a widely accepted modeling tool maintained by the California Air Pollution Control Officers Association ("CAPCOA"). CalEEMod incorporates state and locally approved emission factors and methodologies for estimating both the daily maximum and annual average emissions levels for criteria pollutants and greenhouse gas emissions associated with land development projects, including mining. The following model selection parameters were used:

1. ***Project Location:*** Location is set to the County level for Contra Costa County. This sets windspeed and precipitation frequency assumptions for modeling. The Project site is located within the jurisdiction of the BAAQMD and part of the San Francisco Bay Area Air Basin ("SFBAAB"). The SFBAAB is currently designated as a nonattainment area for State and National ozone standards and national particulate matter ambient air quality standards.

2. ***Lot Acreage:*** The Project reclamation boundary would encompass ±190 acres. For grading activity, this model input parameter has a negligible impact on modeled emissions outputs because the model uses more refined acreage assumptions for graded areas as applicable to each construction phase.

3. ***Urbanization:*** The land use setting for purposes of modeling is designated as urban given the adjacent residential developments in the unincorporated County, City of Clayton, and City of Concord.

4. ***Climate Zone:*** The site is located within Climate Zone 4 based on the site's zip code.

5. ***Mitigated Construction:*** The "mitigated construction" results (as reported in the modeling outputs) assume that disturbed surfaces would be wetted at least two times per day for dust control. CEMEX's current operating practices involve the use of a full-time water truck; therefore, this assumption is considered reasonable. In addition, a speed limit of 15 miles per hour is assumed for unpaved roads based on the basic construction mitigation measures recommended for all projects in the BAAQMD 2017 CEQA Guidelines (Table 8-2). No other mitigations have been modeled or credited in CalEEMod. Based on the foregoing, the "mitigated construction" results have been presented in the emissions summary below.

Project reclamation activities are modeled as independent phases in CalEEMod for each of the overburden fill, quarry pit, off-site drainage improvement, and processing plant areas. For modeling purposes, certain end-of-life Project reclamation activities are assumed to be constructed in year 2049 (ahead of CEMEX's anticipated final reclamation date of 2068). This is

to ensure proper CalEEMod model functionality, which requires that the Project build-out year be set to at least one year after the final year of construction. The final build-out year option in CalEEMod is year 2050; therefore, end-of-life activities are all modeled in construction year 2049 (one year sooner). Since CalEEMod's emissions factors do not extend beyond 2045 and should continue to improve over time, this results in a conservative estimate of emissions for the reclamation activities that are anticipated to occur in 2068. This has no effect on the significance conclusions presented later in this study.

Using the outputs of the CalEEMod model runs, the highest pollutant-generating years for each pollutant are selected for reporting of emissions and comparison of the Project's emissions to BAAQMD's thresholds of significance.

For evaluation of local carbon monoxide (CO) emissions, Compass applied BAAQMD's preliminary screening methodology, which provides a conservative indication of whether the implementation of the proposed Project would result in CO emissions that exceed the applicable thresholds of significance described in Section 4, below. BAAQMD does not publish a threshold of significance for construction-related CO. Construction activities are not usually a significant source of CO as most construction equipment is diesel-powered and produces much lower CO emissions than gasoline combustion engines. Compass also presents data from the closest BAAQMD-managed air monitoring station to show that the Project's CO contribution from reclamation activity would be de-minimis compared to CO concentrations at Treat Boulevard in Concord (nearby), which are still well below the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

The Project would not involve odor-generating sources aside from direct exhaust emissions associated with operation of construction equipment that generally dissipate rapidly into the atmosphere as distance increase from the source. For consideration of odors, BAAQMD presents screening distances for a variety of land uses that typically generate odors, such as landfills, composting facilities, rendering plants, and asphalt concrete batch plants. The Project reclamation activities do not propose or fall under any of the land use categories for which screening distances are provided for odors. Compass also obtained compliance history from BAAQMD for the existing processing facility located on the Project site to show that this permitted use (even though it is not part of the Project) has not resulted in a significant number of odor complaints as compared to BAAQMD thresholds of significance that are discussed in Section 4 below. CEMEX has received no odor complaints in the last three years.

Detailed estimating methods and assumptions are provided in this Study's appendices.

4.0 SIGNIFICANCE CRITERIA

The BAAQMD has established significance thresholds to assist Lead Agencies in determining whether a proposed project may have a significant air quality impact. These thresholds, contained within the district's *California Environmental Quality Act Air Quality Guidelines* (May 2017 Revision) ("BAAQMD CEQA Guidelines") are shown in Table 2, below.

TABLE 2
BAAQMD PROJECT LEVEL THRESHOLDS OF SIGNIFICANCE[1]
(ADAPTED FROM TABLE 2-1, BAAQMD CEQA GUIDELINES MAY 2017)

Pollutant	Construction-Related	Operational-Related	
Criteria Air Pollutants and Precursors (Regional)	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.00 ppm (1-hour average)	
GHGs – Projects other than Stationary Sources	None[2]	Compliance with Qualified GHG Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 MT CO_2e/SP/yr (residents + employees)	
GHGs – Stationary Sources	None[2]	10,000 MT/yr	
Odors	None	5 confirmed complaints per year averaged over three years	

Notes:

1. Project level thresholds of significance adapted from Tables 2-1 and 2-2 of the BAAQMD CEQA Guidelines (May 2017). *http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines (retrieved November 30, 2018).*
2. BAAQMD does not have an adopted threshold for construction-related GHG emissions. However, the Lead Agency should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals, as required by the Public Resources Code, Section 21082.2. The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable. (BAAQMD CEQA Guidelines at p. 2-6).
3. Definitions: CEQA = California Environmental Quality Act; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO_2 = sulfur dioxide; SP = service population; TACs = toxic air contaminants; TBP = toxic best practices; tons/day = tons per day; tpy = tons per year; yr = year; TBD = to be determined.

5.0 RESULTS AND RECOMMENDED MITIGATION

5.1 Criteria Pollutant Emissions of ROG, NOx, PM10, and PM2.5

The modeling results indicate that all Project criteria pollutant emissions are below applicable BAAQMD thresholds of significance for CEQA. Therefore, the Project's potential criteria pollutant impacts would be less-than-significant. Table 3 presents the *daily* criteria air pollutants and ozone precursor emissions analysis. Table 4 presents the *annual* criteria air pollutants and ozone precursor emissions analysis. A complete report of Project emissions and modeling inputs is included as Appendix A, Proposed Project Models and Inputs.

TABLE 3
DAILY CRITERIA AIR POLLUTANTS AND PRECURSOR EMISSIONS ANALYSIS (LB/DAY)

Emissions Category	ROG	NOx	PM10 (Exhaust)	PM2.5 (Exhaust)
2022 Project Emissions	3.8	38.0	1.5	1.4
2025 Project Emissions	2.6	19.0	0.7	0.6
2068 Project Emissions (modeled 2049)	4.6	12.9	0.4	0.4
Highest Year Project Emissions	4.6	38.0	1.5	1.4
BAAQMD CEQA Significance Thresholds	54	54	82	54
Exceeds Threshold (Yes/No)?	**No**	**No**	**No**	**No**

Notes:
1. BAAQMD thresholds from Table 1, above.
2. See Appendix A-2 for daily results for criteria pollutants that do not have BAAQMD adopted thresholds (e.g,. CO, SO2, Fugitive PM_{10}, and Fugitive $PM_{2.5}$).
3. The Applicant will be required to implement BAAQMD's best management practices for construction-related fugitive dust emission controls.

TABLE 4
ANNUAL CRITERIA AIR POLLUTANTS AND PRECURSOR EMISSIONS ANALYSIS (TONS/YEAR)

Emissions Category	ROG	NOx	PM10 (Exhaust)	PM2.5 (Exhaust)
2022 Project Emissions	0.01	0.13	$5.4x10^{-3}$	$5.0x10^{-3}$
2025 Project Emissions	0.05	0.39	0.01	0.01
2068 Project Emissions (modeled 2049)	0.20	0.52	0.01	0.01
Highest Year Project Emissions	0.20	0.52	0.01	0.01
BAAQMD CEQA Significance Thresholds	10	10	15	10
Exceeds Threshold (Yes/No)?	**No**	**No**	**No**	**No**

Notes:
1. BAAQMD thresholds from Table 1, above. Operational-related annual thresholds are used since there are no published construction-related annual thresholds.
2. See Appendix A-2 for annual results for criteria pollutants that do not have BAAQMD adopted thresholds (e.g,. CO, SO2, Fugitive PM_{10}, and Fugitive $PM_{2.5}$).
3. The Applicant will be required to implement BAAQMD's best management practices for construction-related fugitive dust emission controls.

5.2 Carbon Monoxide (CO) Hotspots

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuel. The largest source of CO is vehicle engines, and the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Consequently, violations of the CO standard are generally limited to major intersections during peak-hour traffic conditions. Exposure of humans to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, fatigue, impaired central nervous system function, and angina (chest pain) in persons with serious heart disease. Very high concentrations of CO can be fatal. However, high concentrations are not expected as a result of the Project.

BAAQMD's preliminary screening methodology indicates that the Project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

1. *Project is consistent with an applicable congestion management program established by the County congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.*
2. *The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.*
3. *The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge, underpass, natural or urban street canyon, below-grade roadway).*

Regarding screening criteria number 1, the Contra Costa Transportation Authority ("CCTA") serves as the congestion management agency for Contra Costa County, and develops and implements the applicable Congestion Management Program ("CMP"). The CMP outlines CCTA's strategies for managing the performance of regional transportation within the County, and must be updated every other year. CCTA updated the CMP most recently in 2019.[1] The CMP covers State highways, principal arterials, and the Bay Area Rapid Transit ("BART") system. CCTA recognizes I-680 and State Route 242 as the nearest CMP-covered highways, and Kirker Pass Road, Ignacio Valley Boulevard, and Clayton Road (west of the intersection of Kirker Pass/Ignacio Valley) as the nearest principal arterials and routes of regional significance (CMP at Figures 2-1 and 2-2). The CMP designates principal arterials with average daily traffic that equals or exceeds 20,000 vehicles per day for a segment of one mile or greater. Chapter 5 of the CMP includes a program to analyze the impacts of land use decisions made by local jurisdictions on these regional transportation systems. For short-range analysis of land use impacts, the CMP relies on the traffic impact analysis required by the Measure J Growth Management Program. That program requires every jurisdiction to conduct a traffic impact analysis for any proposed development project,

[1] A copy of the 2019 Congestion Management Program prepared by CCTA is available here: https://www.ccta.net/wp-content/uploads/2019/12/CMP19_MainDoc_Final.pdf

development plan, or General Plan Amendment that would generate more than 100 net new peak hour vehicle trips. (emphasis added).

Although the Project is located within two miles of the principal arterials and roadways of regional significance that are designated in the CMP, the Project will not conflict with the CMP because reclamation activities will only occur for short periods of time and would only place very limited traffic on existing roadways. Traffic associated with Project reclamation activity would be far less than existing traffic levels associated with mining and processing operations at the site and far less than 100 net new peak hour vehicle trips. Based on the Project trip generation estimates reported in Appendix A, the Project would generate up to 98 daily vehicle trips associated with reclamation activity (during removal of the processing plant which is the reclamation activity with the highest trip count), including all worker, vendor, and hauling trips. This corresponds to 49 trips entering and 49 trips leaving the site each day. To put these figures into perspective, as of 2017 Caltrans estimated that State Route 242 at Concord Avenue, which is the closest of the nearby highways, will experience 136,500 annual average daily traffic (AADT).[2]

The project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per *hour* (screening criteria number 2), or to more than 24,000 vehicles *per hour* where vertical and/or horizontal mixing is substantially limited (screening criteria number 3). Based on BAAQMD's screening criteria, the Project's potential CO impacts would be less-than-significant.

Compass' CalEEMod modeling results found in Appendix A indicate that Project CO emissions would peak at approximately 31.85 pounds per day and 1.29 tons per year in model year 2049 (representing the period of final reclamation activities anticipated to occur in 2068). These values represent mass emissions estimates and not an emissions concentration, which is the metric used in BAAQMD's *operational* thresholds. As documented by BAAQMD, CO concentrations in the Project area currently meet all NAAQS and CAAQS and the Bay Area Air Basin as a whole is in attainment status (meaning meeting standards) for CO.[3] State standards, which have been adopted as part of BAAQMD's operational thresholds of significance, are more restrictive than the NAAQS at 9 parts per million (ppm) for the maximum 8-hour concentration and 20 ppm for the maximum 1-hour concentration. CO measurements taken at the Concord air monitoring station since January 2019 indicate a maximum CO concentration of 2.0 ppm (8-hour average) and 9.4 ppm (1-hour average) occurring in April 2020.[4] Given that these CO concentrations are measured in the urban core where traffic is congested during the morning and afternoon peak hours, they represent much higher concentrations of CO than would be expected at the Project

[2] Caltrans' traffic census data (with look ahead projections) for State Route 242 is available here: https://dot.ca.gov/programs/traffic-operations/census/traffic-volumes/2017/route-221-275

[3] A summary of Bay Area Air Basin attainment status published by BAAQMD is available here: http://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status

[4] The Concord (Treat Blvd.) air monitoring station (ID 06-013-0002) is located at approximate GPS coordinates 37.936013, -122.026154, at the intersection of Oak Grove Rd. and Treat Blvd. Concord station data is available here: https://www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data/#/air-quality-home

site. To put these concentrations into perspective, in 2019 BAAQMD estimated that Treat Blvd. at the Concord air monitoring station would generate 39,864 AADT based on updated traffic count data from April 1, 2019.[5] The Project would generate up to 98 daily vehicle trips associated with reclamation activity per day (or 0.2% of the traffic volume at the air monitoring station).

The proposed Project's impacts relating to CO would be less-than-significant based on BAAQMD CO screening criteria and Concord (Treat Blvd.) air monitoring station data.

5.3 Greenhouse Gas Emissions

BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions. Instead, modeled GHG emissions are presented in relation to BAAQMD's operational thresholds of significance. The modeling results indicate that Project GHG emissions are below applicable BAAQMD operational thresholds of significance for CEQA. Table 5 presents the GHG emissions analysis. A complete report of Project emissions and modeling inputs is included as Appendix A.

TABLE 5
GREENHOUSE GAS EMISSIONS ANALYSIS (MT/YEAR)[2]

Emissions Category	CO_2e
Project Emissions	492.8
BAAQMD CEQA Significance Threshold[3]	1,100
Exceeds Threshold (Yes/No)?	**No**

Notes:
1. MT= metric tons. CO_2e = carbon dioxide equivalent.
2. Proposed Project emissions are reported for model year 2049 (representing final reclamation activities anticipated to occur in the year 2068), which is the highest emitting model year for CO_2e. See Appendix A for detail.
3. BAAQMD thresholds from Table 2, above, for operational emissions.

In the absence of adopted construction thresholds, the BAAQMD CEQA Guidelines state that the County should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals.[6] BAAQMD encourages lead agencies to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable. Sources of construction-related GHGs only include exhaust; therefore, construction best management practices should focus on direct and indirect exhaust emissions reductions. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment of at least 15 percent of the

[5] Source: 2018 Air Monitoring Network Plan (BAAQMD, Revised July 1, 2019).
[6] AB 32, the California Global Warming Solutions Act of 2006, requires California to reduce its GHG emissions to 1990 levels by 2020 — a reduction of approximately 15 percent below emissions expected under a "business as usual" scenario.

fleet; using local building materials of at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials.

In the absence of a BAAQMD-adopted construction GHG threshold, Compass compared Project emissions to BAAQMD's operational threshold as a reasonable proxy for furthering AB 32 GHG reduction goals. BAAQMD's operational thresholds are used to determine significance of long-term operation of land uses and developments, often with far greater GHG emissions potentials than that of the proposed Project. Given that modeled GHG emissions are at only about 45 percent of the operational threshold, the Project is not expected to generate a cumulatively considerable contribution of GHG emissions. Therefore, the Project's potential GHG impacts would be less-than-significant.

Compass recognizes that air quality and GHG emissions models are imperfect (like other models) as they are based on a set of assumptions used at the time of modeling. These assumptions (e.g., the duration of a construction activity or the vehicle miles traveled by construction contractors and vendors) are subject to change and actual emissions at the time of construction could be more or less than what is modeled. For these reasons, Compass offers the following mitigation measures (some of which are adapted from Tables 8-2 and 8-3 of the BAAQMD CEQA Guidelines) that can be considered if needed to further minimize construction-related GHG emissions associated with reclamation activity:

1. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. [Measure applies to idling times for all equipment other than diesel-powered equipment].

2. Minimize the idling time of diesel-powered construction equipment to two minutes. [Measure applies to idling times for diesel-powered equipment only].

3. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

4. Use at least 10 percent local building materials in construction (e.g., construction aggregates, concrete pipe).

5. Recycle or reuse at least 50 percent of construction waste or demolition materials (e.g., during decommissioning and removal of processing plant facilities).

6. Perform on-site material hauling with trucks equipped with on-road engines (if less emissive of GHG emissions than off-road engines), if available.

7. Use alternative fuels for generators at construction sites such as propane or solar, or use electrical power, as feasible for each construction site.

5.4 Odors

Project reclamation activities are not expected to introduce significant sources of odors. The Project does not involve odor-generating sources aside from direct exhaust emissions associated with operation of construction equipment that generally dissipate rapidly into the atmosphere as distance increases from the source. BAAQMD has not adopted construction-related thresholds of significance for odors. BAAQMD's operational threshold of significance is five confirmed odor complaints per year averaged over three years.

The BAAQMD CEQA Guidelines provide screening distance criteria for a variety of land uses that have the potential to generate odors, such as landfills, composting facilities, rendering plants, and asphalt batch plants. The Project reclamation activity does not involve installation or operation of any of the land use categories that might be expected to generate odors. Compass obtained compliance history from BAAQMD for the existing plant to compare it against BAAQMD's operational threshold. For the period January 1, 2015 to April 27, 2020, BAAQMD has recorded zero odor complaints for the Clayton Quarry facility.

The Project's potential odor impacts would be less-than-significant based on the nature of reclamation construction activities, BAAQMD's odor screening criteria, and BAAQMD's record of zero complaints for the existing facility.

Appendix A:
Proposed Project Models and Inputs

Appendix A-1:
CalEEMod Modeling Assumptions

Appendix A-1
CalEEMod Modeling Assumptions
Clayton Quarry Reclamation
June 10, 2020

EQUIPMENT USE

See attached for equipment model and horsepower assumptions.

CALEEMOD RUN 1

CalEEMod Construction Tabs

General: "Off-Highway Truck" (402 horsepower model) is used as proxy for water truck per CalEEMod User Guide Section 4.3.2.

1. Overburden Fill Areas – Dress Slopes and Drainage.
    a. Description: Dress slopes and install finish/rehab drainage for overburden fill areas (assumes both north and south fill areas). Use backhoe to trim ditches, drainage, swales, etc. and loader to remove trimmed materials. (3 days each area).
    b. Equipment: Cat 442 backhoe. Water truck.
    c. Crew size: 3, including equipment operators, and laborer.
    d. Duration: 10 days.
    e. Graded acres: 43 acres (north 28 ac; south 15 ac).
2. Overburden Fill Areas – Revegetation.
    a. Description: Hydroseed truck to revegetate overburden fill areas.
    b. Equipment: Off-Highway Truck used as proxy for hydroseed truck.
    c. Crew size: 2.
    d. Duration: 5 days.
3. Quarry Pit Area – Contour Final Knoxville Slopes.
    a. Description: Finish slope contouring for Knoxville slopes along east face of quarry. The Knoxville slopes and benches will have been rough graded to their final configuration during mining and only require final dressing. Position excavator on benches to trim and dress slopes, bringing trimmed material down or up to be picked up by the loader and brought back to quarry basin entrance road at elev. 735 and dumped into haul truck to be brought down to plant site area and used for fill.
    b. Equipment: Cat 349 excavator. Cat 988 loader. Cat 770 haul truck. Water truck.
    c. Crew size: 7, including equipment operators, foreman, grade setter, and laborer.
    d. Duration: 10 days.
    e. Graded acres: 7.5 acres.

4. Quarry Pit Area – Riprap Knoxville Slope Face.

    a. Description: Install riprap along Knoxville slope face from elevation 710 to 738 for erosion protection. This reclamation work to be done concurrent with mining excavations. Position excavator on bench elev. 710 to excavate cut off walls, prep slope and assist laborers to place filter fabric. Bring rock riprap from plant site to in-front of excavator on bench 710. Excavator and loader places riprap. Placement along 1,500 LF. Involves placement of 10,000 SF filter fabric (import) and 11,000 CY rip rap (22,000 tons at 2 tons/CY) sourced from on-site.

    b. Equipment: Cat 349 excavator. Cat 988 loader. Cat 770 haul truck. Water truck (1/2).

    c. Crew size: 10, including equipment operators, foreman, grade setter, and laborers (4).

    d. Duration: 15 days.

    e. Graded acres: 7.5.

    f. Vendor Trips: 2 per day (1 vendor visit per day) to deliver filter fabric.

5. Quarry Pit Area – Drainage – East Rim Haul Road.

    a. Description: Grade east rim access road and ditch and install pipe and berms. Grading and work along 2,300 LF of road, with 4 acre fine grade, 4,600 CY berms, 3 pipes and inlets. East rim road is left high by 0.75'. Final grade road with blade 2300'x75' and windrow into berms both sides (4,700 CY). Shape and track compact berms with loaders. Backhoe excavates pipeline trenches and drop inlets. Cut road ditch with blade. (460' of road/day).

    b. Equipment: Cat 14G grader. Cat 966 loader (2). Cat 442 backhoe. Water truck.

    c. Crew size: 7, including equipment operators, foreman, and laborer.

    d. Duration: 5 days.

    e. Graded acres: 4 acres.

6. Quarry Pit Area – Drainage – RSP Swales Kx Face.

    a. Description: Rock slope protection (RSP) swales (3), 60' high 1:1 Knoxville slopes, 1800' total. Involves placement of 3,200 CY riprap (from onsite). Position excavator at East Rim Rd, benches elev. 890, 830, 770, 710. Excavate RSP swales from top and bottom of benches. Excavated material placed in haul truck and brought to plant site for fill. Laborers trim swale cut-off walls. Backhoe digs swales across the benches. Loader cleans up bench trimmings. Haul truck brings riprap from plant site, place on benches. Excavator places riprap. Concrete pumper truck with extension places concrete on riprap in swales. (~1 swale per week).

    b. Equipment: Cat 442 Backhoe. Cat 349 excavator. Cat 988 loader. Cat 770 haul truck. Water truck (1/2 time). Concrete Pumper Truck (1/3 time).

    c. Crew size: 9, including equipment operators, foreman, and laborers (3).

    d. Duration: 15 days.

    e. Graded acres: <1 acre.

    f. Import material quantity: 300 CY concrete.

g. Hauling trips: 67 trips. (300 CY concrete / 9 CY per load x 2 trips)

h. Adjustment for % Paved Hauling: Reduced to 90% to account for on-site haul.

7. Quarry Pit Area – Tree Screen Along East Rim Road.

    a. Description: Install up to 400 trees as tree screen along top of quarry east rim access road. Flatbed truck transports trees to East Rim Road. Backhoe excavates holes. Laborer with backhoe plants trees on the berm. (24 trees/day)

    b. Equipment: Cat 442 backhoe.

    c. Crew size: 3, including equipment operator, and laborers (2).

    d. Duration: 17 days.

    e. Vendor Trips: 2 per day (1 vendor visit per day) to deliver trees.

8. Quarry Pit Area – Drainage Outlet Structure at Elev. 735.

    a. Description: Install drainage outlet flow control structure for future quarry lake at elev. 735. Backhoe and loader to excavate access road and platform in front of quarry basin outlet structure. Laborers form concrete bulkhead structure. Concrete pumper truck pumps concrete. Welder places plate and screen. Involves 200 CY excavation, 5 CY import concrete, installation of steel plate and trash rack.

    b. Equipment: Cat 442 Backhoe. Cat 988 loader. Welder. Water truck. Concrete Pumper Truck (1/3 time).

    c. Crew size: 8, including equipment operators, foreman, laborers (2), welder.

    d. Duration: 3 days.

    e. Graded acres: <1 acres.

    f. Import material quantity: 5 CY concrete.

    g. Hauling trips: 2 trips. (5 CY concrete in single load x 2 trips)

    h. Adjustment for % Paved Hauling: Reduced to 90% to account for on-site haul.

    i. Vendor Trips: 2 per day (1 vendor visit per day) to deliver steel and trash rack by truck.

9. Quarry Pit Area – Jack and Bore (1) – Excavate Receiving Pit.

    a. Description: Excavator excavates/prepares jacking pit at outlet structure elevation 729. Trim material taken by loader to plant site and used for fill.

    b. Equipment: Cat 349 excavator. Cat 988 loader.

    c. Crew size: 4, including equipment operators, foreman, and laborer.

    d. Duration: 2 days.

    e. Graded acres: <1 acre.

10. Quarry Pit Area – Jack and Bore (2) – Boring Sub Casing Pipe.

    a. Description: Install 350 LF of 48-inch steel casing pipe. Boring machine set up at platform in front of outlet structure. Crane unloads pipe from delivery truck and places it next to boring machine. Welder welds casing pipe as it advances. Boring machine jack and bore casing pipe. (Approx. 1 day set up, 106' of pipe/day, 1 day take down)

b. Equipment: Boring machine. Cat 988 loader. 25-ton hydro crane.

c. Crew size: 8, including equipment operators, foreman, welder, and laborers (3).

d. Duration: 6 days.

e. Graded acres: <1 acre.

f. Vendor Trips: 4 per day (2 vendor visit per day) to deliver casing pipe by truck.

11. Quarry Pit Area – Install Drainage Outlet Pipe to MC Road.

    a. Description: Install 24-inch HDPE pipe from quarry pit drainage outlet structure to Mitchell Canyon Road. Install two manholes. Flatbed truck transports 1800' of 24-inch HDPE pipe to quarry. Excavate for pipeline trench and two manhole with excavator. Loader strings and places pipe, laborers welds HDPE pipe, constructs manholes and connects to catch basin at Mitchell Canyon road. (1800' days/10 = 180'/day)

    b. Equipment: Cat 349 excavator. Cat 966 loader. Welder.

    c. Crew size: 6, including equipment operators, foreman, and laborers (3).

    d. Duration: 10 days.

    e. Graded acres: <1 acre.

    f. Vendor Trips: 4 per day (2 vendor visit per day) to deliver HDPE pipe and manhole materials.

12. Quarry Pit Area – Riprap Mound at Quarry Drainage Outlet.

    a. Description: Install riprap mound for quarry lake wave run-up protection at crest of northeast corner of quarry pit at drainage outlet. Involves 3,700 CY riprap placement (from on-site). Haul truck transports riprap from plant site to quarry basin road elev. 755 and stockpiles. Excavator and loader places rip rap.

    b. Equipment: Cat 349 excavator. Cat 988 loader. Cat 770 haul truck. Water truck (1/2 time).

    c. Crew size: 7, including equipment operators, foreman, grade setter, and laborer.

    d. Duration: 5 days.

    e. Graded acres: <1 acre.

13. Quarry Pit Area – Fencing and Gates.

    a. Description: Install 2,500 LF of fencing with gates. Flatbed truck transports fencing material to various locations surrounding the quarry basin. Backhoe excavates post holes. Laborers installs fencing and gates. (500'/day).

    b. Equipment: Cat 442 backhoe.

    c. Crew size: 4, including equipment operator, and laborers (3).

    d. Duration: 5 days.

    e. Vendor Trips: 2 per day (1 vendor visit per day) to deliver fencing and gate materials.

14. Quarry Pit Area – Revegetation.

    a. Description: Hydroseed truck to revegetate knoxville slopes and disturbed areas.

b. Equipment: Off-Highway Truck used as proxy for hydroseed truck.

c. Crew size: 2.

d. Duration: 5 days.

15. Off-Site Drainage –MC Road at Diablo Downs Storm Drain Replacement.

    a. Description: Replace storm drain at Mitchell Canyon Road and Diablo Downs. Includes two drop inlets, 40 LF of 24-inch HDPE, and 20 LF of curb-and-gutter. Backhoe excavates and removes two existing catch basins, saw cuts asphalt concrete and removes existing 18-inch pipeline across Mitchell Canyon Road. Loader brings bedding material and takes away old pipeline. Install two new catch basins, 40 LF of 24-inch pipe, curb and gutter on east side, repave. Less than 25 tons bedding and 10 tons AC (import).

    b. Equipment: Cat 442 backhoe. Cat 966 loader. Paving machine.

    c. Crew size: 6, including equipment operators, foreman, and laborers (2).

    d. Duration: 10 days.

    e. Graded acres: <1 acre.

    f. Hauling trips: 4 trips. (2 trips for <10 tons asphalt concrete, 2 trips for <25 tons bedding)

    g. Vendor Trips: 2 per day (1 vendor visit per day) to deliver pipe and drop inlet materials.

16. Plant Area – Landscape Screening Berm.

    a. Description: Install up to 1,500 LF landscape screening berm north of existing aggregate processing plant. Self-loading scraper picks up material, sourced from plant site or quarry area, to build berm. Dozer brings up material for scraper and also track-compacts and shapes berms. Loader and/or dozer dresses slopes. Involves placement of 7,700 CY of fill at 10-foot height.

    b. Equipment: Cat 966 loader. Cat 623 scraper (2). Cat D8 dozer. Water truck.

    c. Crew size: 7, including equipment operators, foreman, and grade setter.

    d. Duration: 5 days.

    e. Graded acres: 2 acres.

17. Plant Area – Removal of Processing Plant and Support Structures.

    a. Description: This task involves dismantling, removal and recycling (as appropriate) of processing plant equipment (including crushers, screens, and conveyor assemblies), office, scales, and miscellaneous support structures.

       Preparation: Electricians will be used to disconnect utilities. Welder/mechanics and general laborers will assist in unbolting equipment in preparation for removal.

       Dismantling and Removal: An 80-ton crane will be used to dismantle and place processing plant components (e.g., crushers and screens), scale and other support structures onto flatbed trucks for removal. Crushers, screens, and sand screws will be removed using 9-axle on-road lowbed trucks. Steel structures will be cut into manageable pieces with an excavator equipped with a steel shear, with pieces placed on on-road trucks for removal (approximately 250 tons). An excavator equipped with a

breaker attachment, and front-end loader, will be used for concrete foundation/footing demolition and removal (approximately 100 CY, or 200 tons). Scrap steel and other mixed construction and demolition debris, such as small scrap, broken concrete, plastics, spare parts and conveyor belts, will be loaded into dumpsters using front-end loaders and shipped off-site to licensed facilities (approximately 100 tons). Total material demo approx. 550 tons for off-haul.

b. Equipment: 80-ton Grove GRT880 rough terrain crane. Cat 349 excavator. Cat 330 excavators (2). Cat 966 loaders (2). Cat 988 loader. Cat D8 dozer. Concrete industrial saw (3) at 1/3 time (model default used). Welders (3) (model default used). Fork lift (model default used). Water truck.

c. Crew: 20, including equipment operators, foreman, electricians (3), welders (3), and laborers (3).

d. Duration: 60 days.

e. Hauling trips: 56 trips. (550 tons / 20 tons per load x 2 trips).

f. Vendor Trips: 2 per day (1 vendor visit per day).

18. Plant Area – Contour Grading and Resoiling.

    a. Description: Cut/fill excavation (unbalanced) to contour grade and spread fill soil across plant site area. Fill material from quarry slope trimming and/or other rec items. Dozer and/or loader side-blades west side of plant site hillside to generate fill material. Self-loading scraper moves material around and grades. Grader smooths out grade but leaves loose in prep for revegetation. Approximately 83k CY cut and 120k CY fill.

    b. Equipment: Cat D8 dozer (2). Cat 623 scraper (3). Cat 966 loader. Cat 14H grader. Water truck.

    c. Crew size: 10, including equipment operators, foreman, and laborer.

    d. Duration: 15 days.

    e. Graded acres: 21 acres.

19. Plant Area – Revegetation.

    a. Description: Hydroseed truck to revegetate graded plant site area.

    b. Equipment: Off-Highway Truck used as proxy for hydroseed truck.

    c. Crew size: 2.

    d. Duration: 5 days.

On-Model Mitigation Assumptions

Consistent with BAAQMD requirements, on-model mitigation for construction activity assumes:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) are watered two times per day.
2. All vehicle speeds on unpaved roads are limited to 15 mph.

Appendix A-1
CalEEMod Modeling Assumptions
Clayton Quarry Reclamation
June 10, 2020

Equipment Input Assumptions

Equipment	Model (or equivalent)	HP
Backhoe	CAT 442/444	100
Boring Machine (jack-and-bore)		Default used
Concrete Mixer Truck	Kenworth or equiv.	500
Crane - 25-ton hydro crane	Grove or equiv.	Default used
Crane - 80 -ton hydro crane	Grove GRT880	275
Dozer	CAT D8R	303
Excavator	CAT 330	239
Excavator	CAT 349	396
Fork Lift	Gradall or equiv.	Default used
Haul Truck	CAT 770	515
Loader	CAT 966	276
Loader	CAT 988	580
Motor Grader	CAT 14G/H/M	238
Scraper	CAT 623	407
Water Truck	Varies	Default used

Notes:
Equipment to be used based on input from CEMEX and Spinardi Associates.
Horsepower references to CAT based on CAT Handbook, Ed. 48.
"Default used" refers to CalEEMod default equipment HP rating.

Appendix A-2:
CalEEMod Modeling Results

Clayton Quarry Reclamation

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	190.00	User Defined Unit	190.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2050
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Clayton Quarry reclamation per Revised Reclamation Plan.

Land Use - Reclamation plan boundary approximately 190 acres per Spinardi Associates (2020).

Construction Phase - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

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Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Trips and VMT - See CalEEMod modeling assumptions attachment.

On-road Fugitive Dust - On-site worker and vendor trips assume 90% paved given minimal on-site travel on unpaved roads.

Grading - See CalEEMod modeling assumptions attachment for acreages.

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed areas 2x per day. Unpaved road speed limit 15 mph.

Clayton Quarry Reclamation - Contra Costa County, Annual

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
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tblConstructionPhase	NumDays	3,100.00	10.00
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tblConstructionPhase	NumDays	310.00	5.00
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tblConstructionPhase	NumDays	310.00	5.00
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tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	17.00
tblGrading	AcresOfGrading	52.50	21.00
tblGrading	AcresOfGrading	10.00	2.00
tblGrading	AcresOfGrading	2.50	4.00
tblLandUse	LotAcreage	0.00	190.00
tblOffRoadEquipment	HorsePower	158.00	396.00

tblOffRoadEquipment	HorsePower	158.00	239.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
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tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	402.00	515.00

tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	203.00	580.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00

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tblOffRoadEquipment	PhaseName		Plant Area - Landscape Screening Berm
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tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00

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tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
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tblTripsAndVMT	VendorTripNumber	0.00	2.00

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tblTripsAndVMT	VendorTripNumber	0.00	2.00
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tblTripsAndVMT	WorkerTripNumber	0.00	16.00
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tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
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tblTripsAndVMT	WorkerTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	10.00	14.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripNumber	15.00	18.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0145	0.1337	0.1092	2.9000e-004	0.1397	5.3900e-003	0.1451	0.0210	4.9600e-003	0.0260	0.0000	25.0763	25.0763	7.9600e-003	0.0000	25.2754
2025	0.0534	0.3921	0.3909	1.3800e-003	0.7165	0.0144	0.7309	0.0723	0.0133	0.0855	0.0000	121.7726	121.7726	0.0377	0.0000	122.7156
2049	0.1957	0.5206	1.2952	5.0300e-003	2.3698	0.0136	2.3835	0.2794	0.0136	0.2931	0.0000	492.3862	492.3862	0.0156	0.0000	492.7771
Maximum	**0.1957**	**0.5206**	**1.2952**	**5.0300e-003**	**2.3698**	**0.0144**	**2.3835**	**0.2794**	**0.0136**	**0.2931**	**0.0000**	**492.3862**	**492.3862**	**0.0377**	**0.0000**	**492.7771**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0145	0.1337	0.1092	2.9000e-004	0.0794	5.3900e-003	0.0848	0.0112	4.9600e-003	0.0161	0.0000	25.0763	25.0763	7.9600e-003	0.0000	25.2754
2025	0.0534	0.3921	0.3909	1.3800e-003	0.4384	0.0144	0.4528	0.0444	0.0133	0.0577	0.0000	121.7725	121.7725	0.0377	0.0000	122.7154
2049	0.1957	0.5206	1.2952	5.0300e-003	1.4393	0.0136	1.4530	0.1640	0.0136	0.1776	0.0000	492.3857	492.3857	0.0156	0.0000	492.7765
Maximum	**0.1957**	**0.5206**	**1.2952**	**5.0300e-003**	**1.4393**	**0.0144**	**1.4530**	**0.1640**	**0.0136**	**0.1776**	**0.0000**	**492.3857**	**492.3857**	**0.0377**	**0.0000**	**492.7765**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.33**	**0.00**	**38.93**	**41.10**	**0.00**	**37.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
2	**4-1-2022**	**6-30-2022**	0.1023	0.1023
4	**10-1-2022**	**12-31-2022**	0.0081	0.0081
14	**4-1-2025**	**6-30-2025**	0.3473	0.3473
15	**7-1-2025**	**9-30-2025**	0.0447	0.0447
110	**4-1-2049**	**6-30-2049**	0.1294	0.1294
111	**7-1-2049**	**9-30-2049**	0.5447	0.5447
		Highest	0.5447	0.5447

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6000e-004**	**2.0000e-005**	**1.7300e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4000e-003**	**3.4000e-003**	**1.0000e-005**	**0.0000**	**3.6100e-003**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6000e-004**	**2.0000e-005**	**1.7300e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4000e-003**	**3.4000e-003**	**1.0000e-005**	**0.0000**	**3.6100e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Clayton Quarry Reclamation - Contra Costa County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Overburden Fill Areas - Finish Slopes and Drainage	Grading	5/2/2022	5/13/2022	5	10	Finish grade slopes and finish drainage
2	Plant Area - Landscape Screening Berm	Grading	5/16/2022	5/20/2022	5	5	Install 1500 LF landscape screening berm
3	Overburden Fill Areas - Revegetation	Site Preparation	10/3/2022	10/7/2022	5	5	Hydroseed north and south fill areas
4	Quarry Pit - Contour Final Knoxville Slope	Grading	5/5/2025	5/16/2025	5	10	Contour final Knoxville slopes
5	Quarry Pit - Riprap Knoxville Slope Face	Grading	5/19/2025	6/6/2025	5	15	Riprap Knoxville slope face for erosion protection
6	Quarry Pit - Drainage - East Rim Haul Road	Grading	6/9/2025	6/13/2025	5	5	Grade East Rim road ditch pipe berms
7	Quarry Pit - Drainage - RSP Swales	Grading	6/16/2025	7/4/2025	5	15	Install rock slope protection swales for Knoxville face
8	Quarry Pit - Tree Screen Along East Rim Road	Site Preparation	9/1/2025	9/23/2025	5	17	Install tree screen along east rim access road
9	Quarry Pit - Drainage Outlet Structure at Elev. 735	Building Construction	5/3/2049	5/5/2049	5	3	Install drainage flow control structure for quarry lake at elev. 735
10	Quarry Pit - Jack and Bore (1)	Grading	5/6/2049	5/7/2049	5	2	Excavate J&B receiving pit
11	Quarry Pit - Jack and Bore (2)	Building Construction	5/10/2049	5/17/2049	5	6	J&B sub installs casing pipe
12	Off-Site Drainage - Storm Drain Replacement	Building Construction	5/17/2049	5/28/2049	5	10	Replace storm drain at MC Road an Diablo Downs
13	Quarry Pit - Install Drainage Outlet Pipe to MC Road	Building Construction	5/18/2049	5/31/2049	5	10	Install drainage outlet pipe to Mitchell Canyon Rd
14	Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Grading	6/1/2049	6/7/2049	5	5	Riprap mound at quarry drainage outlet for wave runup protection
15	Quarry Pit - Fencing and Gates	Site Preparation	6/14/2049	6/18/2049	5	5	Install 2500 LF of fencing with gates
16	Plant Area - Removal of Processing Plant	Demolition	6/21/2049	9/10/2049	5	60	Remove processing plant and support structures
17	Plant Area - Contour Grading and Resoiling	Grading	9/13/2049	10/1/2049	5	15	Grade and spread fill soil across plant site area
18	Quarry Pit - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed Knoxville slope faces
19	Plant Area - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed graded plant site area

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Overburden Fill Areas - Finish Slopes and Drainage	Off-Highway Trucks	1	8.00	402	0.38
Overburden Fill Areas - Finish Slopes and Drainage	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Landscape Screening Berm	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Landscape Screening Berm	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Landscape Screening Berm	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Landscape Screening Berm	Scrapers	2	8.00	407	0.48
Overburden Fill Areas - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Excavators	1	8.00	396	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Riprap Knoxville Slope Face	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Knoxville Slope Face	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - East Rim Haul Road	Graders	1	8.00	238	0.41
Quarry Pit - Drainage - East Rim Haul Road	Off-Highway Trucks	1	8.00	402	0.38

Quarry Pit - Drainage - East Rim Haul Road	Rubber Tired Loaders	2	8.00	276	0.36
Quarry Pit - Drainage - East Rim Haul Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage - RSP Swales	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage - RSP Swales	Excavators	1	8.00	396	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage - RSP Swales	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - RSP Swales	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Tree Screen Along East Rim Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage Outlet Structure at Elev. 735	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Welders	1	8.00	46	0.45
Quarry Pit - Jack and Bore (1)	Excavators	1	8.00	396	0.38
Quarry Pit - Jack and Bore (1)	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Jack and Bore (2)	Bore/Drill Rigs	1	8.00	221	0.50
Quarry Pit - Jack and Bore (2)	Cranes	1	8.00	231	0.29
Quarry Pit - Jack and Bore (2)	Rubber Tired Loaders	1	8.00	580	0.36
Off-Site Drainage - Storm Drain Replacement	Paving Equipment	1	8.00	132	0.36
Off-Site Drainage - Storm Drain Replacement	Rubber Tired Loaders	1	8.00	276	0.36
Off-Site Drainage - Storm Drain Replacement	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Excavators	1	8.00	396	0.38
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Rubber Tired Loaders	1	8.00	276	0.36

Quarry Pit - Install Drainage Outlet Pipe to MC Road	Welders	1	8.00	46	0.45
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Fencing and Gates	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Removal of Processing Plant	Concrete/Industrial Saws	3	3.00	81	0.73
Plant Area - Removal of Processing Plant	Cranes	1	8.00	275	0.29
Plant Area - Removal of Processing Plant	Excavators	1	8.00	396	0.38
Plant Area - Removal of Processing Plant	Excavators	2	8.00	239	0.38
Plant Area - Removal of Processing Plant	Forklifts	1	8.00	89	0.20
Plant Area - Removal of Processing Plant	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Removal of Processing Plant	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	2	8.00	276	0.36
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	1	8.00	580	0.36
Plant Area - Removal of Processing Plant	Welders	3	8.00	46	0.45
Plant Area - Contour Grading and Resoiling	Graders	1	8.00	238	0.41
Plant Area - Contour Grading and Resoiling	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Contour Grading and Resoiling	Rubber Tired Dozers	2	8.00	303	0.40
Plant Area - Contour Grading and Resoiling	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Contour Grading and Resoiling	Scrapers	3	8.00	407	0.48
Quarry Pit - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Revegetation	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Overburden Fill Areas - Finish Slopes and Dr	2	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Landscape Screening	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Overburden Fill Areas - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Contour Final Knoxville Slope	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Knoxville Slope Face	4	20.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - East Rim Haul Road	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - RSP Swales	6	18.00	0.00	67.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Tree Screen Along East Ri	1	6.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage Outlet Structure at Ele	5	16.00	2.00	2.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (1)	2	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (2)	3	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Off-Site Drainage - Storm Drain Replace	3	12.00	2.00	4.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Install Drainage Outlet Pipe t	3	12.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Mound at Quarry Drai	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Fencing and Gates	1	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Removal of Processing Plant	16	40.00	2.00	56.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Contour Grading and Recoiling	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0228	0.0000	0.0228	2.4600e-003	0.0000	2.4600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4900e-003	0.0287	0.0283	8.0000e-005		1.1900e-003	1.1900e-003		1.1000e-003	1.1000e-003	0.0000	7.2100	7.2100	2.3300e-003	0.0000	7.2683
Total	**3.4900e-003**	**0.0287**	**0.0283**	**8.0000e-005**	**0.0228**	**1.1900e-003**	**0.0240**	**2.4600e-003**	**1.1000e-003**	**3.5600e-003**	**0.0000**	**7.2100**	**7.2100**	**2.3300e-003**	**0.0000**	**7.2683**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.3000e-004	0.0000	0.0403	0.0000	0.0403	4.0600e-003	0.0000	4.0600e-003	0.0000	0.1939	0.1939	0.0000	0.0000	0.1940
Total	**9.0000e-005**	**6.0000e-005**	**6.3000e-004**	**0.0000**	**0.0403**	**0.0000**	**0.0403**	**4.0600e-003**	**0.0000**	**4.0600e-003**	**0.0000**	**0.1939**	**0.1939**	**0.0000**	**0.0000**	**0.1940**

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0103	0.0000	0.0103	1.1100e-003	0.0000	1.1100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4900e-003	0.0287	0.0283	8.0000e-005		1.1900e-003	1.1900e-003		1.1000e-003	1.1000e-003	0.0000	7.2100	7.2100	2.3300e-003	0.0000	7.2683
Total	**3.4900e-003**	**0.0287**	**0.0283**	**8.0000e-005**	**0.0103**	**1.1900e-003**	**0.0115**	**1.1100e-003**	**1.1000e-003**	**2.2100e-003**	**0.0000**	**7.2100**	**7.2100**	**2.3300e-003**	**0.0000**	**7.2683**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.3000e-004	0.0000	0.0248	0.0000	0.0248	2.5100e-003	0.0000	2.5100e-003	0.0000	0.1939	0.1939	0.0000	0.0000	0.1940
Total	**9.0000e-005**	**6.0000e-005**	**6.3000e-004**	**0.0000**	**0.0248**	**0.0000**	**0.0248**	**2.5100e-003**	**0.0000**	**2.5100e-003**	**0.0000**	**0.1939**	**0.1939**	**0.0000**	**0.0000**	**0.1940**

3.3 Plant Area - Landscape Screening Berm - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0161	0.0000	0.0161	8.3900e-003	0.0000	8.3900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4400e-003	0.0949	0.0709	1.6000e-004		3.8300e-003	3.8300e-003		3.5300e-003	3.5300e-003	0.0000	14.4809	14.4809	4.6800e-003	0.0000	14.5980
Total	**9.4400e-003**	**0.0949**	**0.0709**	**1.6000e-004**	**0.0161**	**3.8300e-003**	**0.0200**	**8.3900e-003**	**3.5300e-003**	**0.0119**	**0.0000**	**14.4809**	**14.4809**	**4.6800e-003**	**0.0000**	**14.5980**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	7.0000e-005	7.4000e-004	0.0000	0.0470	0.0000	0.0471	4.7400e-003	0.0000	4.7400e-003	0.0000	0.2262	0.2262	0.0000	0.0000	0.2263
Total	**1.0000e-004**	**7.0000e-005**	**7.4000e-004**	**0.0000**	**0.0470**	**0.0000**	**0.0471**	**4.7400e-003**	**0.0000**	**4.7400e-003**	**0.0000**	**0.2262**	**0.2262**	**0.0000**	**0.0000**	**0.2263**

3.3 Plant Area - Landscape Screening Berm - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.2500e-003	0.0000	7.2500e-003	3.7800e-003	0.0000	3.7800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4400e-003	0.0949	0.0709	1.6000e-004		3.8300e-003	3.8300e-003		3.5300e-003	3.5300e-003	0.0000	14.4809	14.4809	4.6800e-003	0.0000	14.5980
Total	**9.4400e-003**	**0.0949**	**0.0709**	**1.6000e-004**	**7.2500e-003**	**3.8300e-003**	**0.0111**	**3.7800e-003**	**3.5300e-003**	**7.3100e-003**	**0.0000**	**14.4809**	**14.4809**	**4.6800e-003**	**0.0000**	**14.5980**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	7.0000e-005	7.4000e-004	0.0000	0.0289	0.0000	0.0289	2.9200e-003	0.0000	2.9200e-003	0.0000	0.2262	0.2262	0.0000	0.0000	0.2263
Total	**1.0000e-004**	**7.0000e-005**	**7.4000e-004**	**0.0000**	**0.0289**	**0.0000**	**0.0289**	**2.9200e-003**	**0.0000**	**2.9200e-003**	**0.0000**	**0.2262**	**0.2262**	**0.0000**	**0.0000**	**0.2263**

3.4 Overburden Fill Areas - Revegetation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3200e-003	0.0100	8.4000e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.4000e-004	3.4000e-004	0.0000	2.9007	2.9007	9.4000e-004	0.0000	2.9241
Total	**1.3200e-003**	**0.0100**	**8.4000e-003**	**3.0000e-005**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**3.4000e-004**	**3.4000e-004**	**0.0000**	**2.9007**	**2.9007**	**9.4000e-004**	**0.0000**	**2.9241**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.1000e-004	0.0000	0.0134	0.0000	0.0134	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0646	0.0646	0.0000	0.0000	0.0647
Total	**3.0000e-005**	**2.0000e-005**	**2.1000e-004**	**0.0000**	**0.0134**	**0.0000**	**0.0134**	**1.3500e-003**	**0.0000**	**1.3500e-003**	**0.0000**	**0.0646**	**0.0646**	**0.0000**	**0.0000**	**0.0647**

3.4 Overburden Fill Areas - Revegetation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3200e-003	0.0100	8.4000e-003	3.0000e-005		3.6000e-004	3.6000e-004		3.4000e-004	3.4000e-004	0.0000	2.9007	2.9007	9.4000e-004	0.0000	2.9241
Total	**1.3200e-003**	**0.0100**	**8.4000e-003**	**3.0000e-005**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**3.4000e-004**	**3.4000e-004**	**0.0000**	**2.9007**	**2.9007**	**9.4000e-004**	**0.0000**	**2.9241**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.1000e-004	0.0000	8.2600e-003	0.0000	8.2600e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0646	0.0646	0.0000	0.0000	0.0647
Total	**3.0000e-005**	**2.0000e-005**	**2.1000e-004**	**0.0000**	**8.2600e-003**	**0.0000**	**8.2600e-003**	**8.4000e-004**	**0.0000**	**8.4000e-004**	**0.0000**	**0.0646**	**0.0646**	**0.0000**	**0.0000**	**0.0647**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.2400e-003	0.0000	4.2400e-003	4.6000e-004	0.0000	4.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0846	0.0816	3.0000e-004		3.1700e-003	3.1700e-003		2.9200e-003	2.9200e-003	0.0000	26.6915	26.6915	8.6300e-003	0.0000	26.9073
Total	**0.0119**	**0.0846**	**0.0816**	**3.0000e-004**	**4.2400e-003**	**3.1700e-003**	**7.4100e-003**	**4.6000e-004**	**2.9200e-003**	**3.3800e-003**	**0.0000**	**26.6915**	**26.6915**	**8.6300e-003**	**0.0000**	**26.9073**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.0000e-004	1.1600e-003	0.0000	0.0941	0.0000	0.0941	9.4700e-003	0.0000	9.4800e-003	0.0000	0.4001	0.4001	1.0000e-005	0.0000	0.4003
Total	**1.7000e-004**	**1.0000e-004**	**1.1600e-003**	**0.0000**	**0.0941**	**0.0000**	**0.0941**	**9.4700e-003**	**0.0000**	**9.4800e-003**	**0.0000**	**0.4001**	**0.4001**	**1.0000e-005**	**0.0000**	**0.4003**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.9100e-003	0.0000	1.9100e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0846	0.0816	3.0000e-004		3.1700e-003	3.1700e-003		2.9200e-003	2.9200e-003	0.0000	26.6914	26.6914	8.6300e-003	0.0000	26.9073
Total	**0.0119**	**0.0846**	**0.0816**	**3.0000e-004**	**1.9100e-003**	**3.1700e-003**	**5.0800e-003**	**2.1000e-004**	**2.9200e-003**	**3.1300e-003**	**0.0000**	**26.6914**	**26.6914**	**8.6300e-003**	**0.0000**	**26.9073**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.0000e-004	1.1600e-003	0.0000	0.0578	0.0000	0.0578	5.8500e-003	0.0000	5.8500e-003	0.0000	0.4001	0.4001	1.0000e-005	0.0000	0.4003
Total	**1.7000e-004**	**1.0000e-004**	**1.1600e-003**	**0.0000**	**0.0578**	**0.0000**	**0.0578**	**5.8500e-003**	**0.0000**	**5.8500e-003**	**0.0000**	**0.4001**	**0.4001**	**1.0000e-005**	**0.0000**	**0.4003**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.2400e-003	0.0000	4.2400e-003	4.6000e-004	0.0000	4.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0160	0.1162	0.1105	4.1000e-004		4.3700e-003	4.3700e-003		4.0200e-003	4.0200e-003	0.0000	35.6838	35.6838	0.0115	0.0000	35.9724
Total	**0.0160**	**0.1162**	**0.1105**	**4.1000e-004**	**4.2400e-003**	**4.3700e-003**	**8.6100e-003**	**4.6000e-004**	**4.0200e-003**	**4.4800e-003**	**0.0000**	**35.6838**	**35.6838**	**0.0115**	**0.0000**	**35.9724**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.0800e-003	3.1000e-004	0.0000	0.0137	0.0000	0.0137	1.3800e-003	0.0000	1.3800e-003	0.0000	0.3686	0.3686	1.0000e-005	0.0000	0.3689
Worker	3.5000e-004	2.1000e-004	2.4800e-003	1.0000e-005	0.2016	1.0000e-005	0.2016	0.0203	1.0000e-005	0.0203	0.0000	0.8573	0.8573	1.0000e-005	0.0000	0.8577
Total	**3.8000e-004**	**1.2900e-003**	**2.7900e-003**	**1.0000e-005**	**0.2153**	**1.0000e-005**	**0.2153**	**0.0217**	**1.0000e-005**	**0.0217**	**0.0000**	**1.2259**	**1.2259**	**2.0000e-005**	**0.0000**	**1.2267**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.9100e-003	0.0000	1.9100e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0160	0.1162	0.1105	4.1000e-004		4.3700e-003	4.3700e-003		4.0200e-003	4.0200e-003	0.0000	35.6838	35.6838	0.0115	0.0000	35.9723
Total	**0.0160**	**0.1162**	**0.1105**	**4.1000e-004**	**1.9100e-003**	**4.3700e-003**	**6.2800e-003**	**2.1000e-004**	**4.0200e-003**	**4.2300e-003**	**0.0000**	**35.6838**	**35.6838**	**0.0115**	**0.0000**	**35.9723**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.0800e-003	3.1000e-004	0.0000	8.3900e-003	0.0000	8.3900e-003	8.5000e-004	0.0000	8.6000e-004	0.0000	0.3686	0.3686	1.0000e-005	0.0000	0.3689
Worker	3.5000e-004	2.1000e-004	2.4800e-003	1.0000e-005	0.1239	1.0000e-005	0.1239	0.0125	1.0000e-005	0.0125	0.0000	0.8573	0.8573	1.0000e-005	0.0000	0.8577
Total	**3.8000e-004**	**1.2900e-003**	**2.7900e-003**	**1.0000e-005**	**0.1323**	**1.0000e-005**	**0.1323**	**0.0134**	**1.0000e-005**	**0.0134**	**0.0000**	**1.2259**	**1.2259**	**2.0000e-005**	**0.0000**	**1.2267**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.1200e-003	0.0000	2.1200e-003	2.3000e-004	0.0000	2.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2200e-003	0.0342	0.0300	1.0000e-004		1.2100e-003	1.2100e-003		1.1100e-003	1.1100e-003	0.0000	9.1857	9.1857	2.9700e-003	0.0000	9.2599
Total	**4.2200e-003**	**0.0342**	**0.0300**	**1.0000e-004**	**2.1200e-003**	**1.2100e-003**	**3.3300e-003**	**2.3000e-004**	**1.1100e-003**	**1.3400e-003**	**0.0000**	**9.1857**	**9.1857**	**2.9700e-003**	**0.0000**	**9.2599**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	5.0000e-005	5.8000e-004	0.0000	0.0470	0.0000	0.0470	4.7400e-003	0.0000	4.7400e-003	0.0000	0.2000	0.2000	0.0000	0.0000	0.2001
Total	**8.0000e-005**	**5.0000e-005**	**5.8000e-004**	**0.0000**	**0.0470**	**0.0000**	**0.0470**	**4.7400e-003**	**0.0000**	**4.7400e-003**	**0.0000**	**0.2000**	**0.2000**	**0.0000**	**0.0000**	**0.2001**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.5000e-004	0.0000	9.5000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2200e-003	0.0342	0.0300	1.0000e-004		1.2100e-003	1.2100e-003		1.1100e-003	1.1100e-003	0.0000	9.1857	9.1857	2.9700e-003	0.0000	9.2599
Total	**4.2200e-003**	**0.0342**	**0.0300**	**1.0000e-004**	**9.5000e-004**	**1.2100e-003**	**2.1600e-003**	**1.0000e-004**	**1.1100e-003**	**1.2100e-003**	**0.0000**	**9.1857**	**9.1857**	**2.9700e-003**	**0.0000**	**9.2599**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	5.0000e-005	5.8000e-004	0.0000	0.0289	0.0000	0.0289	2.9200e-003	0.0000	2.9200e-003	0.0000	0.2000	0.2000	0.0000	0.0000	0.2001
Total	**8.0000e-005**	**5.0000e-005**	**5.8000e-004**	**0.0000**	**0.0289**	**0.0000**	**0.0289**	**2.9200e-003**	**0.0000**	**2.9200e-003**	**0.0000**	**0.2000**	**0.2000**	**0.0000**	**0.0000**	**0.2001**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0189	0.1373	0.1397	4.8000e-004		5.1700e-003	5.1700e-003		4.7600e-003	4.7600e-003	0.0000	42.1559	42.1559	0.0136	0.0000	42.4968
Total	**0.0189**	**0.1373**	**0.1397**	**4.8000e-004**	**5.3000e-004**	**5.1700e-003**	**5.7000e-003**	**6.0000e-005**	**4.7600e-003**	**4.8200e-003**	**0.0000**	**42.1559**	**42.1559**	**0.0136**	**0.0000**	**42.4968**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.6000e-004	5.1900e-003	1.5800e-003	2.0000e-005	0.0835	1.0000e-005	0.0835	8.4200e-003	1.0000e-005	8.4300e-003	0.0000	2.3476	2.3476	9.0000e-005	0.0000	2.3499
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	1.9000e-004	2.2300e-003	1.0000e-005	0.1815	1.0000e-005	0.1815	0.0183	1.0000e-005	0.0183	0.0000	0.7716	0.7716	1.0000e-005	0.0000	0.7719
Total	**4.8000e-004**	**5.3800e-003**	**3.8100e-003**	**3.0000e-005**	**0.2649**	**2.0000e-005**	**0.2649**	**0.0267**	**2.0000e-005**	**0.0267**	**0.0000**	**3.1192**	**3.1192**	**1.0000e-004**	**0.0000**	**3.1218**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0189	0.1373	0.1397	4.8000e-004		5.1700e-003	5.1700e-003		4.7600e-003	4.7600e-003	0.0000	42.1559	42.1559	0.0136	0.0000	42.4967
Total	**0.0189**	**0.1373**	**0.1397**	**4.8000e-004**	**2.4000e-004**	**5.1700e-003**	**5.4100e-003**	**3.0000e-005**	**4.7600e-003**	**4.7900e-003**	**0.0000**	**42.1559**	**42.1559**	**0.0136**	**0.0000**	**42.4967**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.6000e-004	5.1900e-003	1.5800e-003	2.0000e-005	0.0513	1.0000e-005	0.0513	5.2100e-003	1.0000e-005	5.2100e-003	0.0000	2.3476	2.3476	9.0000e-005	0.0000	2.3499
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	1.9000e-004	2.2300e-003	1.0000e-005	0.1115	1.0000e-005	0.1115	0.0113	1.0000e-005	0.0113	0.0000	0.7716	0.7716	1.0000e-005	0.0000	0.7719
Total	**4.8000e-004**	**5.3800e-003**	**3.8100e-003**	**3.0000e-005**	**0.1628**	**2.0000e-005**	**0.1628**	**0.0165**	**2.0000e-005**	**0.0165**	**0.0000**	**3.1192**	**3.1192**	**1.0000e-004**	**0.0000**	**3.1218**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1600e-003	0.0117	0.0195	3.0000e-005		4.7000e-004	4.7000e-004		4.4000e-004	4.4000e-004	0.0000	2.4012	2.4012	7.8000e-004	0.0000	2.4206
Total	**1.1600e-003**	**0.0117**	**0.0195**	**3.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.4000e-004**	**4.4000e-004**	**0.0000**	**2.4012**	**2.4012**	**7.8000e-004**	**0.0000**	**2.4206**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-005	1.2300e-003	3.5000e-004	0.0000	0.0155	0.0000	0.0155	1.5600e-003	0.0000	1.5600e-003	0.0000	0.4178	0.4178	2.0000e-005	0.0000	0.4181
Worker	1.2000e-004	7.0000e-005	8.4000e-004	0.0000	0.0686	0.0000	0.0686	6.9000e-003	0.0000	6.9000e-003	0.0000	0.2915	0.2915	1.0000e-005	0.0000	0.2916
Total	**1.6000e-004**	**1.3000e-003**	**1.1900e-003**	**0.0000**	**0.0840**	**0.0000**	**0.0840**	**8.4600e-003**	**0.0000**	**8.4600e-003**	**0.0000**	**0.7092**	**0.7092**	**3.0000e-005**	**0.0000**	**0.7098**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1600e-003	0.0117	0.0195	3.0000e-005		4.7000e-004	4.7000e-004		4.4000e-004	4.4000e-004	0.0000	2.4012	2.4012	7.8000e-004	0.0000	2.4206
Total	**1.1600e-003**	**0.0117**	**0.0195**	**3.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.4000e-004**	**4.4000e-004**	**0.0000**	**2.4012**	**2.4012**	**7.8000e-004**	**0.0000**	**2.4206**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-005	1.2300e-003	3.5000e-004	0.0000	9.5100e-003	0.0000	9.5100e-003	9.7000e-004	0.0000	9.7000e-004	0.0000	0.4178	0.4178	2.0000e-005	0.0000	0.4181
Worker	1.2000e-004	7.0000e-005	8.4000e-004	0.0000	0.0421	0.0000	0.0421	4.2600e-003	0.0000	4.2600e-003	0.0000	0.2915	0.2915	1.0000e-005	0.0000	0.2916
Total	**1.6000e-004**	**1.3000e-003**	**1.1900e-003**	**0.0000**	**0.0516**	**0.0000**	**0.0516**	**5.2300e-003**	**0.0000**	**5.2300e-003**	**0.0000**	**0.7092**	**0.7092**	**3.0000e-005**	**0.0000**	**0.7098**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3200e-003	6.2600e-003	0.0164	6.0000e-005		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004	0.0000	5.7184	5.7184	1.8000e-004	0.0000	5.7230
Total	**2.3200e-003**	**6.2600e-003**	**0.0164**	**6.0000e-005**		**1.4000e-004**	**1.4000e-004**		**1.4000e-004**	**1.4000e-004**	**0.0000**	**5.7184**	**5.7184**	**1.8000e-004**	**0.0000**	**5.7230**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	5.0000e-005	0.0000	2.4900e-003	0.0000	2.4900e-003	2.5000e-004	0.0000	2.5000e-004	0.0000	0.0672	0.0672	0.0000	0.0000	0.0673
Vendor	1.0000e-005	1.9000e-004	5.0000e-005	0.0000	2.7300e-003	0.0000	2.7300e-003	2.8000e-004	0.0000	2.8000e-004	0.0000	0.0710	0.0710	0.0000	0.0000	0.0711
Worker	2.0000e-005	1.0000e-005	1.8000e-004	0.0000	0.0323	0.0000	0.0323	3.2500e-003	0.0000	3.2500e-003	0.0000	0.1011	0.1011	0.0000	0.0000	0.1011
Total	**3.0000e-005**	**3.3000e-004**	**2.8000e-004**	**0.0000**	**0.0375**	**0.0000**	**0.0375**	**3.7800e-003**	**0.0000**	**3.7800e-003**	**0.0000**	**0.2393**	**0.2393**	**0.0000**	**0.0000**	**0.2394**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3200e-003	6.2600e-003	0.0164	6.0000e-005		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004	0.0000	5.7184	5.7184	1.8000e-004	0.0000	5.7229
Total	**2.3200e-003**	**6.2600e-003**	**0.0164**	**6.0000e-005**		**1.4000e-004**	**1.4000e-004**		**1.4000e-004**	**1.4000e-004**	**0.0000**	**5.7184**	**5.7184**	**1.8000e-004**	**0.0000**	**5.7229**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	5.0000e-005	0.0000	1.5300e-003	0.0000	1.5300e-003	1.6000e-004	0.0000	1.6000e-004	0.0000	0.0672	0.0672	0.0000	0.0000	0.0673
Vendor	1.0000e-005	1.9000e-004	5.0000e-005	0.0000	1.6800e-003	0.0000	1.6800e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0710	0.0710	0.0000	0.0000	0.0711
Worker	2.0000e-005	1.0000e-005	1.8000e-004	0.0000	0.0198	0.0000	0.0198	2.0000e-003	0.0000	2.0000e-003	0.0000	0.1011	0.1011	0.0000	0.0000	0.1011
Total	**3.0000e-005**	**3.3000e-004**	**2.8000e-004**	**0.0000**	**0.0230**	**0.0000**	**0.0230**	**2.3300e-003**	**0.0000**	**2.3300e-003**	**0.0000**	**0.2393**	**0.2393**	**0.0000**	**0.0000**	**0.2394**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1900e-003	2.0500e-003	6.8500e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.2669	3.2669	9.0000e-005	0.0000	3.2692
Total	**1.1900e-003**	**2.0500e-003**	**6.8500e-003**	**3.0000e-005**	**5.3000e-004**	**8.0000e-005**	**6.1000e-004**	**6.0000e-005**	**8.0000e-005**	**1.4000e-004**	**0.0000**	**3.2669**	**3.2669**	**9.0000e-005**	**0.0000**	**3.2692**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	6.0000e-005	0.0000	0.0108	0.0000	0.0108	1.0800e-003	0.0000	1.0800e-003	0.0000	0.0337	0.0337	0.0000	0.0000	0.0337
Total	**1.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.0108**	**0.0000**	**0.0108**	**1.0800e-003**	**0.0000**	**1.0800e-003**	**0.0000**	**0.0337**	**0.0337**	**0.0000**	**0.0000**	**0.0337**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1900e-003	2.0500e-003	6.8500e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.2669	3.2669	9.0000e-005	0.0000	3.2692
Total	**1.1900e-003**	**2.0500e-003**	**6.8500e-003**	**3.0000e-005**	**2.4000e-004**	**8.0000e-005**	**3.2000e-004**	**3.0000e-005**	**8.0000e-005**	**1.1000e-004**	**0.0000**	**3.2669**	**3.2669**	**9.0000e-005**	**0.0000**	**3.2692**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	6.0000e-005	0.0000	6.6100e-003	0.0000	6.6100e-003	6.7000e-004	0.0000	6.7000e-004	0.0000	0.0337	0.0337	0.0000	0.0000	0.0337
Total	**1.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**6.6100e-003**	**0.0000**	**6.6100e-003**	**6.7000e-004**	**0.0000**	**6.7000e-004**	**0.0000**	**0.0337**	**0.0337**	**0.0000**	**0.0000**	**0.0337**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.4800e-003	6.5700e-003	0.0220	1.1000e-004		2.5000e-004	2.5000e-004		2.5000e-004	2.5000e-004	0.0000	10.5374	10.5374	2.7000e-004	0.0000	10.5442
Total	**3.4800e-003**	**6.5700e-003**	**0.0220**	**1.1000e-004**		**2.5000e-004**	**2.5000e-004**		**2.5000e-004**	**2.5000e-004**	**0.0000**	**10.5374**	**10.5374**	**2.7000e-004**	**0.0000**	**10.5442**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	7.5000e-004	2.2000e-004	0.0000	0.0109	0.0000	0.0109	1.1000e-003	0.0000	1.1000e-003	0.0000	0.2840	0.2840	1.0000e-005	0.0000	0.2843
Worker	4.0000e-005	3.0000e-005	3.5000e-004	0.0000	0.0645	0.0000	0.0645	6.5000e-003	0.0000	6.5000e-003	0.0000	0.2021	0.2021	0.0000	0.0000	0.2022
Total	**6.0000e-005**	**7.8000e-004**	**5.7000e-004**	**0.0000**	**0.0754**	**0.0000**	**0.0754**	**7.6000e-003**	**0.0000**	**7.6000e-003**	**0.0000**	**0.4862**	**0.4862**	**1.0000e-005**	**0.0000**	**0.4864**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.4800e-003	6.5700e-003	0.0220	1.1000e-004		2.5000e-004	2.5000e-004		2.5000e-004	2.5000e-004	0.0000	10.5374	10.5374	2.7000e-004	0.0000	10.5442
Total	**3.4800e-003**	**6.5700e-003**	**0.0220**	**1.1000e-004**		**2.5000e-004**	**2.5000e-004**		**2.5000e-004**	**2.5000e-004**	**0.0000**	**10.5374**	**10.5374**	**2.7000e-004**	**0.0000**	**10.5442**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-005	7.5000e-004	2.2000e-004	0.0000	6.7100e-003	0.0000	6.7100e-003	6.8000e-004	0.0000	6.8000e-004	0.0000	0.2840	0.2840	1.0000e-005	0.0000	0.2843
Worker	4.0000e-005	3.0000e-005	3.5000e-004	0.0000	0.0396	0.0000	0.0396	4.0100e-003	0.0000	4.0100e-003	0.0000	0.2021	0.2021	0.0000	0.0000	0.2022
Total	**6.0000e-005**	**7.8000e-004**	**5.7000e-004**	**0.0000**	**0.0464**	**0.0000**	**0.0464**	**4.6900e-003**	**0.0000**	**4.6900e-003**	**0.0000**	**0.4862**	**0.4862**	**1.0000e-005**	**0.0000**	**0.4864**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.3100e-003	0.0101	0.0354	9.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004	0.0000	8.3599	8.3599	2.6000e-004	0.0000	8.3664
Total	**3.3100e-003**	**0.0101**	**0.0354**	**9.0000e-005**		**2.7000e-004**	**2.7000e-004**		**2.7000e-004**	**2.7000e-004**	**0.0000**	**8.3599**	**8.3599**	**2.6000e-004**	**0.0000**	**8.3664**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.6000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1344	0.1344	0.0000	0.0000	0.1345
Vendor	2.0000e-005	6.3000e-004	1.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2367	0.2367	1.0000e-005	0.0000	0.2369
Worker	5.0000e-005	3.0000e-005	4.4000e-004	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.2527	0.2527	0.0000	0.0000	0.2527
Total	**8.0000e-005**	**9.2000e-004**	**7.2000e-004**	**0.0000**	**5.8000e-004**	**0.0000**	**5.8000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.6237**	**0.6237**	**1.0000e-005**	**0.0000**	**0.6241**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.3100e-003	0.0101	0.0354	9.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004	0.0000	8.3599	8.3599	2.6000e-004	0.0000	8.3664
Total	**3.3100e-003**	**0.0101**	**0.0354**	**9.0000e-005**		**2.7000e-004**	**2.7000e-004**		**2.7000e-004**	**2.7000e-004**	**0.0000**	**8.3599**	**8.3599**	**2.6000e-004**	**0.0000**	**8.3664**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.6000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1344	0.1344	0.0000	0.0000	0.1345
Vendor	2.0000e-005	6.3000e-004	1.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2367	0.2367	1.0000e-005	0.0000	0.2369
Worker	5.0000e-005	3.0000e-005	4.4000e-004	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.2527	0.2527	0.0000	0.0000	0.2527
Total	**8.0000e-005**	**9.2000e-004**	**7.2000e-004**	**0.0000**	**5.8000e-004**	**0.0000**	**5.8000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.6237**	**0.6237**	**1.0000e-005**	**0.0000**	**0.6241**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.9000e-003	0.0126	0.0318	1.2000e-004		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	12.2998	12.2998	3.9000e-004	0.0000	12.3096
Total	**4.9000e-003**	**0.0126**	**0.0318**	**1.2000e-004**		**2.9000e-004**	**2.9000e-004**		**2.9000e-004**	**2.9000e-004**	**0.0000**	**12.2998**	**12.2998**	**3.9000e-004**	**0.0000**	**12.3096**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-005	1.2600e-003	3.6000e-004	0.0000	0.0182	0.0000	0.0182	1.8400e-003	0.0000	1.8400e-003	0.0000	0.4734	0.4734	1.0000e-005	0.0000	0.4738
Worker	5.0000e-005	3.0000e-005	4.4000e-004	0.0000	0.0807	0.0000	0.0807	8.1200e-003	0.0000	8.1200e-003	0.0000	0.2527	0.2527	0.0000	0.0000	0.2527
Total	**9.0000e-005**	**1.2900e-003**	**8.0000e-004**	**0.0000**	**0.0988**	**0.0000**	**0.0989**	**9.9600e-003**	**0.0000**	**9.9600e-003**	**0.0000**	**0.7260**	**0.7260**	**1.0000e-005**	**0.0000**	**0.7265**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.9000e-003	0.0126	0.0318	1.2000e-004		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	12.2998	12.2998	3.9000e-004	0.0000	12.3096
Total	**4.9000e-003**	**0.0126**	**0.0318**	**1.2000e-004**		**2.9000e-004**	**2.9000e-004**		**2.9000e-004**	**2.9000e-004**	**0.0000**	**12.2998**	**12.2998**	**3.9000e-004**	**0.0000**	**12.3096**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-005	1.2600e-003	3.6000e-004	0.0000	0.0112	0.0000	0.0112	1.1400e-003	0.0000	1.1400e-003	0.0000	0.4734	0.4734	1.0000e-005	0.0000	0.4738
Worker	5.0000e-005	3.0000e-005	4.4000e-004	0.0000	0.0495	0.0000	0.0495	5.0100e-003	0.0000	5.0100e-003	0.0000	0.2527	0.2527	0.0000	0.0000	0.2527
Total	**9.0000e-005**	**1.2900e-003**	**8.0000e-004**	**0.0000**	**0.0607**	**0.0000**	**0.0607**	**6.1500e-003**	**0.0000**	**6.1500e-003**	**0.0000**	**0.7260**	**0.7260**	**1.0000e-005**	**0.0000**	**0.7265**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4200e-003	8.7800e-003	0.0304	1.4000e-004		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004	0.0000	14.3521	14.3521	4.3000e-004	0.0000	14.3629
Total	**5.4200e-003**	**8.7800e-003**	**0.0304**	**1.4000e-004**	**5.3000e-004**	**3.4000e-004**	**8.7000e-004**	**6.0000e-005**	**3.4000e-004**	**4.0000e-004**	**0.0000**	**14.3521**	**14.3521**	**4.3000e-004**	**0.0000**	**14.3629**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.6000e-004	0.0000	0.0470	0.0000	0.0470	4.7400e-003	0.0000	4.7400e-003	0.0000	0.1474	0.1474	0.0000	0.0000	0.1474
Total	**3.0000e-005**	**2.0000e-005**	**2.6000e-004**	**0.0000**	**0.0470**	**0.0000**	**0.0470**	**4.7400e-003**	**0.0000**	**4.7400e-003**	**0.0000**	**0.1474**	**0.1474**	**0.0000**	**0.0000**	**0.1474**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4200e-003	8.7800e-003	0.0304	1.4000e-004		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004	0.0000	14.3520	14.3520	4.3000e-004	0.0000	14.3628
Total	**5.4200e-003**	**8.7800e-003**	**0.0304**	**1.4000e-004**	**2.4000e-004**	**3.4000e-004**	**5.8000e-004**	**3.0000e-005**	**3.4000e-004**	**3.7000e-004**	**0.0000**	**14.3520**	**14.3520**	**4.3000e-004**	**0.0000**	**14.3628**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.6000e-004	0.0000	0.0289	0.0000	0.0289	2.9200e-003	0.0000	2.9200e-003	0.0000	0.1474	0.1474	0.0000	0.0000	0.1474
Total	**3.0000e-005**	**2.0000e-005**	**2.6000e-004**	**0.0000**	**0.0289**	**0.0000**	**0.0289**	**2.9200e-003**	**0.0000**	**2.9200e-003**	**0.0000**	**0.1474**	**0.1474**	**0.0000**	**0.0000**	**0.1474**

3.16 Quarry Pit - Fencing and Gates - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1000e-004	2.4200e-003	6.0400e-003	1.0000e-005		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.8411	0.8411	3.0000e-005	0.0000	0.8419
Total	**4.1000e-004**	**2.4200e-003**	**6.0400e-003**	**1.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.8411**	**0.8411**	**3.0000e-005**	**0.0000**	**0.8419**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	3.1000e-004	9.0000e-005	0.0000	4.5500e-003	0.0000	4.5500e-003	4.6000e-004	0.0000	4.6000e-004	0.0000	0.1184	0.1184	0.0000	0.0000	0.1184
Worker	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	0.0269	0.0000	0.0269	2.7100e-003	0.0000	2.7100e-003	0.0000	0.0842	0.0842	0.0000	0.0000	0.0842
Total	**3.0000e-005**	**3.2000e-004**	**2.4000e-004**	**0.0000**	**0.0314**	**0.0000**	**0.0314**	**3.1700e-003**	**0.0000**	**3.1700e-003**	**0.0000**	**0.2026**	**0.2026**	**0.0000**	**0.0000**	**0.2027**

3.16 Quarry Pit - Fencing and Gates - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1000e-004	2.4200e-003	6.0400e-003	1.0000e-005		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.8411	0.8411	3.0000e-005	0.0000	0.8419
Total	**4.1000e-004**	**2.4200e-003**	**6.0400e-003**	**1.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.8411**	**0.8411**	**3.0000e-005**	**0.0000**	**0.8419**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	3.1000e-004	9.0000e-005	0.0000	2.8000e-003	0.0000	2.8000e-003	2.8000e-004	0.0000	2.8000e-004	0.0000	0.1184	0.1184	0.0000	0.0000	0.1184
Worker	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	0.0165	0.0000	0.0165	1.6700e-003	0.0000	1.6700e-003	0.0000	0.0842	0.0842	0.0000	0.0000	0.0842
Total	**3.0000e-005**	**3.2000e-004**	**2.4000e-004**	**0.0000**	**0.0193**	**0.0000**	**0.0193**	**1.9500e-003**	**0.0000**	**1.9500e-003**	**0.0000**	**0.2026**	**0.2026**	**0.0000**	**0.0000**	**0.2027**

3.17 Plant Area - Removal of Processing Plant - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1370	0.3796	0.9414	3.4900e-003		9.2200e-003	9.2200e-003		9.2200e-003	9.2200e-003	0.0000	338.1893	338.1893	0.0109	0.0000	338.4621
Total	**0.1370**	**0.3796**	**0.9414**	**3.4900e-003**		**9.2200e-003**	**9.2200e-003**		**9.2200e-003**	**9.2200e-003**	**0.0000**	**338.1893**	**338.1893**	**0.0109**	**0.0000**	**338.4621**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	3.6200e-003	1.3600e-003	2.0000e-005	0.0698	1.0000e-005	0.0698	7.0400e-003	1.0000e-005	7.0500e-003	0.0000	1.8814	1.8814	7.0000e-005	0.0000	1.8832
Vendor	1.1000e-004	3.7700e-003	1.0800e-003	1.0000e-005	0.0546	0.0000	0.0546	5.5200e-003	0.0000	5.5200e-003	0.0000	1.4201	1.4201	4.0000e-005	0.0000	1.4212
Worker	1.0400e-003	6.3000e-004	8.7600e-003	6.0000e-005	1.6129	2.0000e-005	1.6129	0.1624	2.0000e-005	0.1624	0.0000	5.0531	5.0531	4.0000e-005	0.0000	5.0541
Total	**1.2800e-003**	**8.0200e-003**	**0.0112**	**9.0000e-005**	**1.7373**	**3.0000e-005**	**1.7373**	**0.1750**	**3.0000e-005**	**0.1750**	**0.0000**	**8.3547**	**8.3547**	**1.5000e-004**	**0.0000**	**8.3585**

3.17 Plant Area - Removal of Processing Plant - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1370	0.3796	0.9414	3.4900e-003		9.2200e-003	9.2200e-003		9.2200e-003	9.2200e-003	0.0000	338.1889	338.1889	0.0109	0.0000	338.4617
Total	**0.1370**	**0.3796**	**0.9414**	**3.4900e-003**		**9.2200e-003**	**9.2200e-003**		**9.2200e-003**	**9.2200e-003**	**0.0000**	**338.1889**	**338.1889**	**0.0109**	**0.0000**	**338.4617**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	3.6200e-003	1.3600e-003	2.0000e-005	0.0429	1.0000e-005	0.0429	4.3500e-003	1.0000e-005	4.3600e-003	0.0000	1.8814	1.8814	7.0000e-005	0.0000	1.8832
Vendor	1.1000e-004	3.7700e-003	1.0800e-003	1.0000e-005	0.0336	0.0000	0.0336	3.4200e-003	0.0000	3.4200e-003	0.0000	1.4201	1.4201	4.0000e-005	0.0000	1.4212
Worker	1.0400e-003	6.3000e-004	8.7600e-003	6.0000e-005	0.9909	2.0000e-005	0.9909	0.1002	2.0000e-005	0.1002	0.0000	5.0531	5.0531	4.0000e-005	0.0000	5.0541
Total	**1.2800e-003**	**8.0200e-003**	**0.0112**	**9.0000e-005**	**1.0673**	**3.0000e-005**	**1.0674**	**0.1080**	**3.0000e-005**	**0.1080**	**0.0000**	**8.3547**	**8.3547**	**1.5000e-004**	**0.0000**	**8.3585**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1015	0.0000	0.1015	0.0509	0.0000	0.0509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0332	0.0764	0.1748	7.9000e-004		2.8300e-003	2.8300e-003		2.8300e-003	2.8300e-003	0.0000	80.3470	80.3470	2.6300e-003	0.0000	80.4127
Total	**0.0332**	**0.0764**	**0.1748**	**7.9000e-004**	**0.1015**	**2.8300e-003**	**0.1043**	**0.0509**	**2.8300e-003**	**0.0537**	**0.0000**	**80.3470**	**80.3470**	**2.6300e-003**	**0.0000**	**80.4127**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	8.0000e-005	1.1000e-003	1.0000e-005	0.2016	0.0000	0.2016	0.0203	0.0000	0.0203	0.0000	0.6316	0.6316	0.0000	0.0000	0.6318
Total	**1.3000e-004**	**8.0000e-005**	**1.1000e-003**	**1.0000e-005**	**0.2016**	**0.0000**	**0.2016**	**0.0203**	**0.0000**	**0.0203**	**0.0000**	**0.6316**	**0.6316**	**0.0000**	**0.0000**	**0.6318**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0457	0.0000	0.0457	0.0229	0.0000	0.0229	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0332	0.0764	0.1748	7.9000e-004		2.8300e-003	2.8300e-003		2.8300e-003	2.8300e-003	0.0000	80.3469	80.3469	2.6300e-003	0.0000	80.4126
Total	**0.0332**	**0.0764**	**0.1748**	**7.9000e-004**	**0.0457**	**2.8300e-003**	**0.0485**	**0.0229**	**2.8300e-003**	**0.0257**	**0.0000**	**80.3469**	**80.3469**	**2.6300e-003**	**0.0000**	**80.4126**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	8.0000e-005	1.1000e-003	1.0000e-005	0.1239	0.0000	0.1239	0.0125	0.0000	0.0125	0.0000	0.6316	0.6316	0.0000	0.0000	0.6318
Total	**1.3000e-004**	**8.0000e-005**	**1.1000e-003**	**1.0000e-005**	**0.1239**	**0.0000**	**0.1239**	**0.0125**	**0.0000**	**0.0125**	**0.0000**	**0.6316**	**0.6316**	**0.0000**	**0.0000**	**0.6318**

3.19 Quarry Pit - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3700e-003	2.0500e-003	7.4400e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.4725	3.4725	1.1000e-004	0.0000	3.4753
Total	**1.3700e-003**	**2.0500e-003**	**7.4400e-003**	**3.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**3.4725**	**3.4725**	**1.1000e-004**	**0.0000**	**3.4753**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.0134	0.0000	0.0134	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0421	0.0421	0.0000	0.0000	0.0421
Total	**1.0000e-005**	**1.0000e-005**	**7.0000e-005**	**0.0000**	**0.0134**	**0.0000**	**0.0134**	**1.3500e-003**	**0.0000**	**1.3500e-003**	**0.0000**	**0.0421**	**0.0421**	**0.0000**	**0.0000**	**0.0421**

3.19 Quarry Pit - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3700e-003	2.0500e-003	7.4400e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.4725	3.4725	1.1000e-004	0.0000	3.4753
Total	**1.3700e-003**	**2.0500e-003**	**7.4400e-003**	**3.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**3.4725**	**3.4725**	**1.1000e-004**	**0.0000**	**3.4753**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	8.2600e-003	0.0000	8.2600e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0421	0.0421	0.0000	0.0000	0.0421
Total	**1.0000e-005**	**1.0000e-005**	**7.0000e-005**	**0.0000**	**8.2600e-003**	**0.0000**	**8.2600e-003**	**8.4000e-004**	**0.0000**	**8.4000e-004**	**0.0000**	**0.0421**	**0.0421**	**0.0000**	**0.0000**	**0.0421**

3.20 Plant Area - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3700e-003	2.0500e-003	7.4400e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.4725	3.4725	1.1000e-004	0.0000	3.4753
Total	**1.3700e-003**	**2.0500e-003**	**7.4400e-003**	**3.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**3.4725**	**3.4725**	**1.1000e-004**	**0.0000**	**3.4753**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.0134	0.0000	0.0134	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0421	0.0421	0.0000	0.0000	0.0421
Total	**1.0000e-005**	**1.0000e-005**	**7.0000e-005**	**0.0000**	**0.0134**	**0.0000**	**0.0134**	**1.3500e-003**	**0.0000**	**1.3500e-003**	**0.0000**	**0.0421**	**0.0421**	**0.0000**	**0.0000**	**0.0421**

3.20 Plant Area - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3700e-003	2.0500e-003	7.4400e-003	3.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	3.4725	3.4725	1.1000e-004	0.0000	3.4753
Total	**1.3700e-003**	**2.0500e-003**	**7.4400e-003**	**3.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**3.4725**	**3.4725**	**1.1000e-004**	**0.0000**	**3.4753**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	8.2600e-003	0.0000	8.2600e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0421	0.0421	0.0000	0.0000	0.0421
Total	**1.0000e-005**	**1.0000e-005**	**7.0000e-005**	**0.0000**	**8.2600e-003**	**0.0000**	**8.2600e-003**	**8.4000e-004**	**0.0000**	**8.4000e-004**	**0.0000**	**0.0421**	**0.0421**	**0.0000**	**0.0000**	**0.0421**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.610901	0.034103	0.184115	0.105098	0.010250	0.004842	0.011067	0.028522	0.001710	0.001425	0.005016	0.002345	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003
Unmitigated	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003
Total	**1.6000e-004**	**2.0000e-005**	**1.7300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4000e-003**	**3.4000e-003**	**1.0000e-005**	**0.0000**	**3.6100e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6000e-004	2.0000e-005	1.7300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4000e-003	3.4000e-003	1.0000e-005	0.0000	3.6100e-003
Total	**1.6000e-004**	**2.0000e-005**	**1.7300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4000e-003**	**3.4000e-003**	**1.0000e-005**	**0.0000**	**3.6100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Clayton Quarry Reclamation

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	190.00	User Defined Unit	190.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2050
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Clayton Quarry reclamation per Revised Reclamation Plan.

Land Use - Reclamation plan boundary approximately 190 acres per Spinardi Associates (2020).

Construction Phase - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

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Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Trips and VMT - See CalEEMod modeling assumptions attachment.

On-road Fugitive Dust - On-site worker and vendor trips assume 90% paved given minimal on-site travel on unpaved roads.

Grading - See CalEEMod modeling assumptions attachment for acreages.

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed areas 2x per day. Unpaved road speed limit 15 mph.

Clayton Quarry Reclamation - Contra Costa County, Summer

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	3,100.00	6.00
tblConstructionPhase	NumDays	3,100.00	10.00
tblConstructionPhase	NumDays	3,100.00	10.00
tblConstructionPhase	NumDays	3,100.00	3.00
tblConstructionPhase	NumDays	200.00	60.00
tblConstructionPhase	NumDays	310.00	10.00
tblConstructionPhase	NumDays	310.00	2.00
tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	15.00
tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	10.00
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tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	15.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	17.00
tblGrading	AcresOfGrading	52.50	21.00
tblGrading	AcresOfGrading	10.00	2.00
tblGrading	AcresOfGrading	2.50	4.00
tblLandUse	LotAcreage	0.00	190.00
tblOffRoadEquipment	HorsePower	158.00	396.00

tblOffRoadEquipment	HorsePower	158.00	239.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
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tblOffRoadEquipment	HorsePower	247.00	303.00
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tblOffRoadEquipment	HorsePower	97.00	100.00
tblOffRoadEquipment	HorsePower	97.00	100.00
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tblOffRoadEquipment	HorsePower	158.00	396.00
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tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	402.00	515.00

tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	203.00	580.00
tblOffRoadEquipment	HorsePower	203.00	580.00
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tblOffRoadEquipment	HorsePower	203.00	580.00
tblOffRoadEquipment	HorsePower	203.00	276.00
tblOffRoadEquipment	HorsePower	203.00	580.00
tblOffRoadEquipment	HorsePower	203.00	276.00
tblOffRoadEquipment	HorsePower	203.00	276.00
tblOffRoadEquipment	HorsePower	203.00	580.00
tblOffRoadEquipment	HorsePower	203.00	580.00
tblOffRoadEquipment	HorsePower	203.00	276.00
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tblOffRoadEquipment	LoadFactor	0.56	0.38
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Plant Area - Landscape Screening Berm
tblOffRoadEquipment	PhaseName		Plant Area - Landscape Screening Berm
tblOffRoadEquipment	UsageHours	8.00	3.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOnRoadDust	HaulingPercentPave	100.00	90.00
tblOnRoadDust	HaulingPercentPave	100.00	90.00
tblOnRoadDust	HaulingPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00

tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
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tblOnRoadDust	WorkerPercentPave	100.00	90.00
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tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	56.00
tblTripsAndVMT	HaulingTripNumber	0.00	67.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	5.00	8.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00
tblTripsAndVMT	WorkerTripNumber	0.00	12.00
tblTripsAndVMT	WorkerTripNumber	0.00	12.00
tblTripsAndVMT	WorkerTripNumber	10.00	14.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	10.00	14.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripNumber	15.00	18.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.8188	37.9636	28.6824	0.0670	28.8031	1.5334	30.3365	5.6045	1.4108	7.0153	0.0000	6,493.7076	6,493.7076	2.0673	0.0000	6,545.3911
2025	2.5805	19.0090	19.1697	0.0685	42.0343	0.6919	42.7262	4.2304	0.6366	4.8670	0.0000	6,666.9996	6,666.9996	2.0191	0.0000	6,717.4779
2049	4.6103	12.9157	31.7983	0.1194	68.8000	0.3775	69.1082	9.9929	0.3775	10.3704	0.0000	12,751.2452	12,751.2452	0.4066	0.0000	12,761.4090
Maximum	**4.6103**	**37.9636**	**31.7983**	**0.1194**	**68.8000**	**1.5334**	**69.1082**	**9.9929**	**1.4108**	**10.3704**	**0.0000**	**12,751.2452**	**12,751.2452**	**2.0673**	**0.0000**	**12,761.4090**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.8188	37.9636	28.6824	0.0670	16.6295	1.5334	18.1629	2.8959	1.4108	4.3067	0.0000	6,493.7076	6,493.7076	2.0673	0.0000	6,545.3911
2025	2.5805	19.0090	19.1697	0.0685	25.8043	0.6919	26.4962	2.6071	0.6366	3.2437	0.0000	6,666.9996	6,666.9996	2.0191	0.0000	6,717.4779
2049	4.6103	12.9157	31.7983	0.1194	42.2498	0.3775	42.5580	5.0309	0.3775	5.4084	0.0000	12,751.2452	12,751.2452	0.4066	0.0000	12,761.4089
Maximum	**4.6103**	**37.9636**	**31.7983**	**0.1194**	**42.2498**	**1.5334**	**42.5580**	**5.0309**	**1.4108**	**5.4084**	**0.0000**	**12,751.2452**	**12,751.2452**	**2.0673**	**0.0000**	**12,761.4089**

Clayton Quarry Reclamation - Contra Costa County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	39.35	0.00	38.65	46.87	0.00	41.77	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**	**0.0000**	**0.0443**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**	**0.0000**	**0.0443**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Clayton Quarry Reclamation - Contra Costa County, Summer

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Overburden Fill Areas - Finish Slopes and Drainage	Grading	5/2/2022	5/13/2022	5	10	Finish grade slopes and finish drainage
2	Plant Area - Landscape Screening Berm	Grading	5/16/2022	5/20/2022	5	5	Install 1500 LF landscape screening berm
3	Overburden Fill Areas - Revegetation	Site Preparation	10/3/2022	10/7/2022	5	5	Hydroseed north and south fill areas
4	Quarry Pit - Contour Final Knoxville Slope	Grading	5/5/2025	5/16/2025	5	10	Contour final Knoxville slopes
5	Quarry Pit - Riprap Knoxville Slope Face	Grading	5/19/2025	6/6/2025	5	15	Riprap Knoxville slope face for erosion protection
6	Quarry Pit - Drainage - East Rim Haul Road	Grading	6/9/2025	6/13/2025	5	5	Grade East Rim road ditch pipe berms
7	Quarry Pit - Drainage - RSP Swales	Grading	6/16/2025	7/4/2025	5	15	Install rock slope protection swales for Knoxville face
8	Quarry Pit - Tree Screen Along East Rim Road	Site Preparation	9/1/2025	9/23/2025	5	17	Install tree screen along east rim access road
9	Quarry Pit - Drainage Outlet Structure at Elev. 735	Building Construction	5/3/2049	5/5/2049	5	3	Install drainage flow control structure for quarry lake at elev. 735
10	Quarry Pit - Jack and Bore (1)	Grading	5/6/2049	5/7/2049	5	2	Excavate J&B receiving pit
11	Quarry Pit - Jack and Bore (2)	Building Construction	5/10/2049	5/17/2049	5	6	J&B sub installs casing pipe
12	Off-Site Drainage - Storm Drain Replacement	Building Construction	5/17/2049	5/28/2049	5	10	Replace storm drain at MC Road an Diablo Downs
13	Quarry Pit - Install Drainage Outlet Pipe to MC Road	Building Construction	5/18/2049	5/31/2049	5	10	Install drainage outlet pipe to Mitchell Canyon Rd
14	Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Grading	6/1/2049	6/7/2049	5	5	Riprap mound at quarry drainage outlet for wave runup protection
15	Quarry Pit - Fencing and Gates	Site Preparation	6/14/2049	6/18/2049	5	5	Install 2500 LF of fencing with gates
16	Plant Area - Removal of Processing Plant	Demolition	6/21/2049	9/10/2049	5	60	Remove processing plant and support structures
17	Plant Area - Contour Grading and Resoiling	Grading	9/13/2049	10/1/2049	5	15	Grade and spread fill soil across plant site area
18	Quarry Pit - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed Knoxville slope faces
19	Plant Area - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed graded plant site area

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Overburden Fill Areas - Finish Slopes and Drainage	Off-Highway Trucks	1	8.00	402	0.38
Overburden Fill Areas - Finish Slopes and Drainage	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Landscape Screening Berm	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Landscape Screening Berm	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Landscape Screening Berm	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Landscape Screening Berm	Scrapers	2	8.00	407	0.48
Overburden Fill Areas - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Excavators	1	8.00	396	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Riprap Knoxville Slope Face	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Knoxville Slope Face	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - East Rim Haul Road	Graders	1	8.00	238	0.41
Quarry Pit - Drainage - East Rim Haul Road	Off-Highway Trucks	1	8.00	402	0.38

Quarry Pit - Drainage - East Rim Haul Road	Rubber Tired Loaders	2	8.00	276	0.36
Quarry Pit - Drainage - East Rim Haul Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage - RSP Swales	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage - RSP Swales	Excavators	1	8.00	396	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage - RSP Swales	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - RSP Swales	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Tree Screen Along East Rim Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage Outlet Structure at Elev. 735	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Welders	1	8.00	46	0.45
Quarry Pit - Jack and Bore (1)	Excavators	1	8.00	396	0.38
Quarry Pit - Jack and Bore (1)	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Jack and Bore (2)	Bore/Drill Rigs	1	8.00	221	0.50
Quarry Pit - Jack and Bore (2)	Cranes	1	8.00	231	0.29
Quarry Pit - Jack and Bore (2)	Rubber Tired Loaders	1	8.00	580	0.36
Off-Site Drainage - Storm Drain Replacement	Paving Equipment	1	8.00	132	0.36
Off-Site Drainage - Storm Drain Replacement	Rubber Tired Loaders	1	8.00	276	0.36
Off-Site Drainage - Storm Drain Replacement	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Excavators	1	8.00	396	0.38
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Rubber Tired Loaders	1	8.00	276	0.36

Quarry Pit - Install Drainage Outlet Pipe to MC Road	Welders	1	8.00	46	0.45
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Fencing and Gates	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Removal of Processing Plant	Concrete/Industrial Saws	3	3.00	81	0.73
Plant Area - Removal of Processing Plant	Cranes	1	8.00	275	0.29
Plant Area - Removal of Processing Plant	Excavators	1	8.00	396	0.38
Plant Area - Removal of Processing Plant	Excavators	2	8.00	239	0.38
Plant Area - Removal of Processing Plant	Forklifts	1	8.00	89	0.20
Plant Area - Removal of Processing Plant	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Removal of Processing Plant	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	2	8.00	276	0.36
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	1	8.00	580	0.36
Plant Area - Removal of Processing Plant	Welders	3	8.00	46	0.45
Plant Area - Contour Grading and Resoiling	Graders	1	8.00	238	0.41
Plant Area - Contour Grading and Resoiling	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Contour Grading and Resoiling	Rubber Tired Dozers	2	8.00	303	0.40
Plant Area - Contour Grading and Resoiling	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Contour Grading and Resoiling	Scrapers	3	8.00	407	0.48
Quarry Pit - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Revegetation	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Overburden Fill Areas - Finish Slopes and Dr	2	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Landscape Screening	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Overburden Fill Areas - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Contour Final Knoxville Slope	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Knoxville Slope Face	4	20.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - East Rim Haul Road	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - RSP Swales	6	18.00	0.00	67.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Tree Screen Along East Ri	1	6.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage Outlet Structure at Ele	5	16.00	2.00	2.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (1)	2	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (2)	3	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Off-Site Drainage - Storm Drain Replace	3	12.00	2.00	4.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Install Drainage Outlet Pipe t	3	12.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Mound at Quarry Drai	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Fencing and Gates	1	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Removal of Processing Plant	16	40.00	2.00	56.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Contour Grading and Recoiling	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.5602	0.0000	4.5602	0.4924	0.0000	0.4924			0.0000			0.0000
Off-Road	0.6982	5.7412	5.6659	0.0164		0.2389	0.2389		0.2198	0.2198		1,589.5409	1,589.5409	0.5141		1,602.3932
Total	**0.6982**	**5.7412**	**5.6659**	**0.0164**	**4.5602**	**0.2389**	**4.7990**	**0.4924**	**0.2198**	**0.7121**		**1,589.5409**	**1,589.5409**	**0.5141**		**1,602.3932**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0187	0.0104	0.1420	4.7000e-004	9.5815	3.0000e-004	9.5818	0.9636	2.8000e-004	0.9639		46.5880	46.5880	9.9000e-004		46.6126
Total	**0.0187**	**0.0104**	**0.1420**	**4.7000e-004**	**9.5815**	**3.0000e-004**	**9.5818**	**0.9636**	**2.8000e-004**	**0.9639**		**46.5880**	**46.5880**	**9.9000e-004**		**46.6126**

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0521	0.0000	2.0521	0.2216	0.0000	0.2216			0.0000			0.0000
Off-Road	0.6982	5.7412	5.6659	0.0164		0.2389	0.2389		0.2198	0.2198	0.0000	1,589.5409	1,589.5409	0.5141		1,602.3932
Total	**0.6982**	**5.7412**	**5.6659**	**0.0164**	**2.0521**	**0.2389**	**2.2909**	**0.2216**	**0.2198**	**0.4413**	**0.0000**	**1,589.5409**	**1,589.5409**	**0.5141**		**1,602.3932**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0187	0.0104	0.1420	4.7000e-004	5.8837	3.0000e-004	5.8840	0.5939	2.8000e-004	0.5941		46.5880	46.5880	9.9000e-004		46.6126
Total	**0.0187**	**0.0104**	**0.1420**	**4.7000e-004**	**5.8837**	**3.0000e-004**	**5.8840**	**0.5939**	**2.8000e-004**	**0.5941**		**46.5880**	**46.5880**	**9.9000e-004**		**46.6126**

3.3 Plant Area - Landscape Screening Berm - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.4463	0.0000	6.4463	3.3560	0.0000	3.3560			0.0000			0.0000
Off-Road	3.7751	37.9392	28.3511	0.0659		1.5327	1.5327		1.4101	1.4101		6,385.0023	6,385.0023	2.0650		6,436.6283
Total	**3.7751**	**37.9392**	**28.3511**	**0.0659**	**6.4463**	**1.5327**	**7.9790**	**3.3560**	**1.4101**	**4.7661**		**6,385.0023**	**6,385.0023**	**2.0650**		**6,436.6283**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0437	0.0243	0.3313	1.0900e-003	22.3568	7.0000e-004	22.3575	2.2485	6.5000e-004	2.2492		108.7053	108.7053	2.3000e-003		108.7628
Total	**0.0437**	**0.0243**	**0.3313**	**1.0900e-003**	**22.3568**	**7.0000e-004**	**22.3575**	**2.2485**	**6.5000e-004**	**2.2492**		**108.7053**	**108.7053**	**2.3000e-003**		**108.7628**

3.3 Plant Area - Landscape Screening Berm - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9008	0.0000	2.9008	1.5102	0.0000	1.5102			0.0000			0.0000
Off-Road	3.7751	37.9392	28.3511	0.0659		1.5327	1.5327		1.4101	1.4101	0.0000	6,385.0023	6,385.0023	2.0650		6,436.6283
Total	**3.7751**	**37.9392**	**28.3511**	**0.0659**	**2.9008**	**1.5327**	**4.4336**	**1.5102**	**1.4101**	**2.9203**	**0.0000**	**6,385.0023**	**6,385.0023**	**2.0650**		**6,436.6283**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0437	0.0243	0.3313	1.0900e-003	13.7286	7.0000e-004	13.7293	1.3857	6.5000e-004	1.3863		108.7053	108.7053	2.3000e-003		108.7628
Total	**0.0437**	**0.0243**	**0.3313**	**1.0900e-003**	**13.7286**	**7.0000e-004**	**13.7293**	**1.3857**	**6.5000e-004**	**1.3863**		**108.7053**	**108.7053**	**2.3000e-003**		**108.7628**

3.4 Overburden Fill Areas - Revegetation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5284	4.0137	3.3587	0.0132		0.1460	0.1460		0.1343	0.1343		1,278.9853	1,278.9853	0.4137		1,289.3265
Total	**0.5284**	**4.0137**	**3.3587**	**0.0132**	**0.0000**	**0.1460**	**0.1460**	**0.0000**	**0.1343**	**0.1343**		**1,278.9853**	**1,278.9853**	**0.4137**		**1,289.3265**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0125	6.9500e-003	0.0947	3.1000e-004	6.3877	2.0000e-004	6.3879	0.6424	1.9000e-004	0.6426		31.0587	31.0587	6.6000e-004		31.0751
Total	**0.0125**	**6.9500e-003**	**0.0947**	**3.1000e-004**	**6.3877**	**2.0000e-004**	**6.3879**	**0.6424**	**1.9000e-004**	**0.6426**		**31.0587**	**31.0587**	**6.6000e-004**		**31.0751**

3.4 Overburden Fill Areas - Revegetation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5284	4.0137	3.3587	0.0132		0.1460	0.1460		0.1343	0.1343	0.0000	1,278.9853	1,278.9853	0.4137		1,289.3265
Total	**0.5284**	**4.0137**	**3.3587**	**0.0132**	**0.0000**	**0.1460**	**0.1460**	**0.0000**	**0.1343**	**0.1343**	**0.0000**	**1,278.9853**	**1,278.9853**	**0.4137**		**1,289.3265**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0125	6.9500e-003	0.0947	3.1000e-004	3.9225	2.0000e-004	3.9227	0.3959	1.9000e-004	0.3961		31.0587	31.0587	6.6000e-004		31.0751
Total	**0.0125**	**6.9500e-003**	**0.0947**	**3.1000e-004**	**3.9225**	**2.0000e-004**	**3.9227**	**0.3959**	**1.9000e-004**	**0.3961**		**31.0587**	**31.0587**	**6.6000e-004**		**31.0751**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	2.3768	16.9274	16.3284	0.0608		0.6340	0.6340		0.5833	0.5833		5,884.4624	5,884.4624	1.9032		5,932.0413
Total	**2.3768**	**16.9274**	**16.3284**	**0.0608**	**0.8484**	**0.6340**	**1.4824**	**0.0916**	**0.5833**	**0.6749**		**5,884.4624**	**5,884.4624**	**1.9032**		**5,932.0413**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0357	0.0179	0.2623	9.6000e-004	22.3568	6.7000e-004	22.3575	2.2485	6.1000e-004	2.2491		96.1357	96.1357	1.6800e-003		96.1778
Total	**0.0357**	**0.0179**	**0.2623**	**9.6000e-004**	**22.3568**	**6.7000e-004**	**22.3575**	**2.2485**	**6.1000e-004**	**2.2491**		**96.1357**	**96.1357**	**1.6800e-003**		**96.1778**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	2.3768	16.9274	16.3284	0.0608		0.6340	0.6340		0.5833	0.5833	0.0000	5,884.4624	5,884.4624	1.9032		5,932.0413
Total	**2.3768**	**16.9274**	**16.3284**	**0.0608**	**0.3818**	**0.6340**	**1.0158**	**0.0412**	**0.5833**	**0.6245**	**0.0000**	**5,884.4624**	**5,884.4624**	**1.9032**		**5,932.0413**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0357	0.0179	0.2623	9.6000e-004	13.7286	6.7000e-004	13.7293	1.3857	6.1000e-004	1.3863		96.1357	96.1357	1.6800e-003		96.1778
Total	**0.0357**	**0.0179**	**0.2623**	**9.6000e-004**	**13.7286**	**6.7000e-004**	**13.7293**	**1.3857**	**6.1000e-004**	**1.3863**		**96.1357**	**96.1357**	**1.6800e-003**		**96.1778**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5656	0.0000	0.5656	0.0611	0.0000	0.0611			0.0000			0.0000
Off-Road	2.1381	15.4944	14.7357	0.0542		0.5828	0.5828		0.5362	0.5362		5,244.6247	5,244.6247	1.6962		5,287.0301
Total	**2.1381**	**15.4944**	**14.7357**	**0.0542**	**0.5656**	**0.5828**	**1.1484**	**0.0611**	**0.5362**	**0.5973**		**5,244.6247**	**5,244.6247**	**1.6962**		**5,287.0301**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.2200e-003	0.1436	0.0382	5.2000e-004	2.1612	1.7000e-004	2.1614	0.2181	1.6000e-004	0.2182		54.7533	54.7533	1.8900e-003		54.8005
Worker	0.0510	0.0256	0.3747	1.3800e-003	31.9383	9.5000e-004	31.9392	3.2121	8.8000e-004	3.2130		137.3368	137.3368	2.4000e-003		137.3968
Total	**0.0552**	**0.1692**	**0.4129**	**1.9000e-003**	**34.0995**	**1.1200e-003**	**34.1006**	**3.4302**	**1.0400e-003**	**3.4312**		**192.0901**	**192.0901**	**4.2900e-003**		**192.1973**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2545	0.0000	0.2545	0.0275	0.0000	0.0275			0.0000			0.0000
Off-Road	2.1381	15.4944	14.7357	0.0542		0.5828	0.5828		0.5362	0.5362	0.0000	5,244.6247	5,244.6247	1.6962		5,287.0301
Total	**2.1381**	**15.4944**	**14.7357**	**0.0542**	**0.2545**	**0.5828**	**0.8373**	**0.0275**	**0.5362**	**0.5637**	**0.0000**	**5,244.6247**	**5,244.6247**	**1.6962**		**5,287.0301**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.2200e-003	0.1436	0.0382	5.2000e-004	1.3281	1.7000e-004	1.3283	0.1348	1.6000e-004	0.1349		54.7533	54.7533	1.8900e-003		54.8005
Worker	0.0510	0.0256	0.3747	1.3800e-003	19.6123	9.5000e-004	19.6133	1.9795	8.8000e-004	1.9804		137.3368	137.3368	2.4000e-003		137.3968
Total	**0.0552**	**0.1692**	**0.4129**	**1.9000e-003**	**20.9404**	**1.1200e-003**	**20.9415**	**2.1143**	**1.0400e-003**	**2.1153**		**192.0901**	**192.0901**	**4.2900e-003**		**192.1973**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	1.6865	13.6630	11.9862	0.0418		0.4838	0.4838		0.4451	0.4451		4,050.1874	4,050.1874	1.3099		4,082.9352
Total	**1.6865**	**13.6630**	**11.9862**	**0.0418**	**0.8484**	**0.4838**	**1.3322**	**0.0916**	**0.4451**	**0.5368**		**4,050.1874**	**4,050.1874**	**1.3099**		**4,082.9352**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0357	0.0179	0.2623	9.6000e-004	22.3568	6.7000e-004	22.3575	2.2485	6.1000e-004	2.2491		96.1357	96.1357	1.6800e-003		96.1778
Total	**0.0357**	**0.0179**	**0.2623**	**9.6000e-004**	**22.3568**	**6.7000e-004**	**22.3575**	**2.2485**	**6.1000e-004**	**2.2491**		**96.1357**	**96.1357**	**1.6800e-003**		**96.1778**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	1.6865	13.6630	11.9862	0.0418		0.4838	0.4838		0.4451	0.4451	0.0000	4,050.1874	4,050.1874	1.3099		4,082.9352
Total	**1.6865**	**13.6630**	**11.9862**	**0.0418**	**0.3818**	**0.4838**	**0.8656**	**0.0412**	**0.4451**	**0.4864**	**0.0000**	**4,050.1874**	**4,050.1874**	**1.3099**		**4,082.9352**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0357	0.0179	0.2623	9.6000e-004	13.7286	6.7000e-004	13.7293	1.3857	6.1000e-004	1.3863		96.1357	96.1357	1.6800e-003		96.1778
Total	**0.0357**	**0.0179**	**0.2623**	**9.6000e-004**	**13.7286**	**6.7000e-004**	**13.7293**	**1.3857**	**6.1000e-004**	**1.3863**		**96.1357**	**96.1357**	**1.6800e-003**		**96.1778**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0707	0.0000	0.0707	7.6300e-003	0.0000	7.6300e-003			0.0000			0.0000
Off-Road	2.5131	18.3038	18.6270	0.0640		0.6898	0.6898		0.6346	0.6346		6,195.8602	6,195.8602	2.0039		6,245.9569
Total	**2.5131**	**18.3038**	**18.6270**	**0.0640**	**0.0707**	**0.6898**	**0.7605**	**7.6300e-003**	**0.6346**	**0.6423**		**6,195.8602**	**6,195.8602**	**2.0039**		**6,245.9569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0215	0.6821	0.2055	3.2600e-003	13.2191	1.2700e-003	13.2204	1.3318	1.2100e-003	1.3331		347.5363	347.5363	0.0131		347.8639
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0459	0.0230	0.3372	1.2400e-003	28.7444	8.6000e-004	28.7453	2.8909	7.9000e-004	2.8917		123.6031	123.6031	2.1600e-003		123.6571
Total	**0.0674**	**0.7052**	**0.5427**	**4.5000e-003**	**41.9636**	**2.1300e-003**	**41.9657**	**4.2228**	**2.0000e-003**	**4.2248**		**471.1394**	**471.1394**	**0.0153**		**471.5210**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0318	0.0000	0.0318	3.4400e-003	0.0000	3.4400e-003			0.0000			0.0000
Off-Road	2.5131	18.3038	18.6270	0.0640		0.6898	0.6898		0.6346	0.6346	0.0000	6,195.8602	6,195.8602	2.0039		6,245.9568
Total	**2.5131**	**18.3038**	**18.6270**	**0.0640**	**0.0318**	**0.6898**	**0.7216**	**3.4400e-003**	**0.6346**	**0.6381**	**0.0000**	**6,195.8602**	**6,195.8602**	**2.0039**		**6,245.9568**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0215	0.6821	0.2055	3.2600e-003	8.1214	1.2700e-003	8.1226	0.8221	1.2100e-003	0.8233		347.5363	347.5363	0.0131		347.8639
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0459	0.0230	0.3372	1.2400e-003	17.6511	8.6000e-004	17.6520	1.7816	7.9000e-004	1.7824		123.6031	123.6031	2.1600e-003		123.6571
Total	**0.0674**	**0.7052**	**0.5427**	**4.5000e-003**	**25.7725**	**2.1300e-003**	**25.7746**	**2.6037**	**2.0000e-003**	**2.6057**		**471.1394**	**471.1394**	**0.0153**		**471.5210**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1362	1.3764	2.2986	3.2200e-003		0.0558	0.0558		0.0513	0.0513		311.3978	311.3978	0.1007		313.9156
Total	**0.1362**	**1.3764**	**2.2986**	**3.2200e-003**	**0.0000**	**0.0558**	**0.0558**	**0.0000**	**0.0513**	**0.0513**		**311.3978**	**311.3978**	**0.1007**		**313.9156**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.2200e-003	0.1436	0.0382	5.2000e-004	2.1612	1.7000e-004	2.1614	0.2181	1.6000e-004	0.2182		54.7533	54.7533	1.8900e-003		54.8005
Worker	0.0153	7.6700e-003	0.1124	4.1000e-004	9.5815	2.9000e-004	9.5818	0.9636	2.6000e-004	0.9639		41.2010	41.2010	7.2000e-004		41.2190
Total	**0.0195**	**0.1513**	**0.1506**	**9.3000e-004**	**11.7427**	**4.6000e-004**	**11.7432**	**1.1817**	**4.2000e-004**	**1.1821**		**95.9544**	**95.9544**	**2.6100e-003**		**96.0195**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1362	1.3764	2.2986	3.2200e-003		0.0558	0.0558		0.0513	0.0513	0.0000	311.3978	311.3978	0.1007		313.9156
Total	**0.1362**	**1.3764**	**2.2986**	**3.2200e-003**	**0.0000**	**0.0558**	**0.0558**	**0.0000**	**0.0513**	**0.0513**	**0.0000**	**311.3978**	**311.3978**	**0.1007**		**313.9156**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.2200e-003	0.1436	0.0382	5.2000e-004	1.3281	1.7000e-004	1.3283	0.1348	1.6000e-004	0.1349		54.7533	54.7533	1.8900e-003		54.8005
Worker	0.0153	7.6700e-003	0.1124	4.1000e-004	5.8837	2.9000e-004	5.8840	0.5939	2.6000e-004	0.5941		41.2010	41.2010	7.2000e-004		41.2190
Total	**0.0195**	**0.1513**	**0.1506**	**9.3000e-004**	**7.2118**	**4.6000e-004**	**7.2122**	**0.7286**	**4.2000e-004**	**0.7290**		**95.9544**	**95.9544**	**2.6100e-003**		**96.0195**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5434	4.1721	10.9391	0.0384		0.0961	0.0961		0.0961	0.0961		4,202.2763	4,202.2763	0.1349		4,205.6493
Total	**1.5434**	**4.1721**	**10.9391**	**0.0384**		**0.0961**	**0.0961**		**0.0961**	**0.0961**		**4,202.2763**	**4,202.2763**	**0.1349**		**4,205.6493**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9900e-003	0.0852	0.0317	4.7000e-004	1.9730	1.6000e-004	1.9732	0.1988	1.5000e-004	0.1989		49.7335	49.7335	1.7900e-003		49.7782
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0145	7.5500e-003	0.1368	8.1000e-004	25.5506	2.7000e-004	25.5509	2.5697	2.5000e-004	2.5700		81.0242	81.0242	6.3000e-004		81.0398
Total	**0.0211**	**0.2179**	**0.2021**	**1.7800e-003**	**29.6849**	**5.7000e-004**	**29.6854**	**2.9866**	**5.3000e-004**	**2.9871**		**183.4862**	**183.4862**	**3.9800e-003**		**183.5855**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5434	4.1721	10.9391	0.0384		0.0961	0.0961		0.0961	0.0961	0.0000	4,202.2763	4,202.2763	0.1349		4,205.6493
Total	**1.5434**	**4.1721**	**10.9391**	**0.0384**		**0.0961**	**0.0961**		**0.0961**	**0.0961**	**0.0000**	**4,202.2763**	**4,202.2763**	**0.1349**		**4,205.6493**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9900e-003	0.0852	0.0317	4.7000e-004	1.2122	1.6000e-004	1.2123	0.1227	1.5000e-004	0.1229		49.7335	49.7335	1.7900e-003		49.7782
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0145	7.5500e-003	0.1368	8.1000e-004	15.6899	2.7000e-004	15.6901	1.5836	2.5000e-004	1.5839		81.0242	81.0242	6.3000e-004		81.0398
Total	**0.0211**	**0.2179**	**0.2021**	**1.7800e-003**	**18.2301**	**5.7000e-004**	**18.2307**	**1.8411**	**5.3000e-004**	**1.8416**		**183.4862**	**183.4862**	**3.9800e-003**		**183.5855**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.1909	2.0483	6.8527	0.0317		0.0771	0.0771		0.0771	0.0771		3,601.0917	3,601.0917	0.1040		3,603.6927
Total	**1.1909**	**2.0483**	**6.8527**	**0.0317**	**0.5303**	**0.0771**	**0.6073**	**0.0573**	**0.0771**	**0.1343**		**3,601.0917**	**3,601.0917**	**0.1040**		**3,603.6927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	7.2500e-003	3.7700e-003	0.0684	4.1000e-004	12.7753	1.4000e-004	12.7754	1.2849	1.3000e-004	1.2850		40.5121	40.5121	3.1000e-004		40.5199
Total	**7.2500e-003**	**3.7700e-003**	**0.0684**	**4.1000e-004**	**12.7753**	**1.4000e-004**	**12.7754**	**1.2849**	**1.3000e-004**	**1.2850**		**40.5121**	**40.5121**	**3.1000e-004**		**40.5199**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2386	0.0000	0.2386	0.0258	0.0000	0.0258			0.0000			0.0000
Off-Road	1.1909	2.0483	6.8527	0.0317		0.0771	0.0771		0.0771	0.0771	0.0000	3,601.0917	3,601.0917	0.1040		3,603.6927
Total	**1.1909**	**2.0483**	**6.8527**	**0.0317**	**0.2386**	**0.0771**	**0.3157**	**0.0258**	**0.0771**	**0.1028**	**0.0000**	**3,601.0917**	**3,601.0917**	**0.1040**		**3,603.6927**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	7.2500e-003	3.7700e-003	0.0684	4.1000e-004	7.8449	1.4000e-004	7.8451	0.7918	1.3000e-004	0.7919		40.5121	40.5121	3.1000e-004		40.5199
Total	**7.2500e-003**	**3.7700e-003**	**0.0684**	**4.1000e-004**	**7.8449**	**1.4000e-004**	**7.8451**	**0.7918**	**1.3000e-004**	**0.7919**		**40.5121**	**40.5121**	**3.1000e-004**		**40.5199**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1592	2.1886	7.3312	0.0372		0.0827	0.0827		0.0827	0.0827		3,871.8170	3,871.8170	0.1004		3,874.3281
Total	**1.1592**	**2.1886**	**7.3312**	**0.0372**		**0.0827**	**0.0827**		**0.0827**	**0.0827**		**3,871.8170**	**3,871.8170**	**0.1004**		**3,874.3281**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2500e-003	0.2502	0.0673	1.0000e-003	4.3225	2.7000e-004	4.3227	0.4361	2.6000e-004	0.4364		105.4571	105.4571	3.1200e-003		105.5350
Worker	0.0145	7.5500e-003	0.1368	8.1000e-004	25.5506	2.7000e-004	25.5509	2.5697	2.5000e-004	2.5700		81.0242	81.0242	6.3000e-004		81.0398
Total	**0.0218**	**0.2578**	**0.2041**	**1.8100e-003**	**29.8731**	**5.4000e-004**	**29.8736**	**3.0059**	**5.1000e-004**	**3.0064**		**186.4813**	**186.4813**	**3.7500e-003**		**186.5748**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1592	2.1886	7.3312	0.0372		0.0827	0.0827		0.0827	0.0827	0.0000	3,871.8170	3,871.8170	0.1004		3,874.3281
Total	**1.1592**	**2.1886**	**7.3312**	**0.0372**		**0.0827**	**0.0827**		**0.0827**	**0.0827**	**0.0000**	**3,871.8170**	**3,871.8170**	**0.1004**		**3,874.3281**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2500e-003	0.2502	0.0673	1.0000e-003	2.6562	2.7000e-004	2.6564	0.2695	2.6000e-004	0.2698		105.4571	105.4571	3.1200e-003		105.5350
Worker	0.0145	7.5500e-003	0.1368	8.1000e-004	15.6899	2.7000e-004	15.6901	1.5836	2.5000e-004	1.5839		81.0242	81.0242	6.3000e-004		81.0398
Total	**0.0218**	**0.2578**	**0.2041**	**1.8100e-003**	**18.3460**	**5.4000e-004**	**18.3466**	**1.8532**	**5.1000e-004**	**1.8537**		**186.4813**	**186.4813**	**3.7500e-003**		**186.5748**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6618	2.0106	7.0712	0.0177		0.0542	0.0542		0.0542	0.0542		1,843.0455	1,843.0455	0.0575		1,844.4825
Total	**0.6618**	**2.0106**	**7.0712**	**0.0177**		**0.0542**	**0.0542**		**0.0542**	**0.0542**		**1,843.0455**	**1,843.0455**	**0.0575**		**1,844.4825**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7900e-003	0.0511	0.0190	2.8000e-004	6.9900e-003	1.0000e-004	7.0900e-003	1.9200e-003	9.0000e-005	2.0100e-003		29.8401	29.8401	1.0700e-003		29.8669
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	0.0135	1.4000e-004	0.0137	3.9000e-003	1.3000e-004	4.0300e-003		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0109	5.6600e-003	0.1026	6.1000e-004	0.0986	2.0000e-004	0.0988	0.0262	1.9000e-004	0.0263		60.7681	60.7681	4.7000e-004		60.7799
Total	**0.0163**	**0.1819**	**0.1553**	**1.3900e-003**	**0.1191**	**4.4000e-004**	**0.1196**	**0.0320**	**4.1000e-004**	**0.0324**		**143.3368**	**143.3368**	**3.1000e-003**		**143.4143**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6618	2.0106	7.0712	0.0177		0.0542	0.0542		0.0542	0.0542	0.0000	1,843.0455	1,843.0455	0.0575		1,844.4825
Total	**0.6618**	**2.0106**	**7.0712**	**0.0177**		**0.0542**	**0.0542**		**0.0542**	**0.0542**	**0.0000**	**1,843.0455**	**1,843.0455**	**0.0575**		**1,844.4825**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7900e-003	0.0511	0.0190	2.8000e-004	6.9900e-003	1.0000e-004	7.0900e-003	1.9200e-003	9.0000e-005	2.0100e-003		29.8401	29.8401	1.0700e-003		29.8669
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	0.0135	1.4000e-004	0.0137	3.9000e-003	1.3000e-004	4.0300e-003		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0109	5.6600e-003	0.1026	6.1000e-004	0.0986	2.0000e-004	0.0988	0.0262	1.9000e-004	0.0263		60.7681	60.7681	4.7000e-004		60.7799
Total	**0.0163**	**0.1819**	**0.1553**	**1.3900e-003**	**0.1191**	**4.4000e-004**	**0.1196**	**0.0320**	**4.1000e-004**	**0.0324**		**143.3368**	**143.3368**	**3.1000e-003**		**143.4143**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9805	2.5177	6.3588	0.0246		0.0575	0.0575		0.0575	0.0575		2,711.6458	2,711.6458	0.0863		2,713.8033
Total	**0.9805**	**2.5177**	**6.3588**	**0.0246**		**0.0575**	**0.0575**		**0.0575**	**0.0575**		**2,711.6458**	**2,711.6458**	**0.0863**		**2,713.8033**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2500e-003	0.2502	0.0673	1.0000e-003	4.3225	2.7000e-004	4.3227	0.4361	2.6000e-004	0.4364		105.4571	105.4571	3.1200e-003		105.5350
Worker	0.0109	5.6600e-003	0.1026	6.1000e-004	19.1630	2.0000e-004	19.1632	1.9273	1.9000e-004	1.9275		60.7681	60.7681	4.7000e-004		60.7799
Total	**0.0181**	**0.2559**	**0.1699**	**1.6100e-003**	**23.4854**	**4.7000e-004**	**23.4859**	**2.3634**	**4.5000e-004**	**2.3639**		**166.2252**	**166.2252**	**3.5900e-003**		**166.3149**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9805	2.5177	6.3588	0.0246		0.0575	0.0575		0.0575	0.0575	0.0000	2,711.6458	2,711.6458	0.0863		2,713.8033
Total	**0.9805**	**2.5177**	**6.3588**	**0.0246**		**0.0575**	**0.0575**		**0.0575**	**0.0575**	**0.0000**	**2,711.6458**	**2,711.6458**	**0.0863**		**2,713.8033**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2500e-003	0.2502	0.0673	1.0000e-003	2.6562	2.7000e-004	2.6564	0.2695	2.6000e-004	0.2698		105.4571	105.4571	3.1200e-003		105.5350
Worker	0.0109	5.6600e-003	0.1026	6.1000e-004	11.7674	2.0000e-004	11.7676	1.1877	1.9000e-004	1.1879		60.7681	60.7681	4.7000e-004		60.7799
Total	**0.0181**	**0.2559**	**0.1699**	**1.6100e-003**	**14.4236**	**4.7000e-004**	**14.4240**	**1.4572**	**4.5000e-004**	**1.4577**		**166.2252**	**166.2252**	**3.5900e-003**		**166.3149**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2121	0.0000	0.2121	0.0229	0.0000	0.0229			0.0000			0.0000
Off-Road	2.1698	3.5119	12.1552	0.0557		0.1347	0.1347		0.1347	0.1347		6,328.1709	6,328.1709	0.1904		6,332.9313
Total	**2.1698**	**3.5119**	**12.1552**	**0.0557**	**0.2121**	**0.1347**	**0.3468**	**0.0229**	**0.1347**	**0.1576**		**6,328.1709**	**6,328.1709**	**0.1904**		**6,332.9313**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0127	6.6000e-003	0.1197	7.1000e-004	22.3568	2.4000e-004	22.3570	2.2485	2.2000e-004	2.2487		70.8962	70.8962	5.5000e-004		70.9099
Total	**0.0127**	**6.6000e-003**	**0.1197**	**7.1000e-004**	**22.3568**	**2.4000e-004**	**22.3570**	**2.2485**	**2.2000e-004**	**2.2487**		**70.8962**	**70.8962**	**5.5000e-004**		**70.9099**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0955	0.0000	0.0955	0.0103	0.0000	0.0103			0.0000			0.0000
Off-Road	2.1698	3.5119	12.1552	0.0557		0.1347	0.1347		0.1347	0.1347	0.0000	6,328.1709	6,328.1709	0.1904		6,332.9313
Total	**2.1698**	**3.5119**	**12.1552**	**0.0557**	**0.0955**	**0.1347**	**0.2301**	**0.0103**	**0.1347**	**0.1450**	**0.0000**	**6,328.1709**	**6,328.1709**	**0.1904**		**6,332.9313**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0127	6.6000e-003	0.1197	7.1000e-004	13.7286	2.4000e-004	13.7289	1.3857	2.2000e-004	1.3859		70.8962	70.8962	5.5000e-004		70.9099
Total	**0.0127**	**6.6000e-003**	**0.1197**	**7.1000e-004**	**13.7286**	**2.4000e-004**	**13.7289**	**1.3857**	**2.2000e-004**	**1.3859**		**70.8962**	**70.8962**	**5.5000e-004**		**70.9099**

3.16 Quarry Pit - Fencing and Gates - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1658	0.9691	2.4165	3.9200e-003		0.0104	0.0104		0.0104	0.0104		370.8539	370.8539	0.0144		371.2128
Total	**0.1658**	**0.9691**	**2.4165**	**3.9200e-003**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**0.0104**	**0.0104**		**370.8539**	**370.8539**	**0.0144**		**371.2128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		52.7285	52.7285	1.5600e-003		52.7675
Worker	7.2500e-003	3.7700e-003	0.0684	4.1000e-004	12.7753	1.4000e-004	12.7754	1.2849	1.3000e-004	1.2850		40.5121	40.5121	3.1000e-004		40.5199
Total	**0.0109**	**0.1289**	**0.1021**	**9.1000e-004**	**14.9365**	**2.8000e-004**	**14.9368**	**1.5029**	**2.6000e-004**	**1.5032**		**93.2406**	**93.2406**	**1.8700e-003**		**93.2874**

3.16 Quarry Pit - Fencing and Gates - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1658	0.9691	2.4165	3.9200e-003		0.0104	0.0104		0.0104	0.0104	0.0000	370.8539	370.8539	0.0144		371.2128
Total	**0.1658**	**0.9691**	**2.4165**	**3.9200e-003**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**370.8539**	**370.8539**	**0.0144**		**371.2128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		52.7285	52.7285	1.5600e-003		52.7675
Worker	7.2500e-003	3.7700e-003	0.0684	4.1000e-004	7.8449	1.4000e-004	7.8451	0.7918	1.3000e-004	0.7919		40.5121	40.5121	3.1000e-004		40.5199
Total	**0.0109**	**0.1289**	**0.1021**	**9.1000e-004**	**9.1730**	**2.8000e-004**	**9.1733**	**0.9266**	**2.6000e-004**	**0.9268**		**93.2406**	**93.2406**	**1.8700e-003**		**93.2874**

3.17 Plant Area - Removal of Processing Plant - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5662	12.6524	31.3783	0.1162		0.3072	0.3072		0.3072	0.3072		12,426.3294	12,426.3294	0.4009		12,436.3524
Total	**4.5662**	**12.6524**	**31.3783**	**0.1162**		**0.3072**	**0.3072**		**0.3072**	**0.3072**		**12,426.3294**	**12,426.3294**	**0.4009**		**12,436.3524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1800e-003	0.1193	0.0444	6.5000e-004	2.7622	2.2000e-004	2.7624	0.2783	2.1000e-004	0.2785		69.6268	69.6268	2.5100e-003		69.6895
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0363	0.0189	0.3420	2.0300e-003	63.8765	6.8000e-004	63.8772	6.4243	6.3000e-004	6.4249		202.5605	202.5605	1.5600e-003		202.5996
Total	**0.0441**	**0.2633**	**0.4200**	**3.1800e-003**	**68.8000**	**1.0400e-003**	**68.8010**	**6.9207**	**9.7000e-004**	**6.9216**		**324.9159**	**324.9159**	**5.6300e-003**		**325.0566**

3.17 Plant Area - Removal of Processing Plant - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5662	12.6524	31.3783	0.1162		0.3072	0.3072		0.3072	0.3072	0.0000	12,426.3293	12,426.3293	0.4009		12,436.3524
Total	**4.5662**	**12.6524**	**31.3783**	**0.1162**		**0.3072**	**0.3072**		**0.3072**	**0.3072**	**0.0000**	**12,426.3293**	**12,426.3293**	**0.4009**		**12,436.3524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1800e-003	0.1193	0.0444	6.5000e-004	1.6970	2.2000e-004	1.6972	0.1718	2.1000e-004	0.1720		69.6268	69.6268	2.5100e-003		69.6895
Vendor	3.6200e-003	0.1251	0.0337	5.0000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		52.7285	52.7285	1.5600e-003		52.7675
Worker	0.0363	0.0189	0.3420	2.0300e-003	39.2247	6.8000e-004	39.2253	3.9591	6.3000e-004	3.9597		202.5605	202.5605	1.5600e-003		202.5996
Total	**0.0441**	**0.2633**	**0.4200**	**3.1800e-003**	**42.2498**	**1.0400e-003**	**42.2508**	**4.2656**	**9.7000e-004**	**4.2666**		**324.9159**	**324.9159**	**5.6300e-003**		**325.0566**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.5289	0.0000	13.5289	6.7808	0.0000	6.7808			0.0000			0.0000
Off-Road	4.4223	10.1842	23.3047	0.1056		0.3772	0.3772		0.3772	0.3772		11,808.9926	11,808.9926	0.3859		11,818.6402
Total	**4.4223**	**10.1842**	**23.3047**	**0.1056**	**13.5289**	**0.3772**	**13.9061**	**6.7808**	**0.3772**	**7.1580**		**11,808.9926**	**11,808.9926**	**0.3859**		**11,818.6402**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0181	9.4300e-003	0.1710	1.0100e-003	31.9383	3.4000e-004	31.9386	3.2121	3.1000e-004	3.2125		101.2802	101.2802	7.8000e-004		101.2998
Total	**0.0181**	**9.4300e-003**	**0.1710**	**1.0100e-003**	**31.9383**	**3.4000e-004**	**31.9386**	**3.2121**	**3.1000e-004**	**3.2125**		**101.2802**	**101.2802**	**7.8000e-004**		**101.2998**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0880	0.0000	6.0880	3.0514	0.0000	3.0514			0.0000			0.0000
Off-Road	4.4223	10.1842	23.3047	0.1056		0.3772	0.3772		0.3772	0.3772	0.0000	11,808.9926	11,808.9926	0.3859		11,818.6402
Total	**4.4223**	**10.1842**	**23.3047**	**0.1056**	**6.0880**	**0.3772**	**6.4652**	**3.0514**	**0.3772**	**3.4285**	**0.0000**	**11,808.9926**	**11,808.9926**	**0.3859**		**11,818.6402**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0181	9.4300e-003	0.1710	1.0100e-003	19.6123	3.4000e-004	19.6127	1.9795	3.1000e-004	1.9799		101.2802	101.2802	7.8000e-004		101.2998
Total	**0.0181**	**9.4300e-003**	**0.1710**	**1.0100e-003**	**19.6123**	**3.4000e-004**	**19.6127**	**1.9795**	**3.1000e-004**	**1.9799**		**101.2802**	**101.2802**	**7.8000e-004**		**101.2998**

3.19 Quarry Pit - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323		1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**		**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6300e-003	1.8900e-003	0.0342	2.0000e-004	6.3877	7.0000e-005	6.3877	0.6424	6.0000e-005	0.6425		20.2561	20.2561	1.6000e-004		20.2600
Total	**3.6300e-003**	**1.8900e-003**	**0.0342**	**2.0000e-004**	**6.3877**	**7.0000e-005**	**6.3877**	**0.6424**	**6.0000e-005**	**0.6425**		**20.2561**	**20.2561**	**1.6000e-004**		**20.2600**

3.19 Quarry Pit - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323	0.0000	1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6300e-003	1.8900e-003	0.0342	2.0000e-004	3.9225	7.0000e-005	3.9225	0.3959	6.0000e-005	0.3960		20.2561	20.2561	1.6000e-004		20.2600
Total	**3.6300e-003**	**1.8900e-003**	**0.0342**	**2.0000e-004**	**3.9225**	**7.0000e-005**	**3.9225**	**0.3959**	**6.0000e-005**	**0.3960**		**20.2561**	**20.2561**	**1.6000e-004**		**20.2600**

3.20 Plant Area - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323		1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**		**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6300e-003	1.8900e-003	0.0342	2.0000e-004	6.3877	7.0000e-005	6.3877	0.6424	6.0000e-005	0.6425		20.2561	20.2561	1.6000e-004		20.2600
Total	**3.6300e-003**	**1.8900e-003**	**0.0342**	**2.0000e-004**	**6.3877**	**7.0000e-005**	**6.3877**	**0.6424**	**6.0000e-005**	**0.6425**		**20.2561**	**20.2561**	**1.6000e-004**		**20.2600**

3.20 Plant Area - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323	0.0000	1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6300e-003	1.8900e-003	0.0342	2.0000e-004	3.9225	7.0000e-005	3.9225	0.3959	6.0000e-005	0.3960		20.2561	20.2561	1.6000e-004		20.2600
Total	**3.6300e-003**	**1.8900e-003**	**0.0342**	**2.0000e-004**	**3.9225**	**7.0000e-005**	**3.9225**	**0.3959**	**6.0000e-005**	**0.3960**		**20.2561**	**20.2561**	**1.6000e-004**		**20.2600**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.610901	0.034103	0.184115	0.105098	0.010250	0.004842	0.011067	0.028522	0.001710	0.001425	0.005016	0.002345	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Unmitigated	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**		**0.0443**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**		**0.0443**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Clayton Quarry Reclamation

Contra Costa County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	190.00	User Defined Unit	190.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2050
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Clayton Quarry reclamation per Revised Reclamation Plan.

Land Use - Reclamation plan boundary approximately 190 acres per Spinardi Associates (2020).

Construction Phase - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

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Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Off-road Equipment - See CalEEMod modeling assumptions attachment.

Trips and VMT - See CalEEMod modeling assumptions attachment.

On-road Fugitive Dust - On-site worker and vendor trips assume 90% paved given minimal on-site travel on unpaved roads.

Grading - See CalEEMod modeling assumptions attachment for acreages.

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed areas 2x per day. Unpaved road speed limit 15 mph.

Clayton Quarry Reclamation - Contra Costa County, Winter

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	3,100.00	6.00
tblConstructionPhase	NumDays	3,100.00	10.00
tblConstructionPhase	NumDays	3,100.00	10.00
tblConstructionPhase	NumDays	3,100.00	3.00
tblConstructionPhase	NumDays	200.00	60.00
tblConstructionPhase	NumDays	310.00	10.00
tblConstructionPhase	NumDays	310.00	2.00
tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	15.00
tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	10.00
tblConstructionPhase	NumDays	310.00	15.00
tblConstructionPhase	NumDays	310.00	5.00
tblConstructionPhase	NumDays	310.00	15.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	5.00
tblConstructionPhase	NumDays	120.00	17.00
tblGrading	AcresOfGrading	52.50	21.00
tblGrading	AcresOfGrading	10.00	2.00
tblGrading	AcresOfGrading	2.50	4.00
tblLandUse	LotAcreage	0.00	190.00
tblOffRoadEquipment	HorsePower	158.00	396.00

tblOffRoadEquipment	HorsePower	158.00	239.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	158.00	396.00
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tblOffRoadEquipment	HorsePower	187.00	238.00
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tblOffRoadEquipment	HorsePower	247.00	303.00
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tblOffRoadEquipment	HorsePower	367.00	407.00
tblOffRoadEquipment	HorsePower	367.00	407.00
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tblOffRoadEquipment	HorsePower	158.00	396.00
tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	402.00	515.00

tblOffRoadEquipment	HorsePower	402.00	515.00
tblOffRoadEquipment	HorsePower	203.00	580.00
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tblOffRoadEquipment	LoadFactor	0.56	0.38
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
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tblOffRoadEquipment	PhaseName		Plant Area - Landscape Screening Berm
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tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
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tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	VendorPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00

tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
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tblOnRoadDust	WorkerPercentPave	100.00	90.00
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tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblOnRoadDust	WorkerPercentPave	100.00	90.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
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tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
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tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripNumber	15.00	18.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.8195	37.9692	28.6522	0.0669	28.8031	1.5334	30.3365	5.6045	1.4108	7.0153	0.0000	6,483.4966	6,483.4966	2.0671	0.0000	6,535.1752
2025	2.5822	19.0242	19.1476	0.0683	42.0343	0.6920	42.7262	4.2304	0.6367	4.8670	0.0000	6,649.4516	6,649.4516	2.0196	0.0000	6,699.9403
2049	4.6138	12.9216	31.7560	0.1192	68.8000	0.3775	69.1082	9.9929	0.3775	10.3704	0.0000	12,729.5592	12,729.5592	0.4066	0.0000	12,739.7229
Maximum	**4.6138**	**37.9692**	**31.7560**	**0.1192**	**68.8000**	**1.5334**	**69.1082**	**9.9929**	**1.4108**	**10.3704**	**0.0000**	**12,729.5592**	**12,729.5592**	**2.0671**	**0.0000**	**12,739.7229**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.8195	37.9692	28.6522	0.0669	16.6295	1.5334	18.1629	2.8959	1.4108	4.3067	0.0000	6,483.4966	6,483.4966	2.0671	0.0000	6,535.1752
2025	2.5822	19.0242	19.1476	0.0683	25.8043	0.6920	26.4963	2.6071	0.6367	3.2437	0.0000	6,649.4516	6,649.4516	2.0196	0.0000	6,699.9403
2049	4.6138	12.9216	31.7560	0.1192	42.2498	0.3775	42.5580	5.0309	0.3775	5.4084	0.0000	12,729.5592	12,729.5592	0.4066	0.0000	12,739.7229
Maximum	**4.6138**	**37.9692**	**31.7560**	**0.1192**	**42.2498**	**1.5334**	**42.5580**	**5.0309**	**1.4108**	**5.4084**	**0.0000**	**12,729.5592**	**12,729.5592**	**2.0671**	**0.0000**	**12,739.7229**

Clayton Quarry Reclamation - Contra Costa County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.35**	**0.00**	**38.65**	**46.87**	**0.00**	**41.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**	**0.0000**	**0.0443**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**	**0.0000**	**0.0443**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Clayton Quarry Reclamation - Contra Costa County, Winter

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Overburden Fill Areas - Finish Slopes and Drainage	Grading	5/2/2022	5/13/2022	5	10	Finish grade slopes and finish drainage
2	Plant Area - Landscape Screening Berm	Grading	5/16/2022	5/20/2022	5	5	Install 1500 LF landscape screening berm
3	Overburden Fill Areas - Revegetation	Site Preparation	10/3/2022	10/7/2022	5	5	Hydroseed north and south fill areas
4	Quarry Pit - Contour Final Knoxville Slope	Grading	5/5/2025	5/16/2025	5	10	Contour final Knoxville slopes
5	Quarry Pit - Riprap Knoxville Slope Face	Grading	5/19/2025	6/6/2025	5	15	Riprap Knoxville slope face for erosion protection
6	Quarry Pit - Drainage - East Rim Haul Road	Grading	6/9/2025	6/13/2025	5	5	Grade East Rim road ditch pipe berms
7	Quarry Pit - Drainage - RSP Swales	Grading	6/16/2025	7/4/2025	5	15	Install rock slope protection swales for Knoxville face
8	Quarry Pit - Tree Screen Along East Rim Road	Site Preparation	9/1/2025	9/23/2025	5	17	Install tree screen along east rim access road
9	Quarry Pit - Drainage Outlet Structure at Elev. 735	Building Construction	5/3/2049	5/5/2049	5	3	Install drainage flow control structure for quarry lake at elev. 735
10	Quarry Pit - Jack and Bore (1)	Grading	5/6/2049	5/7/2049	5	2	Excavate J&B receiving pit
11	Quarry Pit - Jack and Bore (2)	Building Construction	5/10/2049	5/17/2049	5	6	J&B sub installs casing pipe
12	Off-Site Drainage - Storm Drain Replacement	Building Construction	5/17/2049	5/28/2049	5	10	Replace storm drain at MC Road an Diablo Downs
13	Quarry Pit - Install Drainage Outlet Pipe to MC Road	Building Construction	5/18/2049	5/31/2049	5	10	Install drainage outlet pipe to Mitchell Canyon Rd
14	Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Grading	6/1/2049	6/7/2049	5	5	Riprap mound at quarry drainage outlet for wave runup protection
15	Quarry Pit - Fencing and Gates	Site Preparation	6/14/2049	6/18/2049	5	5	Install 2500 LF of fencing with gates
16	Plant Area - Removal of Processing Plant	Demolition	6/21/2049	9/10/2049	5	60	Remove processing plant and support structures
17	Plant Area - Contour Grading and Resoiling	Grading	9/13/2049	10/1/2049	5	15	Grade and spread fill soil across plant site area
18	Quarry Pit - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed Knoxville slope faces
19	Plant Area - Revegetation	Site Preparation	10/4/2049	10/8/2049	5	5	Hydroseed graded plant site area

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Overburden Fill Areas - Finish Slopes and Drainage	Off-Highway Trucks	1	8.00	402	0.38
Overburden Fill Areas - Finish Slopes and Drainage	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Landscape Screening Berm	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Landscape Screening Berm	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Landscape Screening Berm	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Landscape Screening Berm	Scrapers	2	8.00	407	0.48
Overburden Fill Areas - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Excavators	1	8.00	396	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Contour Final Knoxville Slope	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Contour Final Knoxville Slope	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Riprap Knoxville Slope Face	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Knoxville Slope Face	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Knoxville Slope Face	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - East Rim Haul Road	Graders	1	8.00	238	0.41
Quarry Pit - Drainage - East Rim Haul Road	Off-Highway Trucks	1	8.00	402	0.38

Quarry Pit - Drainage - East Rim Haul Road	Rubber Tired Loaders	2	8.00	276	0.36
Quarry Pit - Drainage - East Rim Haul Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage - RSP Swales	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage - RSP Swales	Excavators	1	8.00	396	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Drainage - RSP Swales	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage - RSP Swales	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage - RSP Swales	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Tree Screen Along East Rim Road	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Cement and Mortar Mixers	1	3.00	500	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Off-Highway Trucks	1	8.00	402	0.38
Quarry Pit - Drainage Outlet Structure at Elev. 735	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Drainage Outlet Structure at Elev. 735	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Drainage Outlet Structure at Elev. 735	Welders	1	8.00	46	0.45
Quarry Pit - Jack and Bore (1)	Excavators	1	8.00	396	0.38
Quarry Pit - Jack and Bore (1)	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Jack and Bore (2)	Bore/Drill Rigs	1	8.00	221	0.50
Quarry Pit - Jack and Bore (2)	Cranes	1	8.00	231	0.29
Quarry Pit - Jack and Bore (2)	Rubber Tired Loaders	1	8.00	580	0.36
Off-Site Drainage - Storm Drain Replacement	Paving Equipment	1	8.00	132	0.36
Off-Site Drainage - Storm Drain Replacement	Rubber Tired Loaders	1	8.00	276	0.36
Off-Site Drainage - Storm Drain Replacement	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Excavators	1	8.00	396	0.38
Quarry Pit - Install Drainage Outlet Pipe to MC Road	Rubber Tired Loaders	1	8.00	276	0.36

Clayton Quarry Reclamation - Contra Costa County, Winter

Quarry Pit - Install Drainage Outlet Pipe to MC Road	Welders	1	8.00	46	0.45
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Excavators	1	8.00	396	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	8.00	515	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Off-Highway Trucks	1	4.00	402	0.38
Quarry Pit - Riprap Mound at Quarry Drainage Outlet	Rubber Tired Loaders	1	8.00	580	0.36
Quarry Pit - Fencing and Gates	Tractors/Loaders/Backhoes	1	8.00	100	0.37
Plant Area - Removal of Processing Plant	Concrete/Industrial Saws	3	3.00	81	0.73
Plant Area - Removal of Processing Plant	Cranes	1	8.00	275	0.29
Plant Area - Removal of Processing Plant	Excavators	1	8.00	396	0.38
Plant Area - Removal of Processing Plant	Excavators	2	8.00	239	0.38
Plant Area - Removal of Processing Plant	Forklifts	1	8.00	89	0.20
Plant Area - Removal of Processing Plant	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Removal of Processing Plant	Rubber Tired Dozers	1	8.00	303	0.40
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	2	8.00	276	0.36
Plant Area - Removal of Processing Plant	Rubber Tired Loaders	1	8.00	580	0.36
Plant Area - Removal of Processing Plant	Welders	3	8.00	46	0.45
Plant Area - Contour Grading and Resoiling	Graders	1	8.00	238	0.41
Plant Area - Contour Grading and Resoiling	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Contour Grading and Resoiling	Rubber Tired Dozers	2	8.00	303	0.40
Plant Area - Contour Grading and Resoiling	Rubber Tired Loaders	1	8.00	276	0.36
Plant Area - Contour Grading and Resoiling	Scrapers	3	8.00	407	0.48
Quarry Pit - Revegetation	Off-Highway Trucks	1	8.00	402	0.38
Plant Area - Revegetation	Off-Highway Trucks	1	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Overburden Fill Areas - Finish Slopes and Dr	2	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Landscape Screening	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Overburden Fill Areas - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Contour Final Knoxville Slope	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Knoxville Slope Face	4	20.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - East Rim Haul Road	5	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage - RSP Swales	6	18.00	0.00	67.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Tree Screen Along East Ri	1	6.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Drainage Outlet Structure at Flo	5	16.00	2.00	2.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (1)	2	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Jack and Bore (2)	3	16.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Off-Site Drainage - Storm Drain Replace	3	12.00	2.00	4.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Install Drainage Outlet Pipe t	3	12.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Riprap Mound at Quarry Drai	4	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Fencing and Gates	1	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Removal of Processing Plant	16	40.00	2.00	56.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Contour Grading and Recoiling	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Quarry Pit - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Plant Area - Revegetation	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.5602	0.0000	4.5602	0.4924	0.0000	0.4924			0.0000			0.0000
Off-Road	0.6982	5.7412	5.6659	0.0164		0.2389	0.2389		0.2198	0.2198		1,589.5409	1,589.5409	0.5141		1,602.3932
Total	**0.6982**	**5.7412**	**5.6659**	**0.0164**	**4.5602**	**0.2389**	**4.7990**	**0.4924**	**0.2198**	**0.7121**		**1,589.5409**	**1,589.5409**	**0.5141**		**1,602.3932**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0190	0.0129	0.1291	4.2000e-004	9.5815	3.0000e-004	9.5818	0.9636	2.8000e-004	0.9639		42.2119	42.2119	9.0000e-004		42.2344
Total	**0.0190**	**0.0129**	**0.1291**	**4.2000e-004**	**9.5815**	**3.0000e-004**	**9.5818**	**0.9636**	**2.8000e-004**	**0.9639**		**42.2119**	**42.2119**	**9.0000e-004**		**42.2344**

3.2 Overburden Fill Areas - Finish Slopes and Drainage - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0521	0.0000	2.0521	0.2216	0.0000	0.2216			0.0000			0.0000
Off-Road	0.6982	5.7412	5.6659	0.0164		0.2389	0.2389		0.2198	0.2198	0.0000	1,589.5409	1,589.5409	0.5141		1,602.3932
Total	**0.6982**	**5.7412**	**5.6659**	**0.0164**	**2.0521**	**0.2389**	**2.2909**	**0.2216**	**0.2198**	**0.4413**	**0.0000**	**1,589.5409**	**1,589.5409**	**0.5141**		**1,602.3932**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0190	0.0129	0.1291	4.2000e-004	5.8837	3.0000e-004	5.8840	0.5939	2.8000e-004	0.5941		42.2119	42.2119	9.0000e-004		42.2344
Total	**0.0190**	**0.0129**	**0.1291**	**4.2000e-004**	**5.8837**	**3.0000e-004**	**5.8840**	**0.5939**	**2.8000e-004**	**0.5941**		**42.2119**	**42.2119**	**9.0000e-004**		**42.2344**

3.3 Plant Area - Landscape Screening Berm - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.4463	0.0000	6.4463	3.3560	0.0000	3.3560			0.0000			0.0000
Off-Road	3.7751	37.9392	28.3511	0.0659		1.5327	1.5327		1.4101	1.4101		6,385.0023	6,385.0023	2.0650		6,436.6283
Total	**3.7751**	**37.9392**	**28.3511**	**0.0659**	**6.4463**	**1.5327**	**7.9790**	**3.3560**	**1.4101**	**4.7661**		**6,385.0023**	**6,385.0023**	**2.0650**		**6,436.6283**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0443	0.0300	0.3011	9.9000e-004	22.3568	7.0000e-004	22.3575	2.2485	6.5000e-004	2.2492		98.4943	98.4943	2.1000e-003		98.5469
Total	**0.0443**	**0.0300**	**0.3011**	**9.9000e-004**	**22.3568**	**7.0000e-004**	**22.3575**	**2.2485**	**6.5000e-004**	**2.2492**		**98.4943**	**98.4943**	**2.1000e-003**		**98.5469**

3.3 Plant Area - Landscape Screening Berm - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9008	0.0000	2.9008	1.5102	0.0000	1.5102			0.0000			0.0000
Off-Road	3.7751	37.9392	28.3511	0.0659		1.5327	1.5327		1.4101	1.4101	0.0000	6,385.0023	6,385.0023	2.0650		6,436.6283
Total	**3.7751**	**37.9392**	**28.3511**	**0.0659**	**2.9008**	**1.5327**	**4.4336**	**1.5102**	**1.4101**	**2.9203**	**0.0000**	**6,385.0023**	**6,385.0023**	**2.0650**		**6,436.6283**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0443	0.0300	0.3011	9.9000e-004	13.7286	7.0000e-004	13.7293	1.3857	6.5000e-004	1.3863		98.4943	98.4943	2.1000e-003		98.5469
Total	**0.0443**	**0.0300**	**0.3011**	**9.9000e-004**	**13.7286**	**7.0000e-004**	**13.7293**	**1.3857**	**6.5000e-004**	**1.3863**		**98.4943**	**98.4943**	**2.1000e-003**		**98.5469**

3.4 Overburden Fill Areas - Revegetation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5284	4.0137	3.3587	0.0132		0.1460	0.1460		0.1343	0.1343		1,278.9853	1,278.9853	0.4137		1,289.3265
Total	**0.5284**	**4.0137**	**3.3587**	**0.0132**	**0.0000**	**0.1460**	**0.1460**	**0.0000**	**0.1343**	**0.1343**		**1,278.9853**	**1,278.9853**	**0.4137**		**1,289.3265**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0127	8.5700e-003	0.0860	2.8000e-004	6.3877	2.0000e-004	6.3879	0.6424	1.9000e-004	0.6426		28.1412	28.1412	6.0000e-004		28.1563
Total	**0.0127**	**8.5700e-003**	**0.0860**	**2.8000e-004**	**6.3877**	**2.0000e-004**	**6.3879**	**0.6424**	**1.9000e-004**	**0.6426**		**28.1412**	**28.1412**	**6.0000e-004**		**28.1563**

3.4 Overburden Fill Areas - Revegetation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5284	4.0137	3.3587	0.0132		0.1460	0.1460		0.1343	0.1343	0.0000	1,278.9853	1,278.9853	0.4137		1,289.3265
Total	**0.5284**	**4.0137**	**3.3587**	**0.0132**	**0.0000**	**0.1460**	**0.1460**	**0.0000**	**0.1343**	**0.1343**	**0.0000**	**1,278.9853**	**1,278.9853**	**0.4137**		**1,289.3265**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0127	8.5700e-003	0.0860	2.8000e-004	3.9225	2.0000e-004	3.9227	0.3959	1.9000e-004	0.3961		28.1412	28.1412	6.0000e-004		28.1563
Total	**0.0127**	**8.5700e-003**	**0.0860**	**2.8000e-004**	**3.9225**	**2.0000e-004**	**3.9227**	**0.3959**	**1.9000e-004**	**0.3961**		**28.1412**	**28.1412**	**6.0000e-004**		**28.1563**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	2.3768	16.9274	16.3284	0.0608		0.6340	0.6340		0.5833	0.5833		5,884.4624	5,884.4624	1.9032		5,932.0413
Total	**2.3768**	**16.9274**	**16.3284**	**0.0608**	**0.8484**	**0.6340**	**1.4824**	**0.0916**	**0.5833**	**0.6749**		**5,884.4624**	**5,884.4624**	**1.9032**		**5,932.0413**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0366	0.0220	0.2360	8.7000e-004	22.3568	6.7000e-004	22.3575	2.2485	6.1000e-004	2.2491		87.1180	87.1180	1.5200e-003		87.1561
Total	**0.0366**	**0.0220**	**0.2360**	**8.7000e-004**	**22.3568**	**6.7000e-004**	**22.3575**	**2.2485**	**6.1000e-004**	**2.2491**		**87.1180**	**87.1180**	**1.5200e-003**		**87.1561**

3.5 Quarry Pit - Contour Final Knoxville Slope - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	2.3768	16.9274	16.3284	0.0608		0.6340	0.6340		0.5833	0.5833	0.0000	5,884.4624	5,884.4624	1.9032		5,932.0413
Total	**2.3768**	**16.9274**	**16.3284**	**0.0608**	**0.3818**	**0.6340**	**1.0158**	**0.0412**	**0.5833**	**0.6245**	**0.0000**	**5,884.4624**	**5,884.4624**	**1.9032**		**5,932.0413**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0366	0.0220	0.2360	8.7000e-004	13.7286	6.7000e-004	13.7293	1.3857	6.1000e-004	1.3863		87.1180	87.1180	1.5200e-003		87.1561
Total	**0.0366**	**0.0220**	**0.2360**	**8.7000e-004**	**13.7286**	**6.7000e-004**	**13.7293**	**1.3857**	**6.1000e-004**	**1.3863**		**87.1180**	**87.1180**	**1.5200e-003**		**87.1561**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5656	0.0000	0.5656	0.0611	0.0000	0.0611			0.0000			0.0000
Off-Road	2.1381	15.4944	14.7357	0.0542		0.5828	0.5828		0.5362	0.5362		5,244.6247	5,244.6247	1.6962		5,287.0301
Total	**2.1381**	**15.4944**	**14.7357**	**0.0542**	**0.5656**	**0.5828**	**1.1484**	**0.0611**	**0.5362**	**0.5973**		**5,244.6247**	**5,244.6247**	**1.6962**		**5,287.0301**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.4800e-003	0.1442	0.0436	5.1000e-004	2.1612	1.7000e-004	2.1614	0.2181	1.7000e-004	0.2182		53.3787	53.3787	2.0400e-003		53.4297
Worker	0.0522	0.0315	0.3371	1.2500e-003	31.9383	9.5000e-004	31.9392	3.2121	8.8000e-004	3.2130		124.4542	124.4542	2.1800e-003		124.5086
Total	**0.0567**	**0.1757**	**0.3807**	**1.7600e-003**	**34.0995**	**1.1200e-003**	**34.1006**	**3.4302**	**1.0500e-003**	**3.4312**		**177.8329**	**177.8329**	**4.2200e-003**		**177.9383**

3.6 Quarry Pit - Riprap Knoxville Slope Face - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2545	0.0000	0.2545	0.0275	0.0000	0.0275			0.0000			0.0000
Off-Road	2.1381	15.4944	14.7357	0.0542		0.5828	0.5828		0.5362	0.5362	0.0000	5,244.6247	5,244.6247	1.6962		5,287.0301
Total	**2.1381**	**15.4944**	**14.7357**	**0.0542**	**0.2545**	**0.5828**	**0.8373**	**0.0275**	**0.5362**	**0.5637**	**0.0000**	**5,244.6247**	**5,244.6247**	**1.6962**		**5,287.0301**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.4800e-003	0.1442	0.0436	5.1000e-004	1.3281	1.7000e-004	1.3283	0.1348	1.7000e-004	0.1349		53.3787	53.3787	2.0400e-003		53.4297
Worker	0.0522	0.0315	0.3371	1.2500e-003	19.6123	9.5000e-004	19.6133	1.9795	8.8000e-004	1.9804		124.4542	124.4542	2.1800e-003		124.5086
Total	**0.0567**	**0.1757**	**0.3807**	**1.7600e-003**	**20.9404**	**1.1200e-003**	**20.9415**	**2.1143**	**1.0500e-003**	**2.1153**		**177.8329**	**177.8329**	**4.2200e-003**		**177.9383**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	1.6865	13.6630	11.9862	0.0418		0.4838	0.4838		0.4451	0.4451		4,050.1874	4,050.1874	1.3099		4,082.9352
Total	**1.6865**	**13.6630**	**11.9862**	**0.0418**	**0.8484**	**0.4838**	**1.3322**	**0.0916**	**0.4451**	**0.5368**		**4,050.1874**	**4,050.1874**	**1.3099**		**4,082.9352**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0366	0.0220	0.2360	8.7000e-004	22.3568	6.7000e-004	22.3575	2.2485	6.1000e-004	2.2491		87.1180	87.1180	1.5200e-003		87.1561
Total	**0.0366**	**0.0220**	**0.2360**	**8.7000e-004**	**22.3568**	**6.7000e-004**	**22.3575**	**2.2485**	**6.1000e-004**	**2.2491**		**87.1180**	**87.1180**	**1.5200e-003**		**87.1561**

3.7 Quarry Pit - Drainage - East Rim Haul Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	1.6865	13.6630	11.9862	0.0418		0.4838	0.4838		0.4451	0.4451	0.0000	4,050.1874	4,050.1874	1.3099		4,082.9352
Total	**1.6865**	**13.6630**	**11.9862**	**0.0418**	**0.3818**	**0.4838**	**0.8656**	**0.0412**	**0.4451**	**0.4864**	**0.0000**	**4,050.1874**	**4,050.1874**	**1.3099**		**4,082.9352**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0366	0.0220	0.2360	8.7000e-004	13.7286	6.7000e-004	13.7293	1.3857	6.1000e-004	1.3863		87.1180	87.1180	1.5200e-003		87.1561
Total	**0.0366**	**0.0220**	**0.2360**	**8.7000e-004**	**13.7286**	**6.7000e-004**	**13.7293**	**1.3857**	**6.1000e-004**	**1.3863**		**87.1180**	**87.1180**	**1.5200e-003**		**87.1561**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0707	0.0000	0.0707	7.6300e-003	0.0000	7.6300e-003			0.0000			0.0000
Off-Road	2.5131	18.3038	18.6270	0.0640		0.6898	0.6898		0.6346	0.6346		6,195.8602	6,195.8602	2.0039		6,245.9569
Total	**2.5131**	**18.3038**	**18.6270**	**0.0640**	**0.0707**	**0.6898**	**0.7605**	**7.6300e-003**	**0.6346**	**0.6423**		**6,195.8602**	**6,195.8602**	**2.0039**		**6,245.9569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0221	0.6921	0.2172	3.2000e-003	13.2191	1.2900e-003	13.2204	1.3318	1.2400e-003	1.3331		341.5826	341.5826	0.0137		341.9257
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0470	0.0283	0.3034	1.1200e-003	28.7444	8.6000e-004	28.7453	2.8909	7.9000e-004	2.8917		112.0088	112.0088	1.9600e-003		112.0578
Total	**0.0691**	**0.7204**	**0.5206**	**4.3200e-003**	**41.9636**	**2.1500e-003**	**41.9657**	**4.2228**	**2.0300e-003**	**4.2248**		**453.5914**	**453.5914**	**0.0157**		**453.9834**

3.8 Quarry Pit - Drainage - RSP Swales - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0318	0.0000	0.0318	3.4400e-003	0.0000	3.4400e-003			0.0000			0.0000
Off-Road	2.5131	18.3038	18.6270	0.0640		0.6898	0.6898		0.6346	0.6346	0.0000	6,195.8602	6,195.8602	2.0039		6,245.9568
Total	**2.5131**	**18.3038**	**18.6270**	**0.0640**	**0.0318**	**0.6898**	**0.7216**	**3.4400e-003**	**0.6346**	**0.6381**	**0.0000**	**6,195.8602**	**6,195.8602**	**2.0039**		**6,245.9568**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0221	0.6921	0.2172	3.2000e-003	8.1214	1.2900e-003	8.1227	0.8221	1.2400e-003	0.8233		341.5826	341.5826	0.0137		341.9257
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0470	0.0283	0.3034	1.1200e-003	17.6511	8.6000e-004	17.6520	1.7816	7.9000e-004	1.7824		112.0088	112.0088	1.9600e-003		112.0578
Total	**0.0691**	**0.7204**	**0.5206**	**4.3200e-003**	**25.7725**	**2.1500e-003**	**25.7746**	**2.6037**	**2.0300e-003**	**2.6057**		**453.5914**	**453.5914**	**0.0157**		**453.9834**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1362	1.3764	2.2986	3.2200e-003		0.0558	0.0558		0.0513	0.0513		311.3978	311.3978	0.1007		313.9156
Total	**0.1362**	**1.3764**	**2.2986**	**3.2200e-003**	**0.0000**	**0.0558**	**0.0558**	**0.0000**	**0.0513**	**0.0513**		**311.3978**	**311.3978**	**0.1007**		**313.9156**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.4800e-003	0.1442	0.0436	5.1000e-004	2.1612	1.7000e-004	2.1614	0.2181	1.7000e-004	0.2182		53.3787	53.3787	2.0400e-003		53.4297
Worker	0.0157	9.4400e-003	0.1011	3.7000e-004	9.5815	2.9000e-004	9.5818	0.9636	2.6000e-004	0.9639		37.3363	37.3363	6.5000e-004		37.3526
Total	**0.0202**	**0.1537**	**0.1447**	**8.8000e-004**	**11.7427**	**4.6000e-004**	**11.7432**	**1.1817**	**4.3000e-004**	**1.1821**		**90.7149**	**90.7149**	**2.6900e-003**		**90.7823**

3.9 Quarry Pit - Tree Screen Along East Rim Road - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1362	1.3764	2.2986	3.2200e-003		0.0558	0.0558		0.0513	0.0513	0.0000	311.3978	311.3978	0.1007		313.9156
Total	**0.1362**	**1.3764**	**2.2986**	**3.2200e-003**	**0.0000**	**0.0558**	**0.0558**	**0.0000**	**0.0513**	**0.0513**	**0.0000**	**311.3978**	**311.3978**	**0.1007**		**313.9156**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	4.4800e-003	0.1442	0.0436	5.1000e-004	1.3281	1.7000e-004	1.3283	0.1348	1.7000e-004	0.1349		53.3787	53.3787	2.0400e-003		53.4297
Worker	0.0157	9.4400e-003	0.1011	3.7000e-004	5.8837	2.9000e-004	5.8840	0.5939	2.6000e-004	0.5941		37.3363	37.3363	6.5000e-004		37.3526
Total	**0.0202**	**0.1537**	**0.1447**	**8.8000e-004**	**7.2118**	**4.6000e-004**	**7.2123**	**0.7286**	**4.3000e-004**	**0.7291**		**90.7149**	**90.7149**	**2.6900e-003**		**90.7823**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5434	4.1721	10.9391	0.0384		0.0961	0.0961		0.0961	0.0961		4,202.2763	4,202.2763	0.1349		4,205.6493
Total	**1.5434**	**4.1721**	**10.9391**	**0.0384**		**0.0961**	**0.0961**		**0.0961**	**0.0961**		**4,202.2763**	**4,202.2763**	**0.1349**		**4,205.6493**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.0700e-003	0.0863	0.0334	4.6000e-004	1.9730	1.6000e-004	1.9732	0.1988	1.5000e-004	0.1989		48.8903	48.8903	1.8500e-003		48.9367
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0158	9.2100e-003	0.1170	7.3000e-004	25.5506	2.7000e-004	25.5509	2.5697	2.5000e-004	2.5700		73.3427	73.3427	5.4000e-004		73.3563
Total	**0.0227**	**0.2209**	**0.1888**	**1.6800e-003**	**29.6849**	**5.7000e-004**	**29.6854**	**2.9866**	**5.3000e-004**	**2.9871**		**173.6597**	**173.6597**	**4.0600e-003**		**173.7614**

3.10 Quarry Pit - Drainage Outlet Structure at Elev. 735 - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5434	4.1721	10.9391	0.0384		0.0961	0.0961		0.0961	0.0961	0.0000	4,202.2763	4,202.2763	0.1349		4,205.6493
Total	**1.5434**	**4.1721**	**10.9391**	**0.0384**		**0.0961**	**0.0961**		**0.0961**	**0.0961**	**0.0000**	**4,202.2763**	**4,202.2763**	**0.1349**		**4,205.6493**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.0700e-003	0.0863	0.0334	4.6000e-004	1.2122	1.6000e-004	1.2123	0.1227	1.5000e-004	0.1229		48.8903	48.8903	1.8500e-003		48.9367
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0158	9.2100e-003	0.1170	7.3000e-004	15.6899	2.7000e-004	15.6901	1.5836	2.5000e-004	1.5839		73.3427	73.3427	5.4000e-004		73.3563
Total	**0.0227**	**0.2209**	**0.1888**	**1.6800e-003**	**18.2301**	**5.7000e-004**	**18.2307**	**1.8411**	**5.3000e-004**	**1.8416**		**173.6597**	**173.6597**	**4.0600e-003**		**173.7614**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.1909	2.0483	6.8527	0.0317		0.0771	0.0771		0.0771	0.0771		3,601.0917	3,601.0917	0.1040		3,603.6927
Total	**1.1909**	**2.0483**	**6.8527**	**0.0317**	**0.5303**	**0.0771**	**0.6073**	**0.0573**	**0.0771**	**0.1343**		**3,601.0917**	**3,601.0917**	**0.1040**		**3,603.6927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	7.8800e-003	4.6100e-003	0.0585	3.7000e-004	12.7753	1.4000e-004	12.7754	1.2849	1.3000e-004	1.2850		36.6714	36.6714	2.7000e-004		36.6782
Total	**7.8800e-003**	**4.6100e-003**	**0.0585**	**3.7000e-004**	**12.7753**	**1.4000e-004**	**12.7754**	**1.2849**	**1.3000e-004**	**1.2850**		**36.6714**	**36.6714**	**2.7000e-004**		**36.6782**

3.11 Quarry Pit - Jack and Bore (1) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2386	0.0000	0.2386	0.0258	0.0000	0.0258			0.0000			0.0000
Off-Road	1.1909	2.0483	6.8527	0.0317		0.0771	0.0771		0.0771	0.0771	0.0000	3,601.0917	3,601.0917	0.1040		3,603.6927
Total	**1.1909**	**2.0483**	**6.8527**	**0.0317**	**0.2386**	**0.0771**	**0.3157**	**0.0258**	**0.0771**	**0.1028**	**0.0000**	**3,601.0917**	**3,601.0917**	**0.1040**		**3,603.6927**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	7.8800e-003	4.6100e-003	0.0585	3.7000e-004	7.8449	1.4000e-004	7.8451	0.7918	1.3000e-004	0.7919		36.6714	36.6714	2.7000e-004		36.6782
Total	**7.8800e-003**	**4.6100e-003**	**0.0585**	**3.7000e-004**	**7.8449**	**1.4000e-004**	**7.8451**	**0.7918**	**1.3000e-004**	**0.7919**		**36.6714**	**36.6714**	**2.7000e-004**		**36.6782**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1592	2.1886	7.3312	0.0372		0.0827	0.0827		0.0827	0.0827		3,871.8170	3,871.8170	0.1004		3,874.3281
Total	**1.1592**	**2.1886**	**7.3312**	**0.0372**		**0.0827**	**0.0827**		**0.0827**	**0.0827**		**3,871.8170**	**3,871.8170**	**0.1004**		**3,874.3281**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6900e-003	0.2508	0.0768	9.7000e-004	4.3225	2.8000e-004	4.3227	0.4361	2.6000e-004	0.4364		102.8533	102.8533	3.3400e-003		102.9368
Worker	0.0158	9.2100e-003	0.1170	7.3000e-004	25.5506	2.7000e-004	25.5509	2.5697	2.5000e-004	2.5700		73.3427	73.3427	5.4000e-004		73.3563
Total	**0.0235**	**0.2600**	**0.1938**	**1.7000e-003**	**29.8731**	**5.5000e-004**	**29.8736**	**3.0059**	**5.1000e-004**	**3.0064**		**176.1960**	**176.1960**	**3.8800e-003**		**176.2931**

3.12 Quarry Pit - Jack and Bore (2) - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1592	2.1886	7.3312	0.0372		0.0827	0.0827		0.0827	0.0827	0.0000	3,871.8170	3,871.8170	0.1004		3,874.3281
Total	**1.1592**	**2.1886**	**7.3312**	**0.0372**		**0.0827**	**0.0827**		**0.0827**	**0.0827**	**0.0000**	**3,871.8170**	**3,871.8170**	**0.1004**		**3,874.3281**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6900e-003	0.2508	0.0768	9.7000e-004	2.6562	2.8000e-004	2.6565	0.2695	2.6000e-004	0.2698		102.8533	102.8533	3.3400e-003		102.9368
Worker	0.0158	9.2100e-003	0.1170	7.3000e-004	15.6899	2.7000e-004	15.6901	1.5836	2.5000e-004	1.5839		73.3427	73.3427	5.4000e-004		73.3563
Total	**0.0235**	**0.2600**	**0.1938**	**1.7000e-003**	**18.3460**	**5.5000e-004**	**18.3466**	**1.8532**	**5.1000e-004**	**1.8537**		**176.1960**	**176.1960**	**3.8800e-003**		**176.2931**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6618	2.0106	7.0712	0.0177		0.0542	0.0542		0.0542	0.0542		1,843.0455	1,843.0455	0.0575		1,844.4825
Total	**0.6618**	**2.0106**	**7.0712**	**0.0177**		**0.0542**	**0.0542**		**0.0542**	**0.0542**		**1,843.0455**	**1,843.0455**	**0.0575**		**1,844.4825**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.8400e-003	0.0518	0.0200	2.7000e-004	6.9900e-003	1.0000e-004	7.0900e-003	1.9200e-003	9.0000e-005	2.0100e-003		29.3342	29.3342	1.1100e-003		29.3620
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	0.0135	1.4000e-004	0.0137	3.9000e-003	1.3000e-004	4.0300e-003		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0118	6.9100e-003	0.0878	5.5000e-004	0.0986	2.0000e-004	0.0988	0.0262	1.9000e-004	0.0263		55.0070	55.0070	4.1000e-004		55.0172
Total	**0.0175**	**0.1841**	**0.1462**	**1.3100e-003**	**0.1191**	**4.4000e-004**	**0.1196**	**0.0320**	**4.1000e-004**	**0.0324**		**135.7679**	**135.7679**	**3.1900e-003**		**135.8476**

3.13 Off-Site Drainage - Storm Drain Replacement - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6618	2.0106	7.0712	0.0177		0.0542	0.0542		0.0542	0.0542	0.0000	1,843.0455	1,843.0455	0.0575		1,844.4825
Total	**0.6618**	**2.0106**	**7.0712**	**0.0177**		**0.0542**	**0.0542**		**0.0542**	**0.0542**	**0.0000**	**1,843.0455**	**1,843.0455**	**0.0575**		**1,844.4825**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.8400e-003	0.0518	0.0200	2.7000e-004	6.9900e-003	1.0000e-004	7.0900e-003	1.9200e-003	9.0000e-005	2.0100e-003		29.3342	29.3342	1.1100e-003		29.3620
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	0.0135	1.4000e-004	0.0137	3.9000e-003	1.3000e-004	4.0300e-003		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0118	6.9100e-003	0.0878	5.5000e-004	0.0986	2.0000e-004	0.0988	0.0262	1.9000e-004	0.0263		55.0070	55.0070	4.1000e-004		55.0172
Total	**0.0175**	**0.1841**	**0.1462**	**1.3100e-003**	**0.1191**	**4.4000e-004**	**0.1196**	**0.0320**	**4.1000e-004**	**0.0324**		**135.7679**	**135.7679**	**3.1900e-003**		**135.8476**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9805	2.5177	6.3588	0.0246		0.0575	0.0575		0.0575	0.0575		2,711.6458	2,711.6458	0.0863		2,713.8033
Total	**0.9805**	**2.5177**	**6.3588**	**0.0246**		**0.0575**	**0.0575**		**0.0575**	**0.0575**		**2,711.6458**	**2,711.6458**	**0.0863**		**2,713.8033**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6900e-003	0.2508	0.0768	9.7000e-004	4.3225	2.8000e-004	4.3227	0.4361	2.6000e-004	0.4364		102.8533	102.8533	3.3400e-003		102.9368
Worker	0.0118	6.9100e-003	0.0878	5.5000e-004	19.1630	2.0000e-004	19.1632	1.9273	1.9000e-004	1.9275		55.0070	55.0070	4.1000e-004		55.0172
Total	**0.0195**	**0.2577**	**0.1646**	**1.5200e-003**	**23.4854**	**4.8000e-004**	**23.4859**	**2.3634**	**4.5000e-004**	**2.3639**		**157.8603**	**157.8603**	**3.7500e-003**		**157.9540**

3.14 Quarry Pit - Install Drainage Outlet Pipe to MC Road - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9805	2.5177	6.3588	0.0246		0.0575	0.0575		0.0575	0.0575	0.0000	2,711.6458	2,711.6458	0.0863		2,713.8033
Total	**0.9805**	**2.5177**	**6.3588**	**0.0246**		**0.0575**	**0.0575**		**0.0575**	**0.0575**	**0.0000**	**2,711.6458**	**2,711.6458**	**0.0863**		**2,713.8033**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6900e-003	0.2508	0.0768	9.7000e-004	2.6562	2.8000e-004	2.6565	0.2695	2.6000e-004	0.2698		102.8533	102.8533	3.3400e-003		102.9368
Worker	0.0118	6.9100e-003	0.0878	5.5000e-004	11.7674	2.0000e-004	11.7676	1.1877	1.9000e-004	1.1879		55.0070	55.0070	4.1000e-004		55.0172
Total	**0.0195**	**0.2577**	**0.1646**	**1.5200e-003**	**14.4236**	**4.8000e-004**	**14.4241**	**1.4572**	**4.5000e-004**	**1.4577**		**157.8603**	**157.8603**	**3.7500e-003**		**157.9540**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2121	0.0000	0.2121	0.0229	0.0000	0.0229			0.0000			0.0000
Off-Road	2.1698	3.5119	12.1552	0.0557		0.1347	0.1347		0.1347	0.1347		6,328.1709	6,328.1709	0.1904		6,332.9313
Total	**2.1698**	**3.5119**	**12.1552**	**0.0557**	**0.2121**	**0.1347**	**0.3468**	**0.0229**	**0.1347**	**0.1576**		**6,328.1709**	**6,328.1709**	**0.1904**		**6,332.9313**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0138	8.0600e-003	0.1024	6.4000e-004	22.3568	2.4000e-004	22.3570	2.2485	2.2000e-004	2.2487		64.1749	64.1749	4.8000e-004		64.1868
Total	**0.0138**	**8.0600e-003**	**0.1024**	**6.4000e-004**	**22.3568**	**2.4000e-004**	**22.3570**	**2.2485**	**2.2000e-004**	**2.2487**		**64.1749**	**64.1749**	**4.8000e-004**		**64.1868**

3.15 Quarry Pit - Riprap Mound at Quarry Drainage Outlet - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0955	0.0000	0.0955	0.0103	0.0000	0.0103			0.0000			0.0000
Off-Road	2.1698	3.5119	12.1552	0.0557		0.1347	0.1347		0.1347	0.1347	0.0000	6,328.1709	6,328.1709	0.1904		6,332.9313
Total	**2.1698**	**3.5119**	**12.1552**	**0.0557**	**0.0955**	**0.1347**	**0.2301**	**0.0103**	**0.1347**	**0.1450**	**0.0000**	**6,328.1709**	**6,328.1709**	**0.1904**		**6,332.9313**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0138	8.0600e-003	0.1024	6.4000e-004	13.7286	2.4000e-004	13.7289	1.3857	2.2000e-004	1.3859		64.1749	64.1749	4.8000e-004		64.1868
Total	**0.0138**	**8.0600e-003**	**0.1024**	**6.4000e-004**	**13.7286**	**2.4000e-004**	**13.7289**	**1.3857**	**2.2000e-004**	**1.3859**		**64.1749**	**64.1749**	**4.8000e-004**		**64.1868**

3.16 Quarry Pit - Fencing and Gates - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1658	0.9691	2.4165	3.9200e-003		0.0104	0.0104		0.0104	0.0104		370.8539	370.8539	0.0144		371.2128
Total	**0.1658**	**0.9691**	**2.4165**	**3.9200e-003**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**0.0104**	**0.0104**		**370.8539**	**370.8539**	**0.0144**		**371.2128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		51.4266	51.4266	1.6700e-003		51.4684
Worker	7.8800e-003	4.6100e-003	0.0585	3.7000e-004	12.7753	1.4000e-004	12.7754	1.2849	1.3000e-004	1.2850		36.6714	36.6714	2.7000e-004		36.6782
Total	**0.0117**	**0.1300**	**0.0969**	**8.6000e-004**	**14.9365**	**2.8000e-004**	**14.9368**	**1.5029**	**2.6000e-004**	**1.5032**		**88.0980**	**88.0980**	**1.9400e-003**		**88.1466**

3.16 Quarry Pit - Fencing and Gates - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1658	0.9691	2.4165	3.9200e-003		0.0104	0.0104		0.0104	0.0104	0.0000	370.8539	370.8539	0.0144		371.2128
Total	**0.1658**	**0.9691**	**2.4165**	**3.9200e-003**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**0.0104**	**0.0104**	**0.0000**	**370.8539**	**370.8539**	**0.0144**		**371.2128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		51.4266	51.4266	1.6700e-003		51.4684
Worker	7.8800e-003	4.6100e-003	0.0585	3.7000e-004	7.8449	1.4000e-004	7.8451	0.7918	1.3000e-004	0.7919		36.6714	36.6714	2.7000e-004		36.6782
Total	**0.0117**	**0.1300**	**0.0969**	**8.6000e-004**	**9.1730**	**2.8000e-004**	**9.1733**	**0.9266**	**2.6000e-004**	**0.9268**		**88.0980**	**88.0980**	**1.9400e-003**		**88.1466**

3.17 Plant Area - Removal of Processing Plant - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5662	12.6524	31.3783	0.1162		0.3072	0.3072		0.3072	0.3072		12,426.3294	12,426.3294	0.4009		12,436.3524
Total	**4.5662**	**12.6524**	**31.3783**	**0.1162**		**0.3072**	**0.3072**		**0.3072**	**0.3072**		**12,426.3294**	**12,426.3294**	**0.4009**		**12,436.3524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.2900e-003	0.1208	0.0468	6.4000e-004	2.7622	2.2000e-004	2.7624	0.2783	2.1000e-004	0.2785		68.4464	68.4464	2.6000e-003		68.5114
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	2.1612	1.4000e-004	2.1614	0.2181	1.3000e-004	0.2182		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0394	0.0230	0.2925	1.8300e-003	63.8765	6.8000e-004	63.8772	6.4243	6.3000e-004	6.4249		183.3568	183.3568	1.3600e-003		183.3907
Total	**0.0476**	**0.2692**	**0.3777**	**2.9600e-003**	**68.8000**	**1.0400e-003**	**68.8010**	**6.9207**	**9.7000e-004**	**6.9216**		**303.2299**	**303.2299**	**5.6300e-003**		**303.3705**

3.17 Plant Area - Removal of Processing Plant - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5662	12.6524	31.3783	0.1162		0.3072	0.3072		0.3072	0.3072	0.0000	12,426.3293	12,426.3293	0.4009		12,436.3524
Total	**4.5662**	**12.6524**	**31.3783**	**0.1162**		**0.3072**	**0.3072**		**0.3072**	**0.3072**	**0.0000**	**12,426.3293**	**12,426.3293**	**0.4009**		**12,436.3524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.2900e-003	0.1208	0.0468	6.4000e-004	1.6970	2.2000e-004	1.6972	0.1718	2.1000e-004	0.1720		68.4464	68.4464	2.6000e-003		68.5114
Vendor	3.8500e-003	0.1254	0.0384	4.9000e-004	1.3281	1.4000e-004	1.3282	0.1348	1.3000e-004	0.1349		51.4266	51.4266	1.6700e-003		51.4684
Worker	0.0394	0.0230	0.2925	1.8300e-003	39.2247	6.8000e-004	39.2253	3.9591	6.3000e-004	3.9597		183.3568	183.3568	1.3600e-003		183.3907
Total	**0.0476**	**0.2692**	**0.3777**	**2.9600e-003**	**42.2498**	**1.0400e-003**	**42.2508**	**4.2656**	**9.7000e-004**	**4.2666**		**303.2299**	**303.2299**	**5.6300e-003**		**303.3705**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.5289	0.0000	13.5289	6.7808	0.0000	6.7808			0.0000			0.0000
Off-Road	4.4223	10.1842	23.3047	0.1056		0.3772	0.3772		0.3772	0.3772		11,808.9926	11,808.9926	0.3859		11,818.6402
Total	**4.4223**	**10.1842**	**23.3047**	**0.1056**	**13.5289**	**0.3772**	**13.9061**	**6.7808**	**0.3772**	**7.1580**		**11,808.9926**	**11,808.9926**	**0.3859**		**11,818.6402**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0197	0.0115	0.1463	9.2000e-004	31.9383	3.4000e-004	31.9386	3.2121	3.1000e-004	3.2125		91.6784	91.6784	6.8000e-004		91.6954
Total	**0.0197**	**0.0115**	**0.1463**	**9.2000e-004**	**31.9383**	**3.4000e-004**	**31.9386**	**3.2121**	**3.1000e-004**	**3.2125**		**91.6784**	**91.6784**	**6.8000e-004**		**91.6954**

3.18 Plant Area - Contour Grading and Resoiling - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0880	0.0000	6.0880	3.0514	0.0000	3.0514			0.0000			0.0000
Off-Road	4.4223	10.1842	23.3047	0.1056		0.3772	0.3772		0.3772	0.3772	0.0000	11,808.9926	11,808.9926	0.3859		11,818.6402
Total	**4.4223**	**10.1842**	**23.3047**	**0.1056**	**6.0880**	**0.3772**	**6.4652**	**3.0514**	**0.3772**	**3.4285**	**0.0000**	**11,808.9926**	**11,808.9926**	**0.3859**		**11,818.6402**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0197	0.0115	0.1463	9.2000e-004	19.6123	3.4000e-004	19.6127	1.9795	3.1000e-004	1.9799		91.6784	91.6784	6.8000e-004		91.6954
Total	**0.0197**	**0.0115**	**0.1463**	**9.2000e-004**	**19.6123**	**3.4000e-004**	**19.6127**	**1.9795**	**3.1000e-004**	**1.9799**		**91.6784**	**91.6784**	**6.8000e-004**		**91.6954**

3.19 Quarry Pit - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323		1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**		**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9400e-003	2.3000e-003	0.0293	1.8000e-004	6.3877	7.0000e-005	6.3877	0.6424	6.0000e-005	0.6425		18.3357	18.3357	1.4000e-004		18.3391
Total	**3.9400e-003**	**2.3000e-003**	**0.0293**	**1.8000e-004**	**6.3877**	**7.0000e-005**	**6.3877**	**0.6424**	**6.0000e-005**	**0.6425**		**18.3357**	**18.3357**	**1.4000e-004**		**18.3391**

3.19 Quarry Pit - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323	0.0000	1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9400e-003	2.3000e-003	0.0293	1.8000e-004	3.9225	7.0000e-005	3.9225	0.3959	6.0000e-005	0.3960		18.3357	18.3357	1.4000e-004		18.3391
Total	**3.9400e-003**	**2.3000e-003**	**0.0293**	**1.8000e-004**	**3.9225**	**7.0000e-005**	**3.9225**	**0.3959**	**6.0000e-005**	**0.3960**		**18.3357**	**18.3357**	**1.4000e-004**		**18.3391**

3.20 Plant Area - Revegetation - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323		1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**		**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9400e-003	2.3000e-003	0.0293	1.8000e-004	6.3877	7.0000e-005	6.3877	0.6424	6.0000e-005	0.6425		18.3357	18.3357	1.4000e-004		18.3391
Total	**3.9400e-003**	**2.3000e-003**	**0.0293**	**1.8000e-004**	**6.3877**	**7.0000e-005**	**6.3877**	**0.6424**	**6.0000e-005**	**0.6425**		**18.3357**	**18.3357**	**1.4000e-004**		**18.3391**

3.20 Plant Area - Revegetation - 2049

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5496	0.8217	2.9771	0.0135		0.0323	0.0323		0.0323	0.0323	0.0000	1,531.1255	1,531.1255	0.0485		1,532.3379
Total	**0.5496**	**0.8217**	**2.9771**	**0.0135**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**1,531.1255**	**1,531.1255**	**0.0485**		**1,532.3379**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.9400e-003	2.3000e-003	0.0293	1.8000e-004	3.9225	7.0000e-005	3.9225	0.3959	6.0000e-005	0.3960		18.3357	18.3357	1.4000e-004		18.3391
Total	**3.9400e-003**	**2.3000e-003**	**0.0293**	**1.8000e-004**	**3.9225**	**7.0000e-005**	**3.9225**	**0.3959**	**6.0000e-005**	**0.3960**		**18.3357**	**18.3357**	**1.4000e-004**		**18.3391**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.610901	0.034103	0.184115	0.105098	0.010250	0.004842	0.011067	0.028522	0.001710	0.001425	0.005016	0.002345	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Unmitigated	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**		**0.0443**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7600e-003	1.7000e-004	0.0193	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0416	0.0416	1.1000e-004		0.0443
Total	**1.7600e-003**	**1.7000e-004**	**0.0193**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0416**	**0.0416**	**1.1000e-004**		**0.0443**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX D-2

PUBLIC HEALTH RISK ASSESSMENT OF SITE RECLAMATION

CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC.

CLAYTON QUARRY RECLAMATION PLAN AMENDMENT

PUBLIC HEALTH RISK ASSESSMENT OF SITE RECLAMATION

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COMPASS LAND GROUP

SEPTEMBER 2020

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Project Description 1

1.2 Scope of the Risk Assessment 4

1.3 Toxic Air Contaminants and Fine Particulate Matter 4

1.3.1 Toxic Air Contaminants 4

1.3.2 Fine Particulate Matter 5

1.3.3 Impacted Communities – Project Site Not Included 6

1.4 Report Organization 6

2.0 SIGNIFICANCE CRITERIA 6

3.0 EMISSIONS SUMMARY 7

4.0 METHODS FOR EVALUATING EXPOSURE 8

4.1 Model Setup and Options 9

4.2 Modeling Grid 9

4.3 Meteorological Data 9

5.0 RISK ANALYSIS 11

5.1 Project Risk Analysis 11

5.2 Project Annual Average PM2.5 Concentrations 12

5.3 Cumulative Impacts Resulting from TAC and PM2.5 Emissions 12

6.0 RESULTS AND CONCLUSIONS 13

7.0 REFERENCES 15

TABLES

Table 1 Anticipated Reclamation Schedule and Duration 3

Table 2 Model Selection and Parameters 10

Table 3 Summary of Project Health Risks 13

FIGURES

Figure 1 Project Location and Site Map

Figure 2 Modeling Grid

Figure 3 Distribution of Winds

Figure 4 Spatial Distribution of 30 Year Residential Cancer Risk
Figure 5 Location of Maximum Residential Cancer Risk
Figure 6 Spatial Distribution of Acute Hazard Index
Figure 7 Spatial Distribution of Worker Cancer Risk

APPENDICES

Appendix A Modeling Emissions Inputs
Appendix B Soils Analysis Laboratory Results
Appendix C HARP Model Excerpts
Appendix D HARP Model Risk Tables
Appendix E Annual PM2.5 Emissions Modeling

1.0 INTRODUCTION

Compass Land Group ("Compass") has prepared this Public Health Risk Assessment of Site Reclamation ("HRA") in support of the CEMEX Construction Materials Pacific, LLC. ("CEMEX") Clayton Quarry Reclamation Plan Amendment Project in unincorporated Contra Costa County, California ("Project"). This HRA evaluates the potential air quality related public health risks associated with the proposed Project's reclamation activities. Public health risks are compared against significance thresholds adopted by the Bay Area Air Quality Management District ("BAAQMD"). This HRA is intended to support the lead agency's evaluation of air quality related public health impacts pursuant to the California Environmental Quality Act ("CEQA").

The sections that follow provide a description of the Project, scope of the risk assessment, BAAQMD significance thresholds, exposure assessment, and risk analysis for use in Project CEQA review.

1.1 Project Description

Project Overview

CEMEX owns and operates the Clayton Quarry, a ±190-acre hardrock mining facility located south of the cities of Clayton and Concord, at 515 Mitchell Canyon Road in unincorporated Contra Costa County. CEMEX and its predecessors-in-interest have been continuously mining at Clayton Quarry since 1947. In addition to mining and reclamation, existing permitted and accessory uses at the Clayton Quarry include aggregate processing, stockpiling, load-out, sales, construction materials recycling, and equipment storage and maintenance. CEMEX's mining operations at the site are vested per the mining activities occurring since 1947, the California Surface Mining and Reclamation Act ("SMARA") and County Land Use Permit ("LUP") #363-67 (confirmed by the County in 1983). Surface mining reclamation activities at the site are currently conducted pursuant to Reclamation Plan LUP #2054-81, approved in 1983 ("1983 Reclamation Plan").

Under the proposed Project, CEMEX proposes an amendment to its 1983 Reclamation Plan through adoption of a Revised Reclamation Plan. The Project includes amendments to CEMEX's existing land use entitlements, LUP #363-67 (operating entitlement) and LUP #2054-81 (Reclamation Plan entitlement), to the extent needed to conform their conditions of approval to the Revised Reclamation Plan.

The Revised Reclamation Plan provides for updated final grading contours, a post-mining land use of open space that will provide for a future quarry lake, a final drainage plan for the quarry and plant site, an updated revegetation plan, and current State reclamation standards to be achieved during reclamation.

More specifically, the Revised Reclamation Plan provides for:

- Reclamation over an anticipated period of 50 years to a post-mining land use of open space;

- Reduction of the surface mining disturbance footprint that leaves the east rim of the quarry intact, providing visual buffer between the quarry and view sheds to the east;
- Permanent overburden fill areas;
- Final grading contours reflecting a maximum depth of excavation at elevation 110' msl with finish slope angles that achieve adequate factors of safety;
- A final drainage plan that provides for the quarry pit to slowly fill with stormwater following reclamation to form a quarry lake with a controlled outflow that conveys stormwater to natural drainage courses and man-made drainage facilities;
- Revegetation of the quarry east rim, overburden fill areas and processing plant site to a combination of chaparral and grassland habitats that feature California native seed mixes;
- Elimination of requirements to backfill, grade, and compact the quarry floor and benches, given that the planned open space end use will provide for a future quarry lake;
- Clarification of pre-1976 (pre-SMARA) disturbance areas, including any areas disturbed outside the boundaries of the 1983 Reclamation Plan;
- Removal of facilities, structures and equipment associated with mining; and
- Current State reclamation standards to be achieved during reclamation.

In addition, and in response to stakeholder input, CEMEX has incorporated into the Revised Reclamation Plan a new landscape screening berm between the existing processing plant site and residential communities to the north.

The Project is a modification of an approved reclamation plan project for a vested mining operation. Except as described above, CEMEX proposes no change to any fundamental element of the existing operation (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation). While providing for an increased depth of mining, the final quarry basin configuration proposed under the Revised Reclamation Plan will actually disturb less surface acreage than allowed under the 1983 Reclamation Plan. A more complete description of the proposed Project is contained in CEMEX's Project Description, Revised Reclamation Plan, and other application materials provided to the County.

Project Reclamation Schedule

An estimated time schedule for Project reclamation construction activity is provided in Table 1, Anticipated Reclamation Schedule and Duration. This anticipated sequence and schedule is dependent upon many factors such as securing regulatory entitlements, fluctuations in market demands, and need for specific aggregate products.

The detailed locations for Project reclamation activities are included in the Revised Reclamation Plan and its supporting figures and design sheets submitted to Contra Costa County as part of the application.

TABLE 1
ANTICIPATED RECLAMATION SCHEDULE AND DURATION

Area	Reclamation Year	Reclamation Duration
1. Overburden Fill Areas		
a. Finish slopes and drainage	2022	~2 weeks
b. Revegetation	2022	~1 week
2. Quarry Pit Area		
a. Contour final Knoxville slopes	2025	~2 weeks
b. Rip-rap on Knoxville slope faces	2025	~3 weeks
c. Drainage for east rim haul road	2025	~1 week
d. Drainage rock slope protection	2025	~3 weeks
e. Tree screen along east rim access road	2025	~3 weeks
f. Drainage outlet structure and pipeline	2068	~5 weeks
g. Fencing and gates	2068	~1 week
h. Revegetation (hydroseed)	2068	~1 week
3. Off-Site Drainage Improvement Area		
a. Storm drain replacement at Mitchell Canyon Rd. and Diablo Downs	2068	~2 weeks
4. Processing Plant Area		
a. Landscape screening berm	2022	~1 week
b. Processing plant removal	2068	~3 months
a. Contour grading and resoiling	2068	~3 weeks
b. Revegetation (hydroseed)	2068	~1 week

Notes:

1. Anticipated progression is approximate only. Actual timelines will vary depending on market and geologic conditions and quarry production. The reclamation schedule is based on an anticipated average production of 500,000 tons per year from the quarry.

Project Activities Associated with Public Health Risks

As described above, reclamation would occur in four areas (see Figure 1):

1. Overburden Fill Areas
2. Quarry Pit Area
3. Off-Site Drainage Improvement Area
4. Processing Plant Area

Reclamation would occur in phases and sporadically over a period of approximately 46 years (2022 to 2068) as mining and overburden fill placements are completed in each area. During the reclamation period various activities such as grading, excavation, erosion protection, pipeline installation, and revegetation would take place. Each of these activities has the potential to release fugitive dust as well as exhaust from construction equipment, but in limited time-frames and duration. Exposure to equipment exhaust and fugitive dust can lead to various health impacts. Specifically, the following three types of public health impacts are commonly associated with exposure to trace metals in dust and diesel particulate matter:

1. Cancer risk (reported as a probability)
2. Acute non-cancer risk (reported as a hazard index)
3. Chronic non-cancer risk (reported as a hazard index)

These potential health impacts are more thoroughly described in Section 1.3, below. The objective of this HRA is to determine whether the Project is likely to expose nearby residents or workers to significant health risks that exceed applicable thresholds. The criteria used to determine if health risks are significant is discussed in Section 2.0, below.

1.2 Scope of the Risk Assessment

The preparation of health risk assessments is a three-step process. The first step is to identify potential contaminants that may contribute to public health risks. The second step is to assess the amount of contaminants that may reach the public (exposure assessment). The third and last step is to calculate the magnitude of the health risk as a result of exposure to harmful contaminants on the basis of the toxicology of the contaminants.

As part of this risk assessment, Compass conducted site-specific soil sampling to inform trace metal concentrations for use in the Project health risk modeling, as discussed in Section 3.0 below. The modeling parameters used in this study are described in Section 4.0 below.

1.3 Toxic Air Contaminants and Fine Particulate Matter

The following discussion of toxic air contaminants and fine particulate matter is sourced from the May 2017 *California Environmental Quality Act Air Quality Guidelines* issued by BAAQMD ("BAAQMD CEQA Guidelines") to provide information and background on the primary constituents contributing to the Project health risks that are evaluated in this report.

1.3.1 Toxic Air Contaminants

Toxic air contaminants ("TACs") are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A wide range of sources, from industrial plants to motor vehicles, emit TACs. TACs can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. This report will focus on direct TAC emissions that would be associated with Project reclamation activities, not those formed in the atmosphere.

The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure. Non-carcinogenic substances differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to non-carcinogens is expressed as a hazard index ("HI"), which is the ratio of expected exposure levels to an acceptable reference exposure level.

TACs are primarily regulated through State and local risk management programs. These programs are designed to eliminate, avoid, or minimize the risk of adverse health effects from exposures to TACs. A chemical becomes a regulated TAC in California based on designation by the Office of Environmental Health Hazard Assessment ("OEHHA"). As part of its jurisdiction under the Air Toxics Hot Spots Program (Health and Safety Code Section 44360(b)(2)), OEHHA derives cancer potencies and reference exposure levels ("RELs") for individual air contaminants based on the current scientific knowledge that includes consideration of possible differential effects on the health of infants, children and other sensitive subpopulations, in accordance with California Health and Safety Code Sections 39669.5 et seq.

1.3.2 Fine Particulate Matter

$PM_{2.5}$ is a fine particulate matter with a diameter equal to or less than 2.5 micrometers. $PM_{2.5}$ is a complex mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and wood smoke. $PM_{2.5}$ can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. This report will focus on direct $PM_{2.5}$ emissions that would be associated with Project reclamation activities, not those formed in the atmosphere.

Compelling evidence suggests that $PM_{2.5}$ is the most harmful air pollutant in the San Francisco Bay Area Air Basin ("SFBAAB") in terms of the associated impact on public health (BAAQMD 2017). A large body of scientific evidence indicates that both long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects (e.g., aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardio-vascular symptoms, and contributing to heart attacks and deaths). BAAQMD recommends characterizing potential health effects from exposure to direct $PM_{2.5}$ emissions through comparison to the applicable thresholds of significance. These thresholds are presented in Section 2.0, below.

1.3.3 Impacted Communities – Project Site Not Included

In the Bay Area, there are a number of urban or industrialized communities where the exposure to TACs is relatively high in comparison to others. These same communities are often faced with other environmental and socio-economic hardships that further stress their residents and result in poor health outcomes. To address community risk from air toxics, BAAQMD initiated the Community Air Risk Evaluation ("CARE") program in 2004 to identify locations with high levels of risk from TACs co-located with sensitive populations and use the information to help focus mitigation measures. Through the CARE program, BAAQMD developed an inventory of TAC emissions for 2005 and compiled demographic and heath indicator data. According to the findings of the CARE Program, diesel particulate matter, mostly from on and off-road mobile sources, accounts for over 80 percent of the inhalation cancer risk from TACs in the Bay Area. Impacted communities as of November 2009 include the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose. The Project site is not located in one of these impacted communities.

1.4 Report Organization

This report is divided into seven sections along with supporting figures and appendices. Following this introduction, Section 2.0 describes the applicable significance criteria that the lead agency may use for the evaluation of Project health risks pursuant to CEQA. Section 3.0 discusses the peak hourly and annual averaged emissions and site-specific soil constituents associated with the Project. Section 4.0 describes the methods used for the exposure assessment, including the data and tools used to determine the dispersion pattern of emissions from the Project. This analysis considers the location of nearby homes, local wind patterns and topography. Section 5.0 describes the results of the Project risk assessment. Section 6.0 summarizes the results and the risk assessment findings relative to applicable thresholds of significance. Section 7.0 provides technical references. Technical data and calculations are provided in figures and appendices.

2.0 SIGNIFICANCE CRITERIA

This section describes the criteria that are used in this report to assess the significance of public health risks. These criteria are based on the May 2017 *California Environmental Quality Act Air Quality Guidelines* issued by BAAQMD ("BAAQMD CEQA Guidelines"). The BAAQMD CEQA Guidelines inform the public and lead agencies of the extent of airborne emissions from stationary sources and the potential public health impacts associated with such emissions.

To assist lead agencies in evaluating air quality impacts at the neighborhood scale, BAAQMD recommends thresholds of significance for local community risks and hazards associated with TACs and $PM_{2.5}$ with respect to siting a new source and/or receptor; as well as for assessing both individual source and cumulative multiple source impacts. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. If emissions of TACs or $PM_{2.5}$ exceed any of the thresholds of significance listed below, a proposed project would result in a significant impact:

1. Non-compliance with a qualified risk reduction plan; or
2. An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 would be a cumulatively considerable contribution; or
3. An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ would be a cumulatively considerable contribution.

A project would have a cumulatively considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000 foot radius from the fence line of a source plus the contribution from the project, exceeds the following:

1. Non-compliance with a qualified risk reduction plan; or
2. An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
3. 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.

These thresholds for local risks and hazards associated with TACs and $PM_{2.5}$ are intended to apply to both permitted stationary sources and on- and off-road mobile sources, such as sources related to construction, busy roadways, or freight movement. While the Project does not introduce a new stationary source, the modeled Project health risks involve on- and off-road mobile sources that can be compared to the BAAQMD thresholds for purposes of CEQA analysis.

3.0 EMISSIONS SUMMARY

Project reclamation activities would release a variety of TACs, such as diesel particulate matter ("DPM") and fugitive dust containing trace metals and respirable silica for brief periods of construction-related work. These are not prolonged exposures lasting many years.

A summary of emissions is presented in Appendix A, Modeling Emissions Inputs. DPM emissions are based on the number, type and duration of usage of construction equipment. Table 1 in Appendix A presents a breakdown of DPM by year and annual average DPM emissions. These emissions were sourced from the Project *Air and Greenhouse Gas Emissions Study* (Compass, July 2020), which relied primarily on the CalEEMod model to quantify emissions associated with reclamation activities. Project reclamation activities were modeled as independent phases in CalEEMod for each of the primary reclamation areas. The phases were then combined as appropriate to calculate total Project emissions. Compass' *Air and Greenhouse Gas Emissions Study* was peer-reviewed by Rincon Consultants, Inc. in February 2020 on behalf of the County and determined to be acceptable for use in the CEQA process.

Site-specific soil samples were collected at each of the three primary reclamation areas (i.e., overburden fill areas, quarry pit area, and processing plant area) to inform emission rates for respirable silica and trace metals. The sampling conducted for the processing plant area includes a sample in proximity to the off-site storm drainage improvement that would be associated with

final reclamation. No heavy metals or toxic compounds have been stored in the overburden or quarry pit areas. The same is true for the processing plant area, except for fuels, oils and lubricants that are used for heavy equipment fueling and maintenance and aggregate processing operations.

To identify trace concentrations of metals and respirable silica in soils, three soil samples were collected for each of the three primary reclamation areas for a total of nine samples. Soil samples were conducted in accordance with the EPA operating procedures for soil sampling (i.e., SESDPROC-300-R3, adopted August 21, 2014) and field equipment cleaning and decontamination (i.e., SESDPROC-205-R3, adopted December 18, 2015). Samples were delivered with chain of custody to McCampbell Analytical, Inc. for analysis on July 29, 2020. Samples were analyzed by McCampbell to determine the respirable fraction of silica and trace metals concentrations. McCampbell's laboratory reports are included in Appendix B, Soils Analysis Laboratory Results.

Laboratory results were averaged for each reclamation area to determine annual and daily emission rates. This data along with annual and daily emission rates of PM_{10} were used to quantify annual and hourly emission rates of respirable silica and trace metals. These calculations are provided in Tables 2 through 5 of Appendix A.

The emission rate for respirable silica used in this study is calculated by multiplying the respirable silica percentage (based on the site-specific soil samples) by the PM_{10} emissions rate. The respirable silica percentage is calculated by multiplying the laboratory reported percentage weight of silica quartz in a bulk sample by a factor of 0.44 (44%) to account for the estimated respirable fraction. The respirable factor of 0.44 is based on an aggregate industry study titled, *PM4 Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California* (Richards et al., November 2009), published in the Journal of the Air & Waste Management Association, Vol. 59, which found that the concentration of crystalline silica in respirable PM averaged 44% of the crystalline silica content of the bulk mineral.

The annual emission rate of metals in pounds is calculated by multiplying the laboratory reported average concentration for each metal (in mg/Kg, aka parts per million by weight) by the annual PM_{10} emission rate (in pounds per year) and then dividing by 1,000,000 (see Table 4 of Appendix A). The hourly emission rate of metals in pounds is calculated by multiplying the laboratory reported average concentration for each metal (in mg/Kg or ppm) by the maximum daily PM_{10} emission rate (in pounds per day) and then dividing by 1,000,000, and then dividing again by 8 to convert from pounds per day to pounds per hour.

4.0 METHODS FOR EVALUATING EXPOSURE

Exposure assessment involves translating the emission rate (e.g., lbs/hr) of individual TACs (presented in Tables 1 to 5 of Appendix A) into a concentration (e.g., grams/cubic meter or parts per million) of each TAC. The key step in performing an exposure assessment is the application of an air dispersion model. In general, air dispersion modeling of pollutant emissions is used to estimate ground level concentrations at downwind receptors, which are distributed in a grid pattern of sufficient size and density to capture the maximum concentration. The dispersion

model incorporates the local meteorological data (wind speed, wind direction, local temperature, inversion heights, etc.), emissions release height, and terrain characteristics into the concentration of individual air contaminant.

Dispersion modeling was performed using the latest version of the AERMOD Modeling System version 19121. AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. AERMOD, like most dispersion models, uses mathematical formulations to characterize the atmospheric processes that disperse pollutants emitted by a source. Using source emission rates, exhaust parameters, terrain characteristics, and meteorological inputs, AERMOD calculates down-wind pollutant concentrations at specified receptor locations. AERMOD is recommended by both the U.S. EPA and BAAQMD for stationary source air dispersion modeling.

4.1 Model Setup and Options

The EPA and BAAQMD recommended AERMOD dispersion model was employed for the exposure assessment. Model selection parameters are summarized in Table 2, below.

4.2 Modeling Grid

The modeling grid used to report the Project's distribution of health risk covers an area 2,950 meters x 2,950 meters with a 50-meter spacing, for a total of 3,600 receptors (see Figure 2, Modeling Grid). Fenceline receptors were added at the plant boundary with 25-meter spacing, providing higher resolution of modeling outputs at receptors neighboring the site, for an additional 868 receptors. Six discrete receptors were also located at nearby schools (Mt. Diablo Elementary School and Pine Hollow Middle School), day care centers (Clayton Children's Center, Clayton Community School, and Sho Sho Day Care) and medical center (John Muir Medical Center). Although protection of these sensitive receptors is already incorporated into OEHHA's risk assessment methodology for both cancer risk and noncancer risk assessment, the assessment of risk at these specific location may be useful to assure the public that such individuals have been considered in the analysis.

4.3 Meteorological Data

Clayton Quarry site is located on the eastern slope of a topographic high point referred to as Mt. Zion, and north of Mt. Diablo, in an area characterized by complex and elevated terrain. The current floor of the quarry is at an elevation of approximately 520 feet above mean sea level (ft msl). The rim of the existing quarry varies from a minimum elevation of 755 ft msl, where the haul road enters the east side of the quarry, to approximately 1,500 ft msl at the top of the high wall on the west side of the quarry. The peak elevation of Mt. Zion is approximately 1,635 ft msl. The peak elevation of the neighboring Mt. Diablo to the south is approximately 3,848 ft msl.

TABLE 2
MODEL SELECTION AND PARAMETERS

Category	Selection / Parameter	Notes
Model Selection	AERMOD Version 19121	BAAQMD-approved, industry standard.
Pollutants Modeled	1. Toxic metals in fugitive dust 2. Diesel particulate matter (DPM) 3. Respirable silica	Annual and 1-Hour concentrations were calculated at each receptor.
Control Pathway	1. Regulatory default options used 2. Averaging time options: 1-hour and Period 3. Terrain selection: elevated.	BAAQMD-approved, industry standard.
Source Pathway	1. Diesel fueled construction equipment and fugitive dust emissions from earthmoving, material handling, excavation, reclamation installations, etc. 2. Emissions are modeled as elevated (5-meter height) polygonal area sources for each of the four reclamation areas, by source group. 3. For TACs, a unit emission rate (1 gram/sec) is assigned to each of the area sources. Scaling of emissions for purposes of calculating health risks is done in the HARP model. 4. For $PM_{2.5}$ concentration modeling, the annual emission rates of $PM_{2.5}$ are divided by the area for each source and results are input into AERMOD in terms of grams/square meter per second. See detailed calculation in Appendix E.	Emission rates of DPM and fugitive dust were determined using the CalEEMod model. The emission rates of metals were calculated from the metal composition of fugitive dust based on site specific soil sampling. Three samples were collected from each of the three primary reclamation areas, for a total of nine samples. The processing plant area includes a sample that is representative of the storm drain improvement area.
Receptor Pathway / Modeling Grid	1. Uniform cartesian grid: 2,950 meters x 2,950 meters with a 50-meter spacing. 2. Fenceline receptors established with 25-meter spacing. 3. Sensitive receptors include nearby residences, schools, day care centers, and medical center.	See Figure 2. Total of 3,600 cartesian grid receptors, 868 fenceline (plant boundary) receptors, and 6 discrete sensitive receptors.
Meteorological Pathway	1. 5 years of surface and upper air data for the period 2015 to 2019.	Site-specific meteorological data was developed using the MM5 model with the assistance of Lakes Environmental.

The nearest meteorological station is in the City of Concord (Buchanan Field) approximately six miles west of the Project site. Given the complex terrain around the Project site, meteorological station data from Buchanan Field would not be representative for use in this exposure assessment. Therefore, the MM5 model (5th generation mesoscale model) developed by National Center for Atmospheric Research ("NCAR") was used to generate site-specific meteorological data. MM5 is a prognostic meteorological model for a specified location and domain, and was processed by Lakes Environmental to provide surface and upper air data for the Project site. The pseudo meteorological station parameters were assigned an anemometer height of 14 meters with a station base elevation of 192 meters, with an upper air adjustment of +8 hours. MM5 model outputs were formatted for input into AERMET, which is the meteorological preprocessor for the AERMOD model.

Five years of meteorological data were used in the exposure assessment, with MM5-generated surface air data for the period January 1, 2015 to December 31, 2019. Figure 3, Distribution of Winds, shows the overall wind patterns based on the five years of hourly wind data. This figure shows that the winds are predominantly from the west-southwest with an average annual speed of 7.3 knots. Calm winds occur approximately 2% of the time. In addition to surface meteorological data, hourly inversion height data were also required. The MM5-generated upper air data were used to develop hourly inversion heights.

5.0 RISK ANALYSIS

Health risks from public exposure to various TACs are discussed in this section. The emission rates of various TACs referenced in Section 3.0 are used as a basis to quantify various health risks. The latest version of the Hotspots Analysis and Reporting Program Air Dispersion Modeling and Risk Tool ("HARP2"), dated May 1, 2019, developed by the CARB and OEHHA[1], was used to calculate Project health risks. As described in Section 1.0, three types of health risks were calculated (cancer, chronic non-cancer and acute non-cancer).

5.1 Project Risk Analysis

The project's risks were evaluated using the HARP2 risk model using the OEHHA Derived calculation method. Residential cancer risk is based on a 30-year exposure and worker cancer risk is based on a 25-year exposure consistent with BAAQMD and OEHHA guidelines. For cancer and chronic risks, the minimum mandatory exposure pathways (i.e., inhalation, soil, dermal, and mother's milk) were used. For acute risks, the inhalation pathway was used.

The Project's incremental maximum cancer risk at nearby homes is estimated to be 0.39 cancers per million. The risk varies from approximately <0.4 to less than 0.1 excess cancers per million depending on the exposure scenario (residential or sensitive receptor) and location. Worker incremental maximum cancer risk at nearby businesses is estimated to be 0.01 cancers per

[1] OEHHA Hotspots Analysis and Reporting Program (HARP) available at: https://ww3.arb.ca.gov/toxics/harp/harp.htm

million. These results are presented in terms of a probability (cancers risk per million). The spatial distribution of residential and worker cancer risk is shown on Figures 4 and 7, respectively.

The highest residential risk levels are parallel to and on the east side of Mitchell Canyon Road, immediately east of the Project area. The highest residential risk level is identified at a residence located at the southwest side of the cul-de-sac at the south end of Widmar Place (see Figure 5, Location of Maximum Residential Cancer Risk). Risk at nearby schools, day care centers, and medical centers are estimated to be 0.06 or less cancers per million. The highest worker risk occurs at the Mitchell Canyon Visitor Center within the Mount Diablo State Park at the south end of Mitchell Canyon Road.

The maximum non-cancer risks at nearby homes and businesses are calculated in terms of a hazard index ("HI"). The spatial distribution of acute hazard index is shown on Figure 6, with the highest index values of 0.3 occurring east of Mitchell Canyon Road, south of Diablo Downs Drive, and west of Tally Ho Court. Chronic hazard index was at or below 0.005 at all off-site receptors and as a result a meaningful contour map could not be generated. The risks for both residential and worker locations are summarized in Table 3.

Excerpts of the HARP2 model inputs are included in Appendix C. HARP model risk tables showing the calculated health risks (including cancer risk and hazard indices) are provided in Appendix D.

5.2 Project Annual Average PM2.5 Concentrations

AERMOD was used to model the Project's incremental annual average $PM_{2.5}$ concentration. The emission rate input into AERMOD is in terms of grams per second per square meter. The highest annual emissions occur during model year 2049, which was a CalEEMod model proxy for end-of-life reclamation activity in year 2068. During that year, 0.02 tons, 0.16 tons and 0.0004 tons of $PM_{2.5}$ are released from the quarry, plant and drainage improvement areas, respectively. By this time all reclamation work in the overburden reclamation areas will have been complete so there were no emissions to model for that area.

The Project's incremental annual average $PM_{2.5}$ concentration is 0.11 micrograms per cubic meter ($\mu g/m^3$), which is less than the applicable threshold of greater than 0.3 $\mu g/m^3$. Inputs and excerpts of the $PM_{2.5}$ modeling are provided in Appendix E. In addition, impacts associated with $PM_{2.5}$ emissions were previously evaluated in the Project *Air and Greenhouse Gas Emissions Study* (Compass, July 2020). Compass' study demonstrated that impacts from $PM_{2.5}$ were less than significant.

5.3 Cumulative Impacts Resulting from TAC and PM2.5 Emissions

The BAAQMD has CEQA thresholds of significance for local community and risk hazard impacts associated with exposure to TACs, including diesel particulates. Current cumulative conditions at the site include on-going mining operations, an approved reclamation plan, and associated TAC and $PM_{2.5}$ emissions. Mining activities, and emissions associated with mining, will generally cease in each area when the majority of reclamation activities begin. As a result, the cumulative TAC

and $PM_{2.5}$ emissions in the Project area will be significantly reduced when mining ends and reclamation begins in each area. In addition, State and local law mandate the reclamation of surface mining operations, so reclamation must occur under the approved reclamation plan if the reclamation plan amendments are not approved. Therefore, reclamation emissions from the proposed Project are not considered new. The Project will not have a cumulatively considerable contribution to TAC and $PM_{2.5}$ emissions, as the Project involves amendments to an existing reclamation plan, and these proposed amendments do not implicate an increase in TACs or $PM_{2.5}$ above baseline conditions. The existing reclamation plan would result in substantially higher $PM_{2.5}$ exhaust emissions associated with backfilling the quarry. Thus, the cumulative impacts related to TAC and $PM_{2.5}$ emissions are less-than-significant.

6.0 RESULTS AND CONCLUSIONS

Table 3 below summarizes the Project health risks in comparison to BAAQMD significance thresholds. The Project's potential health risk impact in terms of excess cancer risk, non-cancer hazards, and maximum incremental annual average $PM_{2.5}$ concentrations is **less than significant**.

TABLE 3
SUMMARY OF PROJECT HEALTH RISKS

Risk Metric	Maximum Off-Site Value	Significance Threshold	Significant?
Residential Cancer Risk per Million (30-year exposure)	0.39	10	No
Worker Cancer Risk (25-year exposure)	0.01 at Mitchell Canyon Visitor Center	10	No
Cancer Risk per Million at Discrete Sensitive Receptors (schools, day care, hospitals)	0.028 at Mt. Diablo Elementary School 0.022 at Pine Hollow Middle School 0.064 at Clayton's Children Center 0.028 at Clayton Community School 0.022 at Sho Sho Day Care 0.006 at John Muir Medical Center	10	No
Chronic Hazard Index	Residential 0.005 Worker 0.002	1.0	No
Acute Hazard Index	Residential 0.34 Worker 0.235	1.0	No
Annual $PM_{2.5}$	0.11 ug/m^3	> 0.3 ug/m^3	No

The risk assessment process contains numerous, conservative assumptions to ensure that public health risks are not underestimated. These assumptions are related to the exposure duration, toxicity data and use of Gaussian type statistical atmospheric dispersion models. For example, it is unlikely that any individual would remain in the same location for 30 years. As a result, these modeling assumptions may overstate the Project's contribution and the public's exposure to health risks.

Recommendations for air quality related best management practices for Project construction activities were included in the Air Quality and Greenhouse Gas Emissions Study (Compass, July 2020).

7.0 REFERENCES

BAAQMD (2017). California Environmental Quality Act Air Quality Guidelines. May 2017.

CalEPA (2012). Technical Support Document for Exposure Assessment and Stochastic Analysis. Office of Environmental Health Hazard Assessment. California Environmental Protection Agency. August 2012.

CARB (2003). HARP User's Guide. Available at: http://www.arb.ca.gov/toxics/harp/harp.htm. December 2003.

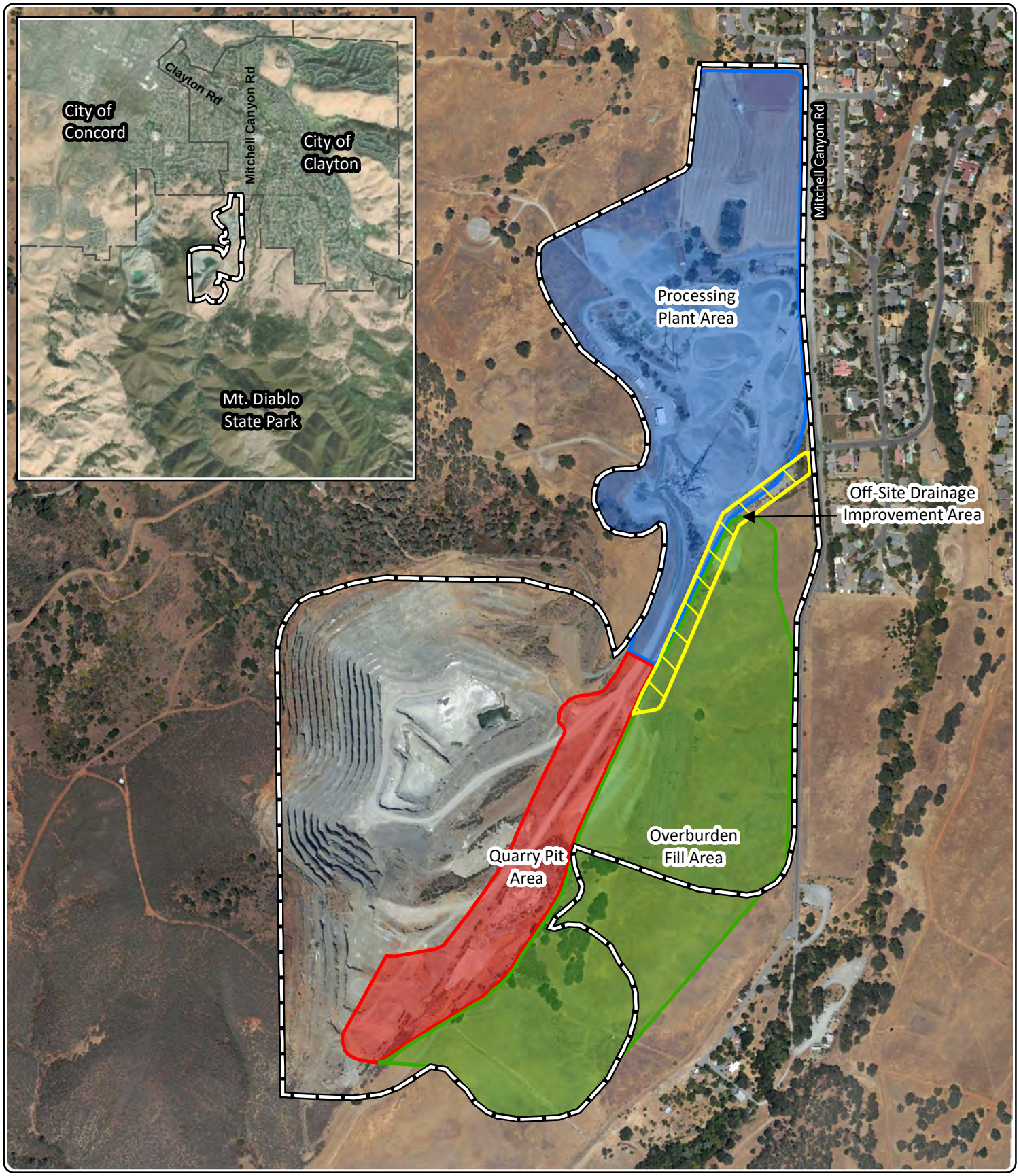
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OEHHA (2014). Consolidated Table of Approved health Risk Values. Cal EPA, Office of Environmental Health Hazard Assessment. July 3, 2014.

Richards et al. (2009). PM4 Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California. Journal of the Air & Waste Management Association, Vol. 59. November 2009.

Figures



Aerial photo adapted from Google Earth Maps Imagery Date 6-16-2014.

- Rec Plan Boundary
- Overburden Fill Area
- Processing Plant Area
- Quarry Pit Area
- Off-Site Drainage Improvement Area

0 400 800 Feet

N

Project Location and Site Map
Clayton Quarry
CEMEX Construction Materials Pacific
Contra Costa County, California

Figure 1

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

COMPASS LAND GROUP



Aerial photo adapted from Google Earth Maps Imagery Date 6-20-2019.

Legend:

Modeling Grid

Rec Plan Boundary

0 1,000 2,000 Feet

N

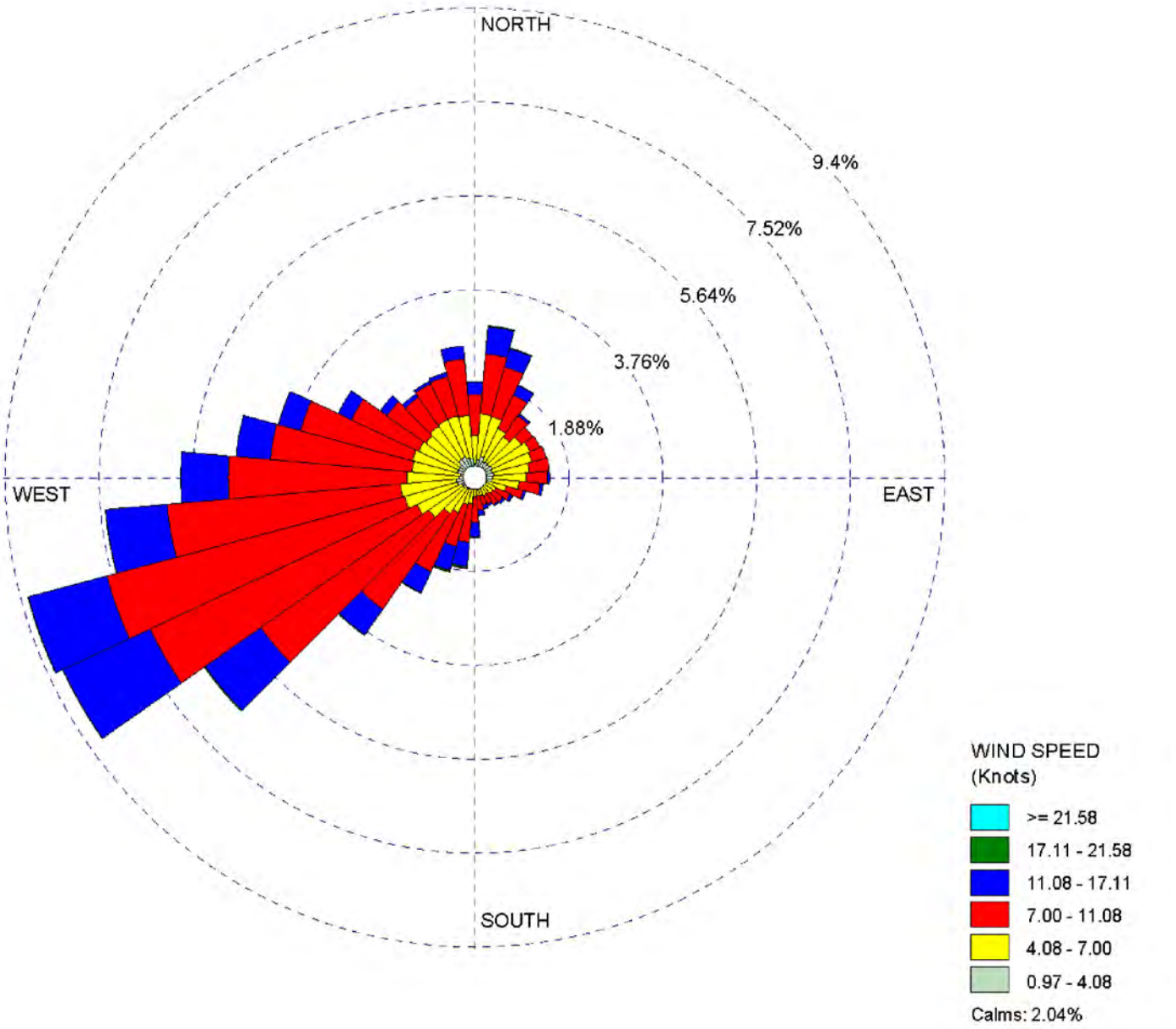
Modeling Grid
Clayton Quarry
CEMEX Construction Materials Pacific
Contra Costa County, California

Figure 2

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

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	Distribution of Winds Clayton Quarry CEMEX Construction Materials Pacific Contra Costa County, California	Figure 3	9/16/2020
		Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.	
		COMPASS LAND GROUP	



Aerial photo adapted from Google Earth Maps Imagery Date 6-20-2019.

Legend:
Rec Plan Boundary
Cancer Risk:
0.3 per million
0.1 per million

0 600 1,200 Feet

N

Spatial Distribution of 30 Year Residential Cancer Risk Clayton Quarry CEMEX Construction Materials Pacific Contra Costa County, California

Figure 4

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

COMPASS LAND GROUP



Aerial Orthophoto from Verical Mapping, Flight on 8/8/2019.

Legend:
Rec Plan Boundary
Cancer Risk:
0.3 per million

0 100 200 Feet

N

Location of Maximum Residential Cancer Risk
Clayton Quarry
CEMEX Construction Materials Pacific
Contra Costa County, California

Figure 5

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

COMPASS LAND GROUP



Aerial photo adapted from Google Earth Maps Imagery Date 6-20-2019.

Legend:
Rec Plan Boundary
Acute Hazard Index
0.3

0 600 1,200 Feet
N

Spatial Distribution of Acute Hazard Index
Clayton Quarry
CEMEX Construction Materials Pacific
Contra Costa County, California

Figure 6

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

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Aerial photo adapted from Google Earth Maps Imagery Date 6-20-2019.

Legend:
Rec Plan Boundary
Worker Risk:
0.01 per million

0 600 1,200 Feet

N

Spatial Distribution of Worker Cancer Risk Clayton Quarry CEMEX Construction Materials Pacific Contra Costa County, California

Figure 7

9/16/2020

Disclaimer: The data was mapped for planning purposes only. No liability is assumed for accuracy of the data shown.

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Appendix A
Modeling Emissions Inputs

Table 1
Summary of Annual DPM Emissions

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

AVERAGE ANNUAL PM2.5 EXHAUST EMISSIONS (TONS/YEAR)

Quarry Area Reclamation			Overburden Area Reclamation			Plant Area Reclamation			Drainage Improvement Area		
Year	Calendar Year	PM2.5 Exhaust (tons/yr)	Year	Calendar Year	PM2.5 Exhaust (tons/yr)	Year	Calendar Year	PM2.5 Exhaust (tons/yr)	Year	Calendar Year	PM2.5 Exhaust (tons/yr)
1	2022	0	1	2022	1.44E-03	1	2022	3.53E-03	1	2022	0
2	2023	0	2	2023	0	2	2023	0	2	2023	0
3	2024	0	3	2024	0	3	2024	0	3	2024	0
4	2025	1.33E-02	4	2025	0	4	2025	0	4	2025	0
5	2026	0	5	2026	0	5	2026	0	5	2026	0
6	2027	0	6	2027	0	6	2027	0	6	2027	0
7	2028	0	7	2028	0	7	2028	0	7	2028	0
8	2029	0	8	2029	0	8	2029	0	8	2029	0
9	2030	0	9	2030	0	9	2030	0	9	2030	0
10	2031	0	10	2031	0	10	2031	0	10	2031	0
11	2032	0	11	2032	0	11	2032	0	11	2032	0
12	2033	0	12	2033	0	12	2033	0	12	2033	0
13	2034	0	13	2034	0	13	2034	0	13	2034	0
14	2035	0	14	2035	0	14	2035	0	14	2035	0
15	2036	0	15	2036	0	15	2036	0	15	2036	0
16	2037	0	16	2037	0	16	2037	0	16	2037	0
17	2038	0	17	2038	0	17	2038	0	17	2038	0
18	2039	0	18	2039	0	18	2039	0	18	2039	0
19	2040	0	19	2040	0	19	2040	0	19	2040	0
20	2041	0	20	2041	0	20	2041	0	20	2041	0
21	2042	0	21	2042	0	21	2042	0	21	2042	0
22	2043	0	22	2043	0	22	2043	0	22	2043	0
23	2044	0	23	2044	0	23	2044	0	23	2044	0
24	2045	0	24	2045	0	24	2045	0	24	2045	0
25	2046	0	25	2046	0	25	2046	0	25	2046	0
26	2047	0	26	2047	0	26	2047	0	26	2047	0
27	2048	0	27	2048	0	27	2048	0	27	2048	0
28	2049	1.21E-03	28	2049	0	28	2049	1.22E-02	28	2049	2.70E-04
29	2050	0	29	2050	0	29	2050	0	29	2050	0
30	2051	0	30	2051	0	30	2051	0	30	2051	0
Average:		**0.000483** tons/yr	**Average:**		**0.000048**	**Average:**		**0.000523**	**Average:**		**0.000009**
		0.966 lbs/yr			0.096			1.046			0.018

Source:
Air and Greenhouse Gas Emissions Study (Compass Land Group, July 2, 2020).

Notes:
1. Results from Appendix A-2, Annual Results. Year 28 (2049) result is CalEEMod proxy for 2068 reclamation

Table 2
Estimate of Annual Daily Emissions of Respirable Silica

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

Area	% Respirable Silica	PM-10 Fugitive Emissions Max. Annual (tons/yr)	PM-10 Fugitive Emissions Max. Daily (lbs/day)	Respirable Silica Emissions Annual (lbs/yr)	Respirable Silica Emissions Daily (lbs/day)	Respirable Silica Emissions Hourly (lbs/hr)
Quarry Area	0.0%	0.44	86.00	0.00	0.00	0.00
Overburden Area	0.8%	0.04	11.86	0.69	0.09	0.01
Plant Area	0.0%	1.25	71.87	0.00	0.00	0.00
Drainage Area	0.0%	0.00	0.12	0.00	0.00	0.00

Notes

1. PM-10 Emissions from Appendix A-2 of Air and Greenhouse Gas Emissions Study (Compass Land Group, July 2, 2020).
2. Calculations:

Annual Silica (lbs/yr) = Annual PM-10 Emissions x % Silica x 2000 lbs/ton

Daily Silica (lbs/day) = Daily PM-10 Emissions x % Silica

$$\text{Hourly Silica (lbs/hr)} = \frac{\text{Daily PM-10 Emissions x \% Silica}}{\text{8 hrs/day}}$$

Table 3
Estimate of Fraction of Respirable Silica

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

RESPIRABLE SILICA WEIGHT FRACTION (BASED ON SITE-SPECIFIC SOIL SAMPLING)
(to be multiplied by PM_{10} process rate for use in analysis)

Lab ID	Description		Quartz Weight %	Respirable Factor[1]	Est. Respirable Silica %	Max. Annual PM-10 Emissions (tons/yr)	Max. Annual Silica Emissions (lbs/yr)
Quarry Area Reclamation							
2007E61-001A	Quarry - Outlet - 01	ND	0	0.44	0.0		
2007E61-002A	Quarry - Upper Rim - 02	ND	0	0.44	0.0		
2007E61-003A	Quarry - Kx RipRap - 03	ND	0	0.44	0.0		
		Average:	**0.0**	**0.44**	**0.0**	0.44	0.00
Overburden Area Reclamation							
2007E61-004A	Overburden - North - 04		1.2	0.44	0.5		
2007E61-005A	Overburden - South - 05		2.4	0.44	1.1		
		Average:	**1.8**	**0.44**	**0.8**	0.04	0.69
Plant Area Reclamation							
2007E61-006A	Plant - Drainage - 06	ND	0	0.44	0.0		
2007E61-007A	Plant - Office/Yard - 07	ND	0	0.44	0.0		
2007E61-008A	Plant - Ponds - 08	ND	0	0.44	0.0		
2007E61-009A	Plant - AgPlant - 09	ND	0	0.44	0.0		
		Average:	**0.0**	**0.44**	**0.0**	1.25	0.00
Drainage Improvement Area Reclamation							
2007E61-006A	Plant - Drainage - 06	ND	0	0.44	0.0		
		Average:	**0.0**	**0.44**	**0.0**	0.00	0.00

Sources:

1. Analytical Report, Clayton Metals Soil Sampling (McCampbell Analytical, Inc. August 6, 2020).

2. *PM4 Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California* (Richards et al., November 2009), published in the Journal of the Air & Waste Management Association, Vol. 59.

Notes:

1. Based on the aggregate industry study (Richards et al., November 2009), the concentration of crystalline silica in PM_4 (respirable) PM averaged 44% of the crystalline silica content of the bulk mineral.
2. ND = Non-detect.

Table 4
Annual Emission Rates of Metals (lbs/yr) Based on Lab Analysis of Metal Content of Soil
[Metal Concentration Units: mg/Kg or ppm by wt.]

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

COMPASS LAND GROUP

			Al	Sb	As	Ba	Be	Cr	Co	Cu	Pb	Hg	Ni	V	Zn
Quarry Area - Drainage Outlet			47,000	0	3.6	120	0	43	26	94	2.8	0.36	33	160	57
Quarry Area - Upper Rim			52,000	0	0	0	0	75	54	290	0	0	43	220	59
Quarry Area - Kx RipRap Face			41,000	0	1.5	16	0	43	39	230	1.1	0.34	30	170	50
Average (ppm by wt)			**46,667**	**0.00**	**1.70**	**45.33**	**0.00**	**53.67**	**39.67**	**204.67**	**1.30**	**0.23**	**35.33**	**183.33**	**55.33**
Max. Annual PM-10 Emission Rate (Ref: App. A-2, Annual)	**(lbs/yr)**	**876.82**	**4.09E+01**	**0.00E+00**	**1.49E-03**	**3.97E-02**	**0.00E+00**	**4.71E-02**	**3.48E-02**	**1.79E-01**	**1.14E-03**	**2.05E-04**	**3.10E-02**	**1.61E-01**	**4.85E-02**

Overburden Area - North			42,000	0	7.7	170	0	38	18	94	7.8	0.11	32	130	83
Overburden Area - South			48,000	0	10	220	0.65	41	18	81	9.6	0.079	33	130	100
Average (ppm by wt)			**45,000**	**0.00**	**8.85**	**195.00**	**0.33**	**39.50**	**18.00**	**87.50**	**8.70**	**0.09**	**32.50**	**130.00**	**91.50**
Max. Annual PM-10 Emission Rate (Ref: App. A-2, Annual)	**(lbs/yr)**	**86.72**	**3.90E+00**	**0.00E+00**	**7.67E-04**	**1.69E-02**	**2.82E-05**	**3.43E-03**	**1.56E-03**	**7.59E-03**	**7.54E-04**	**8.20E-06**	**2.82E-03**	**1.13E-02**	**7.93E-03**

Plant Area - Off-Site Drainage Storm Drain			52,000	0	0	0	0	68	64	590	0	0.65	42	220	36
Plant Area - Office/Yard			43,000	0	1.2	24	0	40	31	130	1.7	0.55	31	160	35
Plant Area - Ponds			35,000	0	0.64	10	0	35	26	130	1.7	0.44	26	140	32
Plant Area - AgPlant			33,000	0	0	0	0	30	22	78	0	0.58	26	130	15
Average (ppm by wt)			**40,750**	**0.00**	**0.46**	**8.50**	**0.00**	**43.25**	**35.75**	**232.00**	**0.85**	**0.56**	**31.25**	**162.50**	**29.50**
Max. Annual PM-10 Emission Rate (Ref: App. A-2, Annual)	**(lbs/yr)**	**2490.32**	**1.01E+02**	**0.00E+00**	**1.15E-03**	**2.12E-02**	**0.00E+00**	**1.08E-01**	**8.90E-02**	**5.78E-01**	**2.12E-03**	**1.38E-03**	**7.78E-02**	**4.05E-01**	**7.35E-02**

Plant Area - Off-Site Drainage Storm Drain			52,000	0	0	0	0	68	64	590	0	0.65	42	220	36
Average (ppm by wt)			**52,000**	**0.00**	**0.00**	**0.00**	**0.00**	**68.00**	**64.00**	**590.00**	**0.00**	**0.65**	**42.00**	**220.00**	**36.00**
Max. Annual PM-10 Emission Rate (Ref: Appendix A-2, Annual)	**(lbs/yr)**	**1.160**	**6.03E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**7.89E-05**	**7.42E-05**	**6.84E-04**	**0.00E+00**	**7.54E-07**	**4.87E-05**	**2.55E-04**	**4.18E-05**

Table 5
Hourly Emission Rates of Metals Based on Lab Analysis of Metal Content of Soil
[Metal Concentration Units: mg/Kg or ppm by wt.]

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

COMPASS LAND GROUP

			Al	Sb	As	Ba	Be	Cr	Co	Cu	Pb	Hg	Ni	V	Zn
Quarry Area - Drainage Outlet			47,000	0	3.6	120	0	43	26	94	2.8	0.36	33	160	57
Quarry Area - Upper Rim			52,000	0	0	0	0	75	54	290	0	0	43	220	59
Quarry Area - Kx RipRap Face			41,000	0	1.5	16	0	43	39	230	1.1	0.34	30	170	50
Average (ppm by wt)			**46,667**	**0.00**	**1.70**	**45.33**	**0.00**	**53.67**	**39.67**	**204.67**	**1.30**	**0.23**	**35.33**	**183.33**	**55.33**
Max. Daily PM-10 Emission Rate (Ref: App. A-2, Summer Daily)	**(lbs/day)**	**86.00**	**4.01E+00**	**0.00E+00**	**1.46E-04**	**3.90E-03**	**0.00E+00**	**4.62E-03**	**3.41E-03**	**1.76E-02**	**1.12E-04**	**2.01E-05**	**3.04E-03**	**1.58E-02**	**4.76E-03**
	(lbs/hr)	**10.75**	**5.02E-01**	**0.00E+00**	**1.83E-05**	**4.87E-04**	**0.00E+00**	**5.77E-04**	**4.26E-04**	**2.20E-03**	**1.40E-05**	**2.51E-06**	**3.80E-04**	**1.97E-03**	**5.95E-04**

Overburden Area - North - 04			42,000	0	7.7	170	0	38	18	94	7.8	0.11	32	130	83
Overburden Area - South - 05			48,000	0	10	220	0.65	41	18	81	9.6	0.079	33	130	100
Average (ppm by wt)			**45,000**	**0.00**	**8.85**	**195.00**	**0.33**	**39.50**	**18.00**	**87.50**	**8.70**	**0.09**	**32.50**	**130.00**	**91.50**
Max. Daily PM-10 Emission Rate (Ref: App. A-2, Summer Daily)	**(lbs/day)**	**11.86**	**5.34E-01**	**0.00E+00**	**1.05E-04**	**2.31E-03**	**3.85E-06**	**4.68E-04**	**2.13E-04**	**1.04E-03**	**1.03E-04**	**1.12E-06**	**3.85E-04**	**1.54E-03**	**1.09E-03**
	(lbs/hr)	**1.4823**	**6.67E-02**	**0.00E+00**	**1.31E-05**	**2.89E-04**	**4.82E-07**	**5.86E-05**	**2.67E-05**	**1.30E-04**	**1.29E-05**	**1.40E-07**	**4.82E-05**	**1.93E-04**	**1.36E-04**

Plant Area - Off-Site Drainage Storm Drain			52,000	0	0	0	0	68	64	590	0	0.65	42	220	36
Plant Area - Office/Yard			43,000	0	1.2	24	0	40	31	130	1.7	0.55	31	160	35
Plant Area - Ponds			35,000	0	0.64	10	0	35	26	130	1.7	0.44	26	140	32
Plant Area - AgPlant			33,000	0	0	0	0	30	22	78	0	0.58	26	130	15
Average (ppm by wt)			**40,750**	**0.00**	**0.46**	**8.50**	**0.00**	**43.25**	**35.75**	**232.00**	**0.85**	**0.56**	**31.25**	**162.50**	**29.50**
Max. Daily PM-10 Emission Rate (Ref: App. A-2, Summer Daily)	**(lbs/day)**	**71.87**	**2.93E+00**	**0.00E+00**	**3.31E-05**	**6.11E-04**	**0.00E+00**	**3.11E-03**	**2.57E-03**	**1.67E-02**	**6.11E-05**	**3.99E-05**	**2.25E-03**	**1.17E-02**	**2.12E-03**
	(lbs/hr)	**8.9841**	**3.66E-01**	**0.00E+00**	**4.13E-06**	**7.64E-05**	**0.00E+00**	**3.89E-04**	**3.21E-04**	**2.08E-03**	**7.64E-06**	**4.99E-06**	**2.81E-04**	**1.46E-03**	**2.65E-04**

Plant Area - Off-Site Drainage Storm Drain			52,000	0	0	0	0	68	64	590	0	0.65	42	220	36
Average (ppm by wt)			**52,000**	**0.00**	**0.00**	**0.00**	**0.00**	**68.00**	**64.00**	**590.00**	**0.00**	**0.65**	**42.00**	**220.00**	**36.00**
Max. Daily PM-10 Emission Rate (Ref: App. A-2, Summer Daily)	**(lbs/day)**	**0.119**	**6.19E-03**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**8.10E-06**	**7.62E-06**	**7.03E-05**	**0.00E+00**	**7.74E-08**	**5.00E-06**	**2.62E-05**	**4.29E-06**
	(lbs/hr)	**0.0149**	**7.74E-04**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**1.01E-06**	**9.53E-07**	**8.78E-06**	**0.00E+00**	**9.68E-09**	**6.25E-07**	**3.28E-06**	**5.36E-07**

Appendix B
Soils Analysis Laboratory Results

McCampbell Analytical, Inc.
"When Quality Counts"

Analytical Report

WorkOrder: 2007E61

Report Created for: Compass Land Group

3140 Peacekeeper Way #102
McClellan Park, CA 95652

Project Contact: Yasha Saber
Project P.O.: 012
Project: Clayton Metals Soil Sampling

Project Received: 07/29/2020

Analytical Report reviewed & approved for release on 08/06/2020 by:

Yen Cao
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Compass Land Group
Project: Clayton Metals Soil Sampling
WorkOrder: 2007E61

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: Compass Land Group
Project: Clayton Metals Soil Sampling
WorkOrder: 2007E61

Analytical Qualifiers

a1	Sample diluted due to matrix interference

Bulk Crystalline Silica Analysis by Modified NIOSH 7602 Method, Issue 4, 2017

[MAI ID 2007E61-001A to -009A]

Report prepared by Kelly Chen

McCampbell Analytical received samples 2007E61-001A to -009A for bulk crystalline silica analysis (α-quartz and cristobalite) by a modified NIOSH 7602 method on 7/29/2020. A table of the client and laboratory sample IDs is listed in Table 1.

Client ID	Lab ID
Quarry-Outlet-01	2007E61-001A
Quarry-UpperRim-02	2007E61-002A
Quarry-Kx RipRap-03	2007E61-003A
Overburden-North-04	2007E61-004A
Overburden-South-05	2007E61-005A
Plant-Drainage-06	2007E61-006A
Plant-Office/Yard-07	2007E61-007A
Plant-Ponds-08	2007E61-008A
Plant-AgPlant-09	2007E61-009A

Table 1. Client and lab sample IDs.

Samples 2007E61-001A to -009A were prepared and analyzed according to the NIOSH 7602 method with the following modifications. The soil samples were ground and passed through a No. 500 (25 μm) sieve. 1mg of sample was mixed with 299mg FTIR Grade KBr using an agate mortar and pestle. FTIR analysis was performed using a ABB MB3000 FTIR spectrometer. The modified quartz calibration was based on the peak at 694 cm^{-1} due to interferences present at the major peak at 800 cm^{-1}. The cristobalite calibration was based on the peak at 623 cm^{-1}.

The crystalline silica content of the bulk soil samples are listed in Table 2. The results are calculated based on the initial 1mg sample amount used. The minimum detection limits (MDL) for α-quartz and cristobalite are 0.7% and 0.3%, respectively. However, the MDL for α-quartz is based on the calibration at the 800 cm^{-1} peak.

Sample	α-Quartz weight %	Cristobalite weight %
2007E61-001A	ND	ND
2007E61-002A	ND	ND
2007E61-003A	ND	ND
2007E61-004A	1.2	ND
2007E61-005A	2.4	ND
2007E61-006A	ND	ND
2007E61-007A	ND	ND
2007E61-008A	ND	ND
2007E61-009A	ND	ND

Table 2. Crystalline silica weight % of samples 2007E61-001A to -009A. ($MDL_{\alpha\text{-quartz}}$ = 0.7%, $MDL_{cristobalite}$ = 0.3%, ND = not detected.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3060A
Date Prepared:	07/30/2020	**Analytical Method:**	SW7199
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

Hexavalent chromium by Alkaline Digestion and IC Analysis

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-Outlet-01	2007E61-001A	Soil	07/29/2020 11:09	IC2 20073016.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 17:02

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-UpperRim-02	2007E61-002A	Soil	07/29/2020 11:45	IC2 20073017.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 17:15

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-Kx RipRap-03	2007E61-003A	Soil	07/29/2020 11:27	IC2 20073018.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 17:27

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Overburden-North-04	2007E61-004A	Soil	07/29/2020 12:47	IC2 20073019.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 17:40

Analyst(s): AO

(Cont.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3060A
Date Prepared:	07/30/2020	**Analytical Method:**	SW7199
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

Hexavalent chromium by Alkaline Digestion and IC Analysis

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Overburden-South-05	2007E61-005A	Soil	07/29/2020 12:13	IC2 20073020.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 17:53

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Drainage-06	2007E61-006A	Soil	07/29/2020 13:47	IC2 20073021.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 18:05

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Office/Yard-07	2007E61-007A	Soil	07/29/2020 13:10	IC2 20073022.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 18:18

Analyst(s): AO

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Ponds-08	2007E61-008A	Soil	07/29/2020 10:35	IC2 20073023.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 18:31

Analyst(s): AO

(Cont.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3060A
Date Prepared:	07/30/2020	**Analytical Method:**	SW7199
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

Hexavalent chromium by Alkaline Digestion and IC Analysis

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-AgPlant-09	2007E61-009A	Soil	07/29/2020 10:55	IC2 20073024.CHW	202865

Analytes	Result	RL	DF	Date Analyzed
Hexavalent chromium	ND	0.20	1	07/30/2020 18:43

Analyst(s): AO

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-Outlet-01	2007E61-001A	Soil	07/29/2020 11:09	ICP-MS5 90257SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**47,000**	1000	20	08/05/2020 15:32
Antimony	ND	0.50	1	07/30/2020 19:57
Arsenic	**3.6**	0.50	1	07/30/2020 19:57
Barium	**120**	5.0	1	07/30/2020 19:57
Beryllium	ND	0.50	1	07/30/2020 19:57
Cadmium	ND	0.50	1	07/30/2020 19:57
Chromium	**43**	0.50	1	07/30/2020 19:57
Cobalt	**26**	0.50	1	07/30/2020 19:57
Copper	**94**	0.50	1	07/30/2020 19:57
Lead	**2.8**	0.50	1	07/30/2020 19:57
Mercury	**0.36**	0.050	1	07/30/2020 19:57
Molybdenum	ND	0.50	1	07/30/2020 19:57
Nickel	**33**	0.50	1	07/30/2020 19:57
Selenium	**1.4**	0.50	1	07/30/2020 19:57
Silver	ND	0.50	1	07/30/2020 19:57
Thallium	ND	0.50	1	07/30/2020 19:57
Vanadium	**160**	0.50	1	07/30/2020 19:57
Zinc	**57**	5.0	1	07/30/2020 19:57

Surrogates	REC (%)	Limits	
Terbium	113	70-130	07/30/2020 19:57

Analyst(s): MIG, WV

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-UpperRim-02	2007E61-002A	Soil	07/29/2020 11:45	ICP-MS5 90258SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**52,000**	1000	20	08/05/2020 15:35
Antimony	ND	5.0	10	07/31/2020 18:39
Arsenic	ND	5.0	10	07/31/2020 18:39
Barium	ND	50	10	07/31/2020 18:39
Beryllium	ND	5.0	10	07/31/2020 18:39
Cadmium	ND	5.0	10	07/31/2020 18:39
Chromium	**75**	5.0	10	07/31/2020 18:39
Cobalt	**54**	5.0	10	07/31/2020 18:39
Copper	**290**	5.0	10	07/31/2020 18:39
Lead	ND	5.0	10	07/31/2020 18:39
Mercury	ND	0.50	10	07/31/2020 18:39
Molybdenum	ND	5.0	10	07/31/2020 18:39
Nickel	**43**	5.0	10	07/31/2020 18:39
Selenium	ND	5.0	10	07/31/2020 18:39
Silver	ND	5.0	10	07/31/2020 18:39
Thallium	ND	5.0	10	07/31/2020 18:39
Vanadium	**220**	5.0	10	07/31/2020 18:39
Zinc	**59**	50	10	07/31/2020 18:39

Surrogates	REC (%)	Limits	
Terbium	105	70-130	07/31/2020 18:39

Analyst(s): MIG, WV

Analytical Comments: a1

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Quarry-Kx RipRap-03	2007E61-003A	Soil	07/29/2020 11:27	ICP-MS5 90259SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**41,000**	1000	20	08/05/2020 15:39
Antimony	ND	0.50	1	07/30/2020 20:05
Arsenic	**1.5**	0.50	1	07/30/2020 20:05
Barium	**16**	5.0	1	07/30/2020 20:05
Beryllium	ND	0.50	1	07/30/2020 20:05
Cadmium	ND	0.50	1	07/30/2020 20:05
Chromium	**43**	0.50	1	07/30/2020 20:05
Cobalt	**39**	0.50	1	07/30/2020 20:05
Copper	**230**	0.50	1	07/30/2020 20:05
Lead	**1.1**	0.50	1	07/30/2020 20:05
Mercury	**0.34**	0.050	1	07/30/2020 20:05
Molybdenum	ND	0.50	1	07/30/2020 20:05
Nickel	**30**	0.50	1	07/30/2020 20:05
Selenium	**1.4**	0.50	1	07/30/2020 20:05
Silver	ND	0.50	1	07/30/2020 20:05
Thallium	ND	0.50	1	07/30/2020 20:05
Vanadium	**170**	0.50	1	07/30/2020 20:05
Zinc	**50**	5.0	1	07/30/2020 20:05

Surrogates	REC (%)	Limits	
Terbium	111	70-130	07/30/2020 20:05

Analyst(s): MIG, WV

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Overburden-North-04	2007E61-004A	Soil	07/29/2020 12:47	ICP-MS5 90260SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**42,000**	1000	20	08/05/2020 15:42
Antimony	ND	0.50	1	07/31/2020 00:01
Arsenic	**7.7**	0.50	1	07/31/2020 00:01
Barium	**170**	5.0	1	07/31/2020 00:01
Beryllium	ND	0.50	1	07/31/2020 00:01
Cadmium	ND	0.50	1	07/31/2020 00:01
Chromium	**38**	0.50	1	07/31/2020 00:01
Cobalt	**18**	0.50	1	07/31/2020 00:01
Copper	**94**	0.50	1	07/31/2020 00:01
Lead	**7.8**	0.50	1	07/31/2020 00:01
Mercury	**0.11**	0.050	1	07/31/2020 00:01
Molybdenum	**0.54**	0.50	1	07/31/2020 00:01
Nickel	**32**	0.50	1	07/31/2020 00:01
Selenium	**1.2**	0.50	1	07/31/2020 00:01
Silver	ND	0.50	1	07/31/2020 00:01
Thallium	ND	0.50	1	07/31/2020 00:01
Vanadium	**130**	0.50	1	07/31/2020 00:01
Zinc	**83**	5.0	1	07/31/2020 00:01

Surrogates	REC (%)	Limits	
Terbium	109	70-130	07/31/2020 00:01

Analyst(s): MIG, WV

(Cont.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Overburden-South-05	2007E61-005A	Soil	07/29/2020 12:13	ICP-MS5 90261SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**48,000**	1000	20	08/05/2020 15:45
Antimony	ND	0.50	1	07/31/2020 00:05
Arsenic	**10**	0.50	1	07/31/2020 00:05
Barium	**220**	5.0	1	07/31/2020 00:05
Beryllium	**0.65**	0.50	1	07/31/2020 00:05
Cadmium	ND	0.50	1	07/31/2020 00:05
Chromium	**41**	0.50	1	07/31/2020 00:05
Cobalt	**18**	0.50	1	07/31/2020 00:05
Copper	**81**	0.50	1	07/31/2020 00:05
Lead	**9.6**	0.50	1	07/31/2020 00:05
Mercury	**0.079**	0.050	1	07/31/2020 00:05
Molybdenum	**0.55**	0.50	1	07/31/2020 00:05
Nickel	**33**	0.50	1	07/31/2020 00:05
Selenium	**1.8**	0.50	1	07/31/2020 00:05
Silver	ND	0.50	1	07/31/2020 00:05
Thallium	ND	0.50	1	07/31/2020 00:05
Vanadium	**130**	0.50	1	07/31/2020 00:05
Zinc	**100**	5.0	1	07/31/2020 00:05

Surrogates	REC (%)	Limits	
Terbium	107	70-130	07/31/2020 00:05

Analyst(s): MIG, WV

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Drainage-06	2007E61-006A	Soil	07/29/2020 13:47	ICP-MS5 90262SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**52,000**	1000	20	08/05/2020 15:49
Antimony	ND	2.5	5	07/31/2020 14:08
Arsenic	ND	2.5	5	07/31/2020 14:08
Barium	ND	25	5	07/31/2020 14:08
Beryllium	ND	2.5	5	07/31/2020 14:08
Cadmium	ND	2.5	5	07/31/2020 14:08
Chromium	**68**	2.5	5	07/31/2020 14:08
Cobalt	**64**	2.5	5	07/31/2020 14:08
Copper	**590**	2.5	5	07/31/2020 14:08
Lead	ND	2.5	5	07/31/2020 14:08
Mercury	**0.65**	0.25	5	07/31/2020 14:08
Molybdenum	ND	2.5	5	07/31/2020 14:08
Nickel	**42**	2.5	5	07/31/2020 14:08
Selenium	ND	2.5	5	07/31/2020 14:08
Silver	ND	2.5	5	07/31/2020 14:08
Thallium	ND	2.5	5	07/31/2020 14:08
Vanadium	**220**	2.5	5	07/31/2020 14:08
Zinc	**36**	25	5	07/31/2020 14:08

Surrogates	REC (%)	Limits	
Terbium	108	70-130	07/31/2020 14:08

Analyst(s): JAG, MIG

Analytical Comments: a1

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Office/Yard-07	2007E61-007A	Soil	07/29/2020 13:10	ICP-MS5 90263SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**43,000**	1000	20	08/05/2020 15:52
Antimony	ND	0.50	1	07/31/2020 00:31
Arsenic	**1.2**	0.50	1	07/31/2020 00:31
Barium	**24**	5.0	1	07/31/2020 00:31
Beryllium	ND	0.50	1	07/31/2020 00:31
Cadmium	ND	0.50	1	07/31/2020 00:31
Chromium	**40**	0.50	1	07/31/2020 00:31
Cobalt	**31**	0.50	1	07/31/2020 00:31
Copper	**130**	0.50	1	07/31/2020 00:31
Lead	**1.7**	0.50	1	07/31/2020 00:31
Mercury	**0.55**	0.050	1	07/31/2020 00:31
Molybdenum	**0.55**	0.50	1	07/31/2020 00:31
Nickel	**31**	0.50	1	07/31/2020 00:31
Selenium	**1.3**	0.50	1	07/31/2020 00:31
Silver	ND	0.50	1	07/31/2020 00:31
Thallium	ND	0.50	1	07/31/2020 00:31
Vanadium	**160**	0.50	1	07/31/2020 00:31
Zinc	**35**	5.0	1	07/31/2020 00:31

Surrogates	REC (%)	Limits	
Terbium	109	70-130	07/31/2020 00:31

Analyst(s): MIG, WV

(Cont.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-Ponds-08	2007E61-008A	Soil	07/29/2020 10:35	ICP-MS5 90267SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**35,000**	1000	20	08/05/2020 16:06
Antimony	ND	0.50	1	07/31/2020 00:35
Arsenic	**0.64**	0.50	1	07/31/2020 00:35
Barium	**10**	5.0	1	07/31/2020 00:35
Beryllium	ND	0.50	1	07/31/2020 00:35
Cadmium	ND	0.50	1	07/31/2020 00:35
Chromium	**35**	0.50	1	07/31/2020 00:35
Cobalt	**26**	0.50	1	07/31/2020 00:35
Copper	**130**	0.50	1	07/31/2020 00:35
Lead	**1.7**	0.50	1	07/31/2020 00:35
Mercury	**0.44**	0.050	1	07/31/2020 00:35
Molybdenum	**0.66**	0.50	1	07/31/2020 00:35
Nickel	**26**	0.50	1	07/31/2020 00:35
Selenium	**1.1**	0.50	1	07/31/2020 00:35
Silver	ND	0.50	1	07/31/2020 00:35
Thallium	ND	0.50	1	07/31/2020 00:35
Vanadium	**140**	0.50	1	07/31/2020 00:35
Zinc	**32**	5.0	1	07/31/2020 00:35

Surrogates	REC (%)	Limits	
Terbium	109	70-130	07/31/2020 00:35

Analyst(s): MIG, WV

(Cont.)

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Analytical Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Received:	07/29/2020 14:33	**Extraction Method:**	SW3050B
Date Prepared:	07/29/2020	**Analytical Method:**	SW6020
Project:	Clayton Metals Soil Sampling	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Plant-AgPlant-09	2007E61-009A	Soil	07/29/2020 10:55	ICP-MS5 90268SMPL.d	202765

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**33,000**	1000	20	08/05/2020 16:09
Antimony	ND	0.50	1	07/31/2020 00:38
Arsenic	ND	0.50	1	07/31/2020 00:38
Barium	ND	5.0	1	07/31/2020 00:38
Beryllium	ND	0.50	1	07/31/2020 00:38
Cadmium	ND	0.50	1	07/31/2020 00:38
Chromium	**30**	0.50	1	07/31/2020 00:38
Cobalt	**22**	0.50	1	07/31/2020 00:38
Copper	**78**	0.50	1	07/31/2020 00:38
Lead	ND	0.50	1	07/31/2020 00:38
Mercury	**0.58**	0.050	1	07/31/2020 00:38
Molybdenum	ND	0.50	1	07/31/2020 00:38
Nickel	**26**	0.50	1	07/31/2020 00:38
Selenium	**0.85**	0.50	1	07/31/2020 00:38
Silver	ND	0.50	1	07/31/2020 00:38
Thallium	ND	0.50	1	07/31/2020 00:38
Vanadium	**130**	0.50	1	07/31/2020 00:38
Zinc	**15**	5.0	1	07/31/2020 00:38

Surrogates	REC (%)	Limits	
Terbium	106	70-130	07/31/2020 00:38

Analyst(s): MIG, WV

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Quality Control Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Prepared:	07/30/2020	**BatchID:**	202865
Date Analyzed:	07/30/2020	**Extraction Method:**	SW3060A
Instrument:	IC2	**Analytical Method:**	SW7199
Matrix:	Soil	**Unit:**	mg/Kg
Project:	Clayton Metals Soil Sampling	**Sample ID:**	MB/LCS/LCSD-202865

QC Summary Report for SW7199 (Hexavalent chromium)

Analyte	MB Result	MDL	RL			
Hexavalent chromium	ND	0.200	0.200	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Hexavalent chromium	3.78	3.73	4	94	93	70-130	1.39	10

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Quality Control Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Prepared:	07/29/2020	**BatchID:**	202765
Date Analyzed:	07/30/2020	**Extraction Method:**	SW3050B
Instrument:	ICP-MS4	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/kg
Project:	Clayton Metals Soil Sampling	**Sample ID:**	MB/LCS/LCSD-202765

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aluminum	ND	18.0	50.0	-	-	-
Antimony	ND	0.160	0.500	-	-	-
Arsenic	ND	0.150	0.500	-	-	-
Barium	ND	0.570	5.00	-	-	-
Beryllium	ND	0.0730	0.500	-	-	-
Cadmium	ND	0.0610	0.500	-	-	-
Chromium	ND	0.130	0.500	-	-	-
Cobalt	ND	0.0520	0.500	-	-	-
Copper	ND	0.180	0.500	-	-	-
Lead	ND	0.140	0.500	-	-	-
Mercury	ND	0.0320	0.0500	-	-	-
Molybdenum	ND	0.160	0.500	-	-	-
Nickel	ND	0.170	0.500	-	-	-
Selenium	ND	0.150	0.500	-	-	-
Silver	ND	0.120	0.500	-	-	-
Thallium	ND	0.0670	0.500	-	-	-
Vanadium	ND	0.130	0.500	-	-	-
Zinc	ND	3.00	5.00	-	-	-
Surrogate Recovery						
Terbium	549			500	110	70-130

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Quality Control Report

Client:	Compass Land Group	**WorkOrder:**	2007E61
Date Prepared:	07/29/2020	**BatchID:**	202765
Date Analyzed:	07/30/2020	**Extraction Method:**	SW3050B
Instrument:	ICP-MS4	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/kg
Project:	Clayton Metals Soil Sampling	**Sample ID:**	MB/LCS/LCSD-202765

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aluminum	527	519	500	105	104	75-125	1.55	20
Antimony	54.0	54.3	50	108	109	75-125	0.524	20
Arsenic	53.2	52.0	50	106	104	75-125	2.20	20
Barium	525	527	500	105	105	75-125	0.442	20
Beryllium	53.0	51.3	50	106	103	75-125	3.23	20
Cadmium	52.2	51.8	50	104	104	75-125	0.846	20
Chromium	53.1	53.0	50	106	106	75-125	0.189	20
Cobalt	53.9	52.8	50	108	106	75-125	2.15	20
Copper	53.2	53.0	50	106	106	75-125	0.401	20
Lead	52.5	52.7	50	105	105	75-125	0.411	20
Mercury	1.19	1.20	1.25	95	96	75-125	1.51	20
Molybdenum	51.4	51.8	50	103	104	75-125	0.746	20
Nickel	53.9	52.2	50	108	104	75-125	3.25	20
Selenium	51.4	50.8	50	103	102	75-125	1.22	20
Silver	52.4	53.0	50	105	106	75-125	1.14	20
Thallium	53.1	54.2	50	106	108	75-125	2.02	20
Vanadium	53.5	52.4	50	107	105	75-125	2.22	20
Zinc	521	521	500	104	104	75-125	0.127	20
Surrogate Recovery								
Terbium	562	550	500	112	110	70-130	2.20	20

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 2007E61 **ClientCode: CLGMP** **QuoteID: 202737**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☐ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag
☐ Detection Summary ☑ Dry-Weight

Report to:
Yasha Saber
Compass Land Group
3140 Peacekeeper Way #102
McClellan Park, CA 95652
(916) 825-4997 FAX:

Email: ysaber@compassland.net
cc/3rd Party: sage@compassland.net;
PO: 012
Project: Clayton Metals Soil Sampling

Bill to:
Accounts Payable
Compass Land Group
3140 Peacekeeper Way #102
McClellan Park, 95652
ysaber@compassland.net

Requested TAT: 5 days;

Date Received: **07/29/2020**
Date Logged: **07/29/2020**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
2007E61-001	Quarry-Outlet-01	Soil	7/29/2020 11:09	☐	A	A	A	A								
2007E61-002	Quarry-UpperRim-02	Soil	7/29/2020 11:45	☐	A	A	A	A								
2007E61-003	Quarry-Kx RipRap-03	Soil	7/29/2020 11:27	☐	A	A	A	A								
2007E61-004	Overburden-North-04	Soil	7/29/2020 12:47	☐	A	A	A	A								
2007E61-005	Overburden-South-05	Soil	7/29/2020 12:13	☐	A	A	A	A								
2007E61-006	Plant-Drainage-06	Soil	7/29/2020 13:47	☐	A	A	A	A								
2007E61-007	Plant-Office/Yard-07	Soil	7/29/2020 13:10	☐	A	A	A	A								
2007E61-008	Plant-Ponds-08	Soil	7/29/2020 10:35	☐	A	A	A	A								
2007E61-009	Plant-AgPlant-09	Soil	7/29/2020 10:55	☐	A	A	A	A								

Test Legend:

1	7199_TTLC_LL_S	2	CAM17MS_TTLC_S	3	FTIR_ANALYSIS_SOLID	4	PRDisposal Fee
5		6		7		8	
9		10		11		12	

Project Manager: Rosa Venegas

Prepared by: Valerie Alfaro

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: COMPASS LAND GROUP
Client Contact: Yasha Saber
Contact's Email: ysaber@compassland.net

Project: Clayton Metals Soil Sampling
Comments

Work Order: 2007E61
QC Level:
Date Logged: 7/29/2020

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☐ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
2007E61-001A	Quarry-Outlet-01	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 11:09	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-002A	Quarry-UpperRim-02	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 11:45	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-003A	Quarry-Kx RipRap-03	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 11:27	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-004A	Overburden-North-04	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 12:47	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-005A	Overburden-South-05	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 12:13	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

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WORK ORDER SUMMARY

Client Name: COMPASS LAND GROUP **Project:** Clayton Metals Soil Sampling **Work Order:** 2007E61
Client Contact: Yasha Saber **QC Level:**
Contact's Email: ysaber@compassland.net **Comments** **Date Logged:** 7/29/2020

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☐ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
2007E61-006A	Plant-Drainage-06	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 13:47	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-007A	Plant-Office/Yard-07	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 13:10	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-008A	Plant-Ponds-08	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 10:35	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	
2007E61-009A	Plant-AgPlant-09	Soil	FTIR Analysis	1	8OZ GJ, Unpres	☐	7/29/2020 10:55	5 days		☐	
			SW6020 (CAM 17)			☐		5 days		☐	
			SW7199 (Hexavalent chromium, Low-Level)			☐		5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

General COC

MAI Work Order # 2007E61

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Telephone: (877) 252-9262 / Fax: (925) 252-9269
www.mccampbell.com main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush | 2 Day Rush | 3 Day Rush | STD | Quote # 202737
J-Flag / MDL | ESL | Cleanup Approved | Dry Weight | Bottle Order #
Delivery Format: PDF | GeoTracker EDF | EDD | Write On (DW) | Detect Summary

Report To: Yasha Saber; Sage Thurmond — Bill To: Yasha Saber
Company: Compass Land Group
Email: ysaber@compassland.net
Alt Email: sage@compassland.net — Tele: (916) 767-1602
Project Name: Clayton Metals Soil Sampling — Project #: n.a.
Project Location: 515 Mitchell Canyon Rd, Clayton — PO # 012
Sampler Signature:

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative	FTIR Analysis (Bulk Crystalline Silica by N7602m)	SW7199 (Hexavalent chromium, Low-Level)	SW6020 (Metals)
Quarry-Outlet-01	7/29/20	11:09	1	S	1	●	●	●
Quarry-UpperRim-02	7/29/20	11:45	1	S	1	●	●	●
Quarry-Kx RipRap-03	7/29/20	11:27	1	S	1	●	●	●
Overburden-North-04	7/29/20	12:47	1	S	1	●	●	●
Overburden-South-05	7/29/20	12:13	1	S	1	●	●	●
Plant-Drainage-06	7/29/20	13:47	1	S	1	●	●	●
Plant-Office/Yard-07	7/29/20	13:10	1	S	1	●	●	●
Plant-Ponds-08	7/29/20	10:35	1	S	1	●	●	●
Plant-AgPlant-09	7/29/20	10:55	1	S	1	●	●	●

Analysis Requested

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.
Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
Sage Thurmond / Compass Land Group	7-29-20	14:33		7/29/20	14:33

Comments / Instructions
Pulverize up to 2 Samples ($100.00) if needed. Please call if more is necessary.

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other
Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 2.8 °C (wet) Initials AA

Page 1 of 1

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Sample Receipt Checklist

Client Name: **Compass Land Group**
Project: **Clayton Metals Soil Sampling**

WorkOrder №: **2007E61** Matrix: Soil
Carrier: Client Drop-In

Date and Time Received: **7/29/2020 14:33**
Date Logged: **7/29/2020**
Received by: Valerie Alfaro
Logged by: Valerie Alfaro

Chain of Custody (COC) Information

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Sample IDs noted by Client on COC?	Yes	☑	No	☐		
Date and Time of collection noted by Client on COC?	Yes	☑	No	☐		
Sampler's name noted on COC?	Yes	☑	No	☐		
COC agrees with Quote?	Yes	☑	No	☐	NA	☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes	☐	No	☐	NA	☑
Shipping container/cooler in good condition?	Yes	☑	No	☐		
Samples in proper containers/bottles?	Yes	☑	No	☐		
Sample containers intact?	Yes	☑	No	☐		
Sufficient sample volume for indicated test?	Yes	☑	No	☐		

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes	☑	No	☐	NA	☐
Samples Received on Ice?	Yes	☑	No	☐		
(Ice Type: WET ICE)						
Sample/Temp Blank temperature	Temp: 2.8°C				NA	☐
Water - VOA vials have zero headspace / no bubbles?	Yes	☐	No	☐	NA	☑
Sample labels checked for correct preservation?	Yes	☑	No	☐		
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes	☐	No	☐	NA	☑
UCMR Samples:						
pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes	☐	No	☐	NA	☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes	☐	No	☐	NA	☑

Comments:

Appendix C
HARP Model Excerpts

Appendix C
HARP Model Excerpts
September 2020

Screenshot of Emissions Inventory

Emission Inventory

Add | Import | Export | Delete All | Options | Filter: All | All

SrcID	StkID	ProID	PolID	PolAbbrev	Multiplier	Annual Ems (lbs/yr)	Max Hr Ems (lbs/hr)	MWAF
OVERB...	0	0	9901	DieselExhPM	1	0.096	3.29E-05	1
OVERB...	0	0	7429905	Aluminum	1	3.9	0.0667	1
OVERB...	0	0	7440382	Arsenic	1	0.000767	1.31E-05	1
OVERB...	0	0	7440393	Barium	1	0.0169	0.000289	1
OVERB...	0	0	7440417	Beryllium	1	2.82E-05	4.82E-07	1
OVERB...	0	0	7440473	Chromium	1	0.00343	5.86E-05	1
OVERB...	0	0	7440484	Cobalt	1	0.00156	2.67E-05	1
OVERB...	0	0	7440508	Copper	1	0.00759	0.00013	1
OVERB...	0	0	7439921	Lead	1	0.000754	1.29E-05	1
OVERB...	0	0	7439976	Mercury	1	8.2E-06	1.4E-07	1
OVERB...	0	0	7440020	Nickel	1	0.00282	4.82E-05	1
OVERB...	0	0	7440622	Vanadium	1	0.0113	0.000193	1
OVERB...	0	0	7440666	Zinc	1	0.00793	0.000136	1
OVERB...	0	0	1175	Silica, Crystln	1	0.69	0.01	1
PLANT	0	0	9901	DieselExhPM	1	1.046	0.000358	1
PLANT	0	0	7429905	Aluminum	1	101	0.366	1
PLANT	0	0	7440382	Arsenic	1	0.00115	4.13E-06	1
PLANT	0	0	7440393	Barium	1	0.0212	7.64E-05	1
PLANT	0	0	7440417	Beryllium	1	0	0	1
PLANT	0	0	7440473	Chromium	1	0.108	0.000389	1
PLANT	0	0	7440484	Cobalt	1	0.089	0.000321	1
PLANT	0	0	7440508	Copper	1	0.578	0.00208	1
PLANT	0	0	7439921	Lead	1	0.00212	7.64E-06	1
PLANT	0	0	7439976	Mercury	1	0.00138	4.99E-06	1
PLANT	0	0	7440020	Nickel	1	0.0778	0.000281	1
PLANT	0	0	7440622	Vanadium	1	0.405	0.00146	1
PLANT	0	0	7440666	Zinc	1	0.0735	0.000265	1
PLANT	0	0	1175	Silica, Crystln	1	0	0	1

Screenshot of Emissions Inventory (Continued)

Emission Inventory

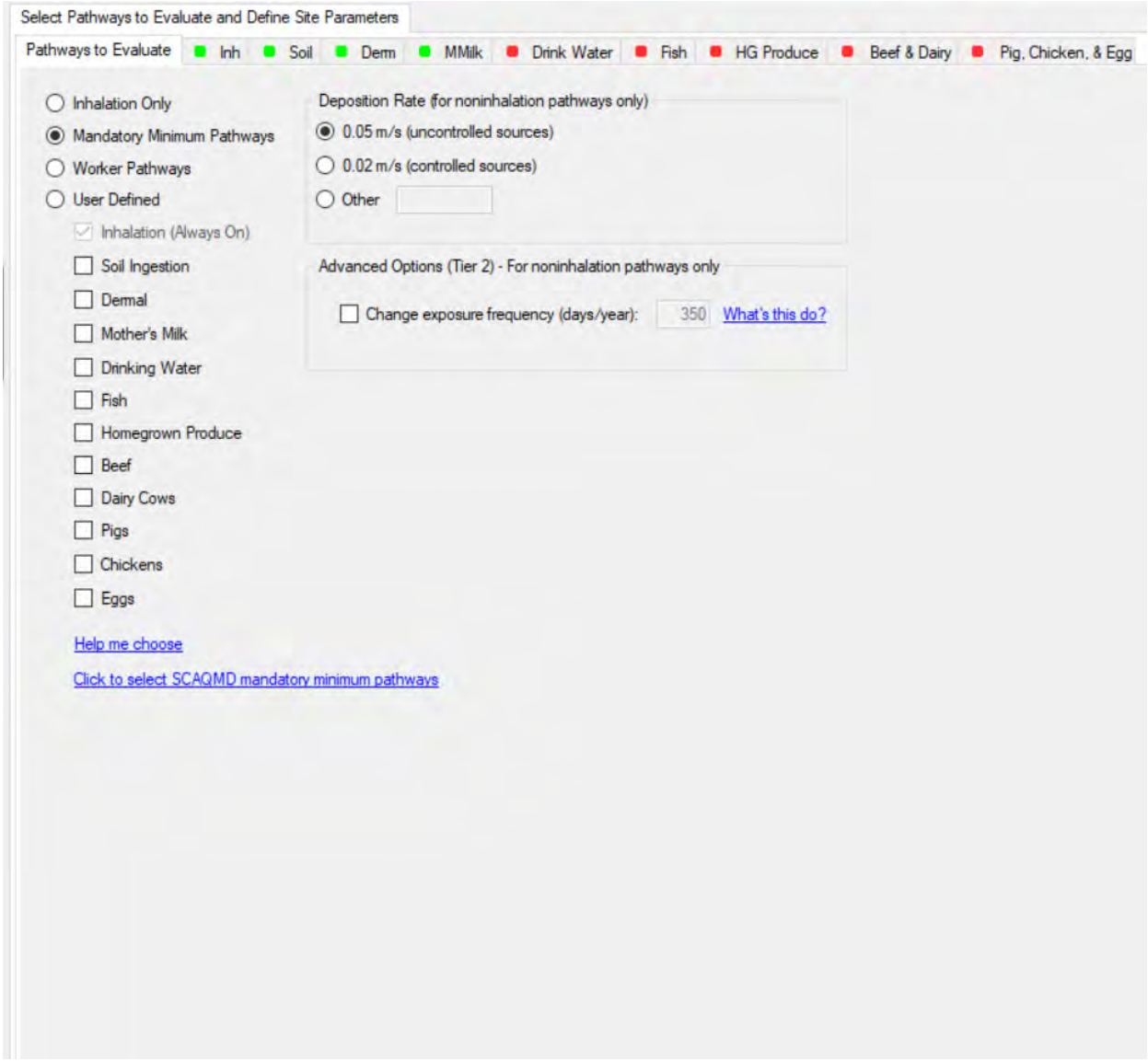
Add Import Export Delete All Options Filter: All All

SrcID	StkID	ProID	PolID	PolAbbrev	Multiplier	Annual Ems (lbs/yr)	Max Hr Ems (lbs/hr)	MWAF
PLANT	0	0	1175	Silica, Crystln	1	0	0	1
QUARRY	0	0	9901	DieselExhPM	1	0.966	0.000331	1
QUARRY	0	0	7429905	Aluminum	1	40.9	0.502	1
QUARRY	0	0	7440382	Arsenic	1	0.00149	1.83E-05	1
QUARRY	0	0	7440393	Barium	1	0.0397	0.000487	1
QUARRY	0	0	7440417	Beryllium	1	0	0	1
QUARRY	0	0	7440473	Chromium	1	0.0471	0.000577	1
QUARRY	0	0	7440484	Cobalt	1	0.0348	0.000426	1
QUARRY	0	0	7440508	Copper	1	0.179	0.0022	1
QUARRY	0	0	7439921	Lead	1	0.00114	1.4E-05	1
QUARRY	0	0	7439976	Mercury	1	0.000205	2.51E-06	1
QUARRY	0	0	7440020	Nickel	1	0.031	0.00038	1
QUARRY	0	0	7440622	Vanadium	1	0.161	0.00197	1
QUARRY	0	0	7440666	Zinc	1	0.0485	0.000595	1
QUARRY	0	0	1175	Silica, Crystln	1	0	0	1
DRAINA...	0	0	9901	DieselExhPM	1	0.018	6.16E-06	1
DRAINA...	0	0	7429905	Aluminum	1	0.0603	0.000774	1
DRAINA...	0	0	7440382	Arsenic	1	0	0	1
DRAINA...	0	0	7440393	Barium	1	0	0	1
DRAINA...	0	0	7440417	Beryllium	1	0	0	1
DRAINA...	0	0	7440473	Chromium	1	7.89E-05	1.01E-06	1
DRAINA...	0	0	7440484	Cobalt	1	7.42E-05	9.53E-07	1
DRAINA...	0	0	7440508	Copper	1	0.000684	8.78E-06	1
DRAINA...	0	0	7439921	Lead	1	0	0	1
DRAINA...	0	0	7439976	Mercury	1	7.54E-07	9.68E-09	1
DRAINA...	0	0	7440020	Nickel	1	4.87E-05	6.25E-07	1
DRAINA...	0	0	7440622	Vanadium	1	0.000255	3.28E-06	1
DRAINA...	0	0	7440666	Zinc	1	4.18E-05	5.36E-07	1
DRAINA...	0	0	1175	Silica, Crystln	1	0	0	1

Count: 56

Appendix C
HARP Model Excerpts
September 2020

Screenshot of Exposure Pathways for Cancer Risk Evaluation



Screenshot of Plot Files

List of PLOTFILES to Convert

Add Import

	Source ID	PERIOD File	Max 1-Hr File
▶	OVERBURD	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\PE00G001.PLT	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\01H1G001.PLT
	PLANT	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\PE00G002.PLT	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\01H1G002.PLT
	QUARRY	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\PE00G003.PLT	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\01H1G003.PLT
	DRAINAGE	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\PE00G004.PLT	C:\Lakes\Projects\P012 Clayton HRA\Clayton_HRA.AD\01H1G004.PLT

Appendix C
HARP Model Excerpts
September 2020

Screenshot of Cancer Risk By Receptor

View Risk Results

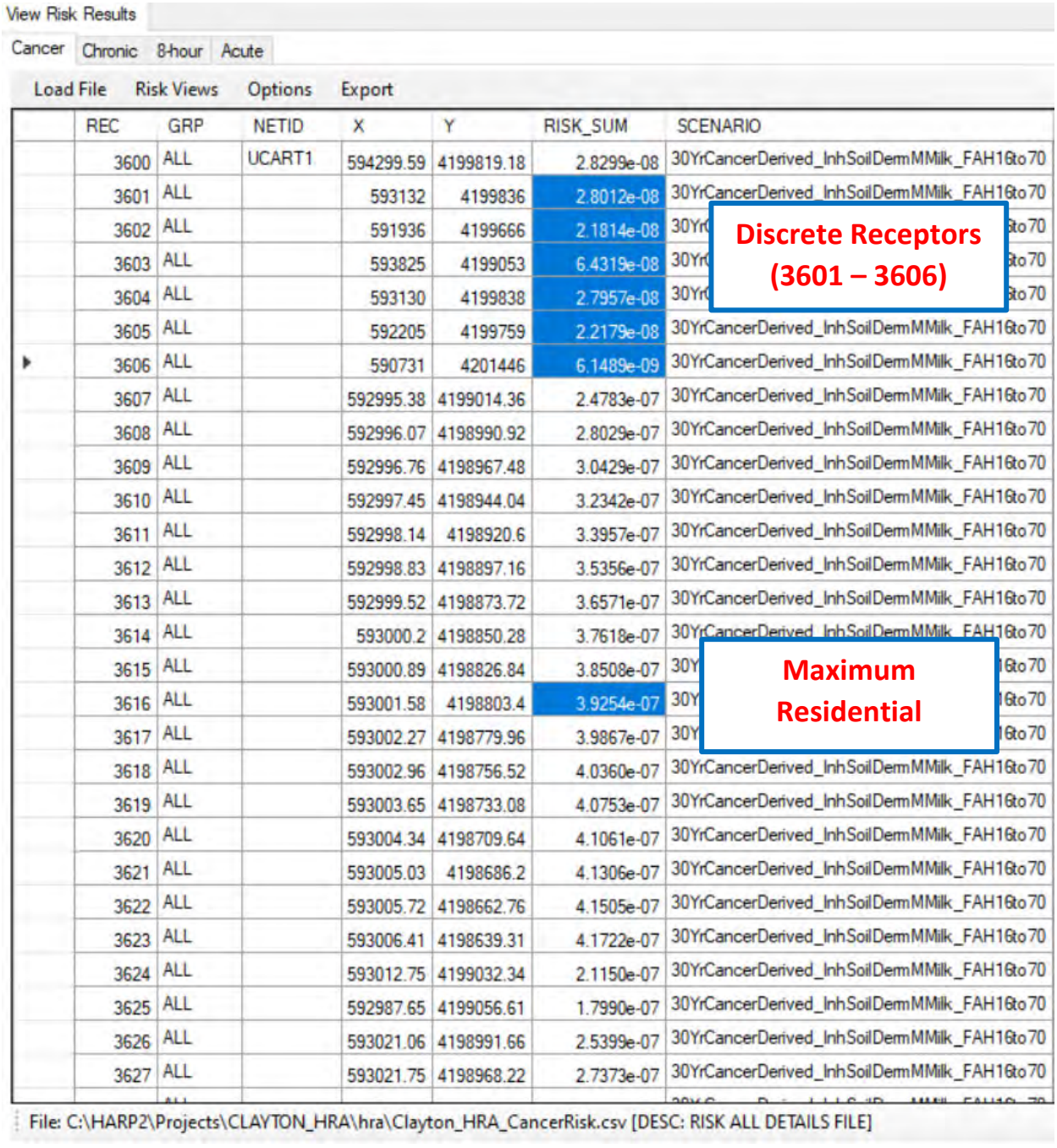
Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Options | Export

	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
	1	ALL	UCART1	591349.59	4196869.18	9.0717e-10	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	2	ALL	UCART1	591399.59	4196869.18	9.5237e-10	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	3	ALL	UCART1	591449.59	4196869.18	1.0023e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	4	ALL	UCART1	591499.59	4196869.18	9.9755e-10	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	5	ALL	UCART1	591549.59	4196869.18	9.8556e-10	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	6	ALL	UCART1	591599.59	4196869.18	9.9114e-10	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	7	ALL	UCART1	591649.59	4196869.18	1.0853e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	8	ALL	UCART1	591699.59	4196869.18	1.2031e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	9	ALL	UCART1	591749.59	4196869.18	1.3381e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	10	ALL	UCART1	591799.59	4196869.18	1.4909e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	11	ALL	UCART1	591849.59	4196869.18	1.6673e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	12	ALL	UCART1	591899.59	4196869.18	1.9028e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	13	ALL	UCART1	591949.59	4196869.18	2.2572e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	14	ALL	UCART1	591999.59	4196869.18	2.7938e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	15	ALL	UCART1	592049.59	4196869.18	3.8780e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	16	ALL	UCART1	592099.59	4196869.18	5.6211e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	17	ALL	UCART1	592149.59	4196869.18	6.6550e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	18	ALL	UCART1	592199.59	4196869.18	7.6918e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	19	ALL	UCART1	592249.59	4196869.18	9.0013e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	20	ALL	UCART1	592299.59	4196869.18	1.1209e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	21	ALL	UCART1	592349.59	4196869.18	1.8617e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	22	ALL	UCART1	592399.59	4196869.18	2.7785e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	23	ALL	UCART1	592449.59	4196869.18	2.8017e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	24	ALL	UCART1	592499.59	4196869.18	3.1854e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	25	ALL	UCART1	592549.59	4196869.18	1.1467e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	26	ALL	UCART1	592599.59	4196869.18	8.8793e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	27	ALL	UCART1	592649.59	4196869.18	7.9213e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	28	ALL	UCART1	592699.59	4196869.18	9.2090e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70

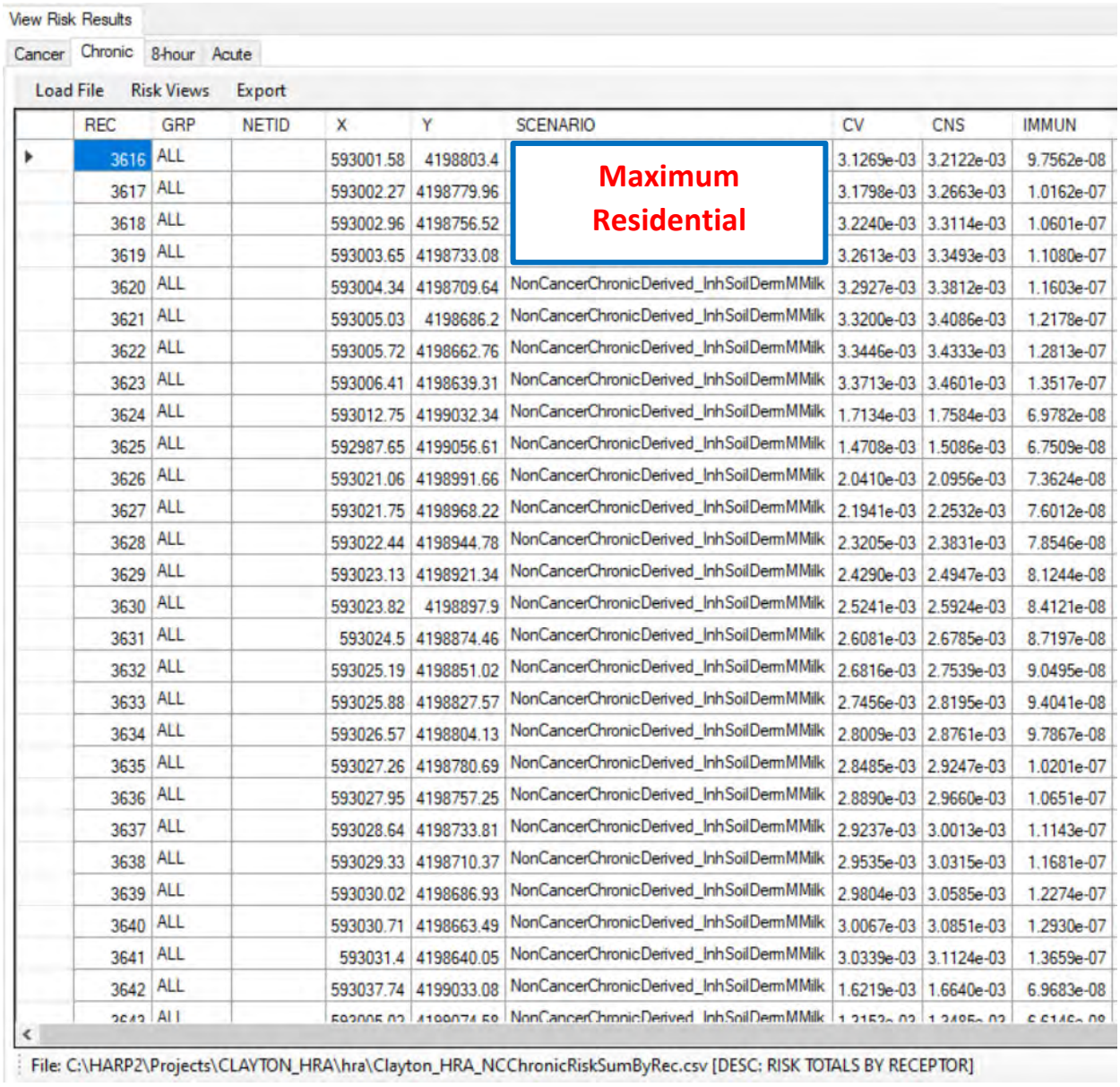
File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_CancerRisk.csv [DESC: RISK ALL DETAILS FILE]

Screenshot of Cancer Risk By Receptor (Continued)



REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
3600	ALL	UCART1	594299.59	4199819.18	2.8299e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3601	ALL		593132	4199836	2.8012e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3602	ALL		591936	4199666	2.1814e-08	30Yr…to70
3603	ALL		593825	4199053	6.4319e-08	30Yr…to70
3604	ALL		593130	4199838	2.7957e-08	30Yr…to70
3605	ALL		592205	4199759	2.2179e-08	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3606	ALL		590731	4201446	6.1489e-09	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3607	ALL		592995.38	4199014.36	2.4783e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3608	ALL		592996.07	4198990.92	2.8029e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3609	ALL		592996.76	4198967.48	3.0429e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3610	ALL		592997.45	4198944.04	3.2342e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3611	ALL		592998.14	4198920.6	3.3957e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3612	ALL		592998.83	4198897.16	3.5356e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3613	ALL		592999.52	4198873.72	3.6571e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3614	ALL		593000.2	4198850.28	3.7618e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3615	ALL		593000.89	4198826.84	3.8508e-07	30Y…16to70
3616	ALL		593001.58	4198803.4	3.9254e-07	30Y…16to70
3617	ALL		593002.27	4198779.96	3.9867e-07	30Y…16to70
3618	ALL		593002.96	4198756.52	4.0360e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3619	ALL		593003.65	4198733.08	4.0753e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3620	ALL		593004.34	4198709.64	4.1061e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3621	ALL		593005.03	4198686.2	4.1306e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3622	ALL		593005.72	4198662.76	4.1505e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3623	ALL		593006.41	4198639.31	4.1722e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3624	ALL		593012.75	4199032.34	2.1150e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3625	ALL		592987.65	4199056.61	1.7990e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3626	ALL		593021.06	4198991.66	2.5399e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
3627	ALL		593021.75	4198968.22	2.7373e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70

Screenshot of Chronic Hazard Index by Receptor



View Risk Results

Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Export

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN
3616	ALL		593001.58	4198803.4	Maximum Residential	3.1269e-03	3.2122e-03	9.7562e-08
3617	ALL		593002.27	4198779.96		3.1798e-03	3.2663e-03	1.0162e-07
3618	ALL		593002.96	4198756.52		3.2240e-03	3.3114e-03	1.0601e-07
3619	ALL		593003.65	4198733.08		3.2613e-03	3.3493e-03	1.1080e-07
3620	ALL		593004.34	4198709.64	NonCancerChronicDerived_InhSoilDermMMilk	3.2927e-03	3.3812e-03	1.1603e-07
3621	ALL		593005.03	4198686.2	NonCancerChronicDerived_InhSoilDermMMilk	3.3200e-03	3.4086e-03	1.2178e-07
3622	ALL		593005.72	4198662.76	NonCancerChronicDerived_InhSoilDermMMilk	3.3446e-03	3.4333e-03	1.2813e-07
3623	ALL		593006.41	4198639.31	NonCancerChronicDerived_InhSoilDermMMilk	3.3713e-03	3.4601e-03	1.3517e-07
3624	ALL		593012.75	4199032.34	NonCancerChronicDerived_InhSoilDermMMilk	1.7134e-03	1.7584e-03	6.9782e-08
3625	ALL		592987.65	4199056.61	NonCancerChronicDerived_InhSoilDermMMilk	1.4708e-03	1.5086e-03	6.7509e-08
3626	ALL		593021.06	4198991.66	NonCancerChronicDerived_InhSoilDermMMilk	2.0410e-03	2.0956e-03	7.3624e-08
3627	ALL		593021.75	4198968.22	NonCancerChronicDerived_InhSoilDermMMilk	2.1941e-03	2.2532e-03	7.6012e-08
3628	ALL		593022.44	4198944.78	NonCancerChronicDerived_InhSoilDermMMilk	2.3205e-03	2.3831e-03	7.8546e-08
3629	ALL		593023.13	4198921.34	NonCancerChronicDerived_InhSoilDermMMilk	2.4290e-03	2.4947e-03	8.1244e-08
3630	ALL		593023.82	4198897.9	NonCancerChronicDerived_InhSoilDermMMilk	2.5241e-03	2.5924e-03	8.4121e-08
3631	ALL		593024.5	4198874.46	NonCancerChronicDerived_InhSoilDermMMilk	2.6081e-03	2.6785e-03	8.7197e-08
3632	ALL		593025.19	4198851.02	NonCancerChronicDerived_InhSoilDermMMilk	2.6816e-03	2.7539e-03	9.0495e-08
3633	ALL		593025.88	4198827.57	NonCancerChronicDerived_InhSoilDermMMilk	2.7456e-03	2.8195e-03	9.4041e-08
3634	ALL		593026.57	4198804.13	NonCancerChronicDerived_InhSoilDermMMilk	2.8009e-03	2.8761e-03	9.7867e-08
3635	ALL		593027.26	4198780.69	NonCancerChronicDerived_InhSoilDermMMilk	2.8485e-03	2.9247e-03	1.0201e-07
3636	ALL		593027.95	4198757.25	NonCancerChronicDerived_InhSoilDermMMilk	2.8890e-03	2.9660e-03	1.0651e-07
3637	ALL		593028.64	4198733.81	NonCancerChronicDerived_InhSoilDermMMilk	2.9237e-03	3.0013e-03	1.1143e-07
3638	ALL		593029.33	4198710.37	NonCancerChronicDerived_InhSoilDermMMilk	2.9535e-03	3.0315e-03	1.1681e-07
3639	ALL		593030.02	4198686.93	NonCancerChronicDerived_InhSoilDermMMilk	2.9804e-03	3.0585e-03	1.2274e-07
3640	ALL		593030.71	4198663.49	NonCancerChronicDerived_InhSoilDermMMilk	3.0067e-03	3.0851e-03	1.2930e-07
3641	ALL		593031.4	4198640.05	NonCancerChronicDerived_InhSoilDermMMilk	3.0339e-03	3.1124e-03	1.3659e-07
3642	ALL		593037.74	4199033.08	NonCancerChronicDerived_InhSoilDermMMilk	1.6219e-03	1.6640e-03	6.9683e-08

File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_NCChronicRiskSumByRec.csv [DESC: RISK TOTALS BY RECEPTOR]

Screenshot of Chronic Hazard Index by Receptor (continued)

View Risk Results

Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Export

	SP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
▶	77e-03	3.1269e-03	0.0000e+00	0.0000e+00	0.0000			.0000e+00	5.0977e-03
	91e-03	3.1798e-03	0.0000e+00	0.0000e+00	0.0000			.0000e+00	5.1791e-03
	53e-03	3.2240e-03	0.0000e+00	0.0000e+00	0.0000			.0000e+00	5.2453e-03
	90e-03	3.2613e-03	0.0000e+00	0.0000e+00	0.0000			.0000e+00	5.2990e-03
	22e-03	3.2927e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.9652e-03	0.0000e+00	0.0000e+00	5.3422e-03
	73e-03	3.3200e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.9723e-03	0.0000e+00	0.0000e+00	5.3773e-03
	71e-03	3.3446e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.9768e-03	0.0000e+00	0.0000e+00	5.4071e-03
	94e-03	3.3713e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.9817e-03	0.0000e+00	0.0000e+00	5.4394e-03
	15e-03	1.7134e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.0042e-03	0.0000e+00	0.0000e+00	2.7615e-03
	56e-03	1.4708e-03	0.0000e+00	0.0000e+00	0.0000e+00	8.4708e-04	0.0000e+00	0.0000e+00	2.3556e-03
	78e-03	2.0410e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.2147e-03	0.0000e+00	0.0000e+00	3.3078e-03
	21e-03	2.1941e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.3119e-03	0.0000e+00	0.0000e+00	3.5621e-03
	08e-03	2.3205e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.3910e-03	0.0000e+00	0.0000e+00	3.7708e-03
	89e-03	2.4290e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.4579e-03	0.0000e+00	0.0000e+00	3.9489e-03
	40e-03	2.5241e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.5154e-03	0.0000e+00	0.0000e+00	4.1040e-03
	97e-03	2.6081e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.5651e-03	0.0000e+00	0.0000e+00	4.2397e-03
	74e-03	2.6816e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.6074e-03	0.0000e+00	0.0000e+00	4.3574e-03
	86e-03	2.7456e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.6430e-03	0.0000e+00	0.0000e+00	4.4586e-03
	47e-03	2.8009e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.6723e-03	0.0000e+00	0.0000e+00	4.5447e-03
	71e-03	2.8485e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.6958e-03	0.0000e+00	0.0000e+00	4.6171e-03
	70e-03	2.8890e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.7141e-03	0.0000e+00	0.0000e+00	4.6770e-03
	64e-03	2.9237e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.7279e-03	0.0000e+00	0.0000e+00	4.7264e-03
	69e-03	2.9535e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.7376e-03	0.0000e+00	0.0000e+00	4.7669e-03
	14e-03	2.9804e-03	0.0000e+00	0.0000e+00	0.0000e+00	1.7446e-03	0.0000e+00	0.0000e+00	4.8014e-03

Maximum Residential (ID 3616)

File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_NCChronicRiskSumByRec.csv [DESC: RISK TOTALS BY RECEPTOR]

Screenshot of Acute Hazard Index by Receptor

View Risk Results

Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Export

	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN
▶	3707	ALL		593057.62	4198363.59			-02	3.3896e-01
	3708	ALL		593060.2	4198338.95			-02	3.3845e-01
	3709	ALL		593062.77	4198314.32			-02	3.2859e-01
	3710	ALL		593065.35	4198289.68		1.6897e-02	1.7925e-02	3.1645e-01
	3711	ALL		593067.92	4198265.05	NonCancerAcute	1.6655e-02	1.7692e-02	3.1636e-01
	3712	ALL		593069.62	4198489.37	NonCancerAcute	1.7209e-02	1.8140e-02	3.0646e-01
	3713	ALL		593072.19	4198464.73	NonCancerAcute	1.7099e-02	1.8054e-02	3.0975e-01
	3714	ALL		593074.77	4198440.1	NonCancerAcute	1.7422e-02	1.8409e-02	3.1728e-01
	3715	ALL		593077.34	4198415.46	NonCancerAcute	1.7759e-02	1.8779e-02	3.2585e-01
	3716	ALL		593079.91	4198390.82	NonCancerAcute	1.7928e-02	1.8971e-02	3.3133e-01
	3717	ALL		593082.49	4198366.19	NonCancerAcute	1.7924e-02	1.8980e-02	3.3344e-01
	3718	ALL		593085.06	4198341.55	NonCancerAcute	1.7488e-02	1.8532e-02	3.2668e-01
	3719	ALL		593087.64	4198316.92	NonCancerAcute	1.6675e-02	1.7686e-02	3.1212e-01
	3720	ALL		593090.21	4198292.28	NonCancerAcute	1.6437e-02	1.7448e-02	3.1105e-01
	3721	ALL		593092.78	4198267.64	NonCancerAcute	1.5968e-02	1.6982e-02	3.0755e-01
	3722	ALL		593094.48	4198491.97	NonCancerAcute	1.6783e-02	1.7688e-02	2.9888e-01
	3723	ALL		593097.06	4198467.33	NonCancerAcute	1.7055e-02	1.7984e-02	3.0488e-01
	3724	ALL		593099.63	4198442.69	NonCancerAcute	1.7376e-02	1.8341e-02	3.1384e-01
	3725	ALL		593102.2	4198418.06	NonCancerAcute	1.7489e-02	1.8481e-02	3.1921e-01
	3726	ALL		593104.78	4198393.42	NonCancerAcute	1.7522e-02	1.8537e-02	3.2346e-01
	3727	ALL		593107.35	4198368.79	NonCancerAcute	1.7143e-02	1.8159e-02	3.1947e-01
	3728	ALL		593109.93	4198344.15	NonCancerAcute	1.6395e-02	1.7393e-02	3.0802e-01
	3729	ALL		593112.5	4198319.51	NonCancerAcute	1.6184e-02	1.7184e-02	3.0777e-01
	3730	ALL		593115.07	4198294.88	NonCancerAcute	1.5700e-02	1.6686e-02	3.0185e-01
	3731	ALL		593117.65	4198270.24	NonCancerAcute	1.4946e-02	1.5919e-02	2.9275e-01
	3732	ALL		593033.33	4198229.01	NonCancerAcute	1.6784e-02	1.7824e-02	3.1789e-01
	3733	ALL		593025.05	4198206.95	NonCancerAcute	1.6604e-02	1.7648e-02	3.1717e-01
	3734	ALL		593016.78	4198184.89	NonCancerAcute	1.6324e-02	1.7364e-02	3.1412e-01

Maximum Residential

File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_AcuteOnly_NCAcuteRisk.csv [DESC: RISK ALL DETAILS]

Screenshot of Acute Hazard Index by Receptor (continued)

View Risk Results

Cancer | Chronic | 8-hour | Acute

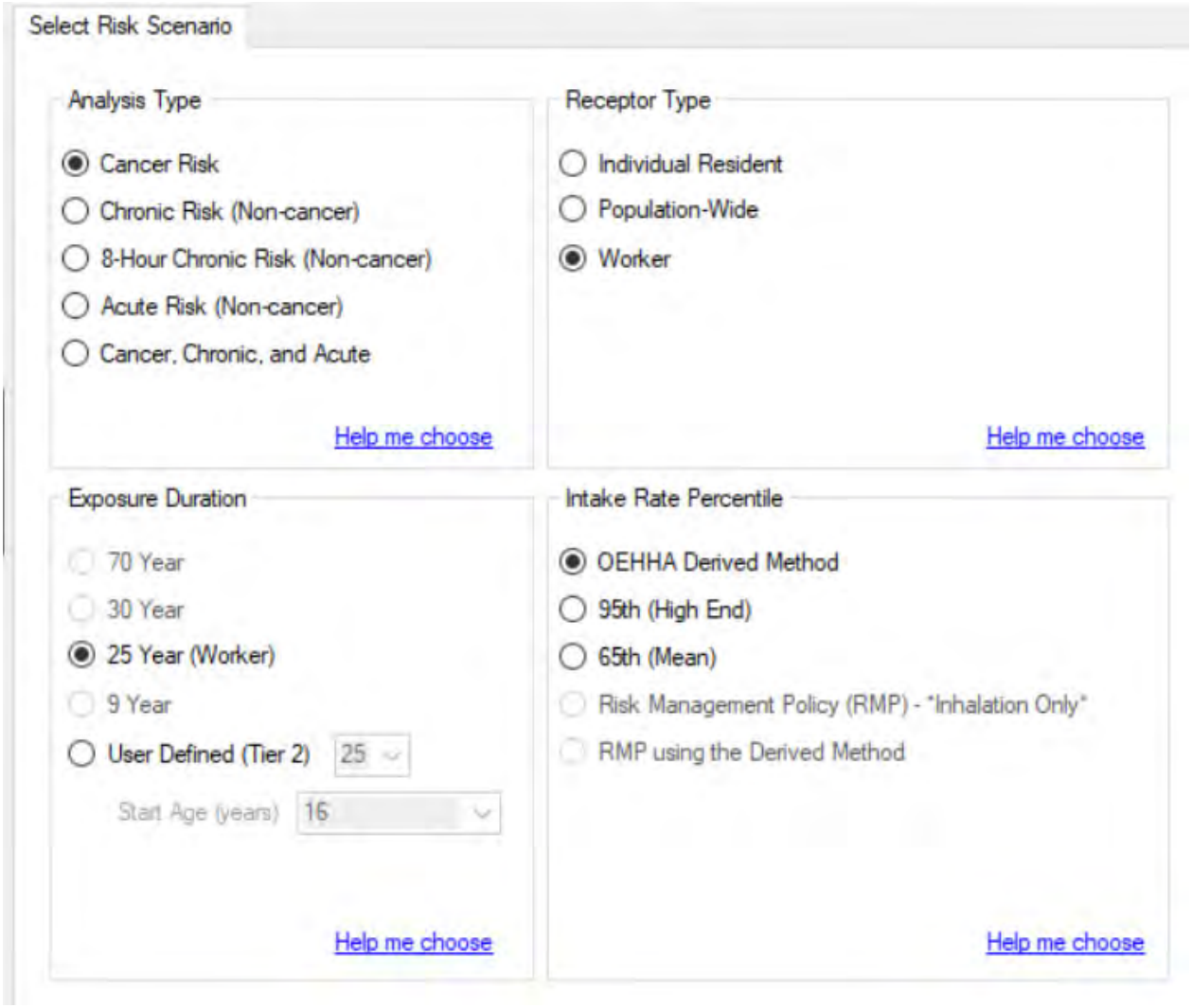
Load File | Risk Views | Export

	ESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
▶	637e-02	0.0000e+00	1.1543e-02	0.0000e+00	0.0			0.0000e+00	3.3896e-01
	615e-02	0.0000e+00	1.1526e-02	0.0000e+00	0.0			0.0000e+00	3.3845e-01
	160e-02	0.0000e+00	1.1188e-02	0.0000e+00	0.0			0.0000e+00	3.2859e-01
	616e-02	0.0000e+00	1.0772e-02	0.0000e+00	0.0			0.0000e+00	3.1645e-01
	629e-02	0.0000e+00	1.0775e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1636e-01
	084e-02	0.0000e+00	1.0421e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0646e-01
	259e-02	0.0000e+00	1.0540e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0975e-01
	613e-02	0.0000e+00	1.0797e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1728e-01
	017e-02	0.0000e+00	1.1091e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.2585e-01
	278e-02	0.0000e+00	1.1280e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.3133e-01
	385e-02	0.0000e+00	1.1355e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.3344e-01
	081e-02	0.0000e+00	1.1124e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.2668e-01
	416e-02	0.0000e+00	1.0626e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1212e-01
	378e-02	0.0000e+00	1.0595e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1105e-01
	237e-02	0.0000e+00	1.0481e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0755e-01
	735e-02	0.0000e+00	1.0165e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	2.9888e-01
	016e-02	0.0000e+00	1.0369e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0488e-01
	442e-02	0.0000e+00	1.0678e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1384e-01
	703e-02	0.0000e+00	1.0864e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1921e-01
	914e-02	0.0000e+00	1.1013e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.2346e-01
	744e-02	0.0000e+00	1.0879e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.1947e-01
	230e-02	0.0000e+00	1.0488e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0802e-01
	231e-02	0.0000e+00	1.0486e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0777e-01
	969e-02	0.0000e+00	1.0289e-02	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	3.0185e-01
	571e-02	0.0000e+00	9.9839e-03	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00	2.9275e-01

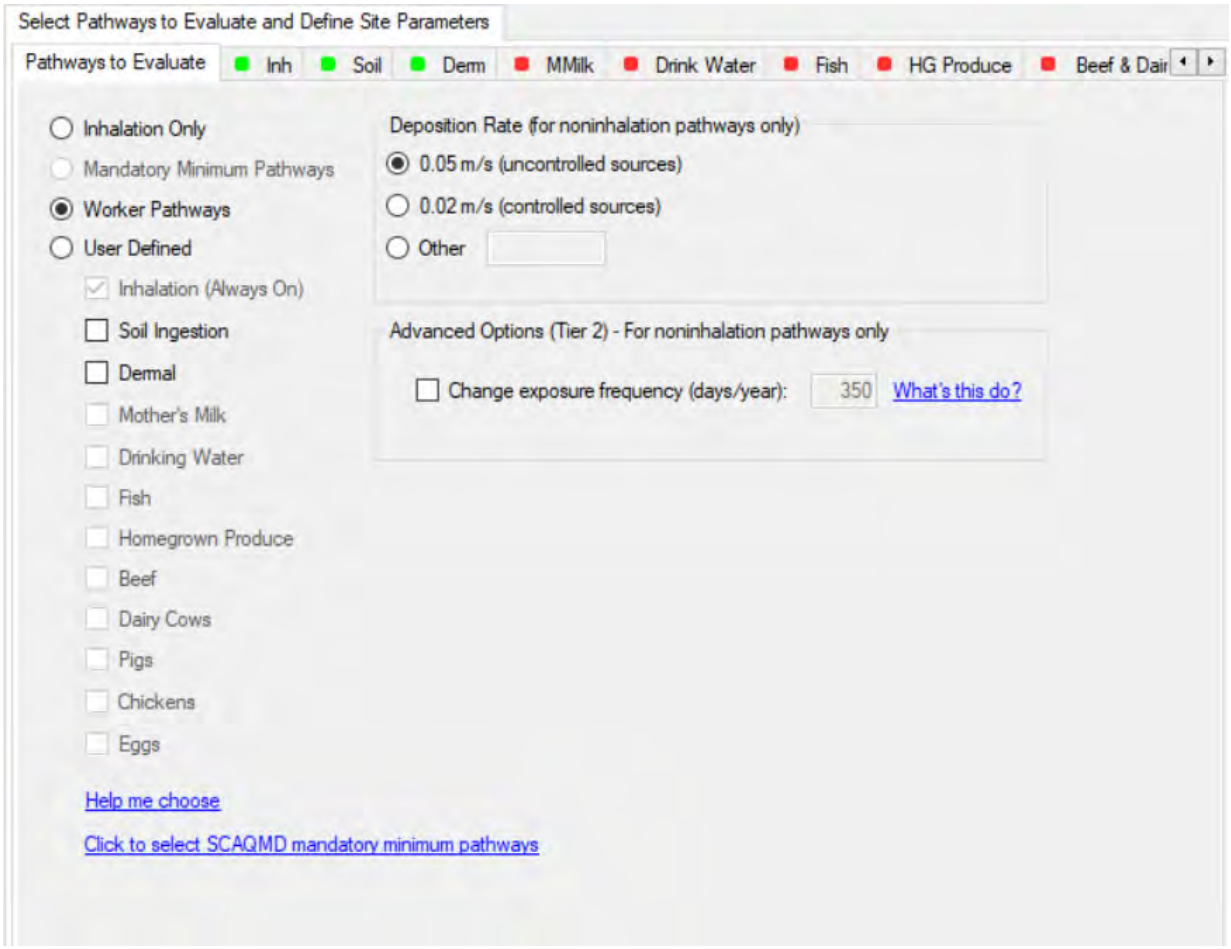
Maximum Residential (ID 3707)

File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_AcuteOnly_NCAcuteRisk.csv [DESC: RISK ALL DETAILS]

Screenshot of Worker Cancer Risk Selection



Screenshot of Worker Cancer Exposure Pathway



Screenshot of Worker Cancer Risk

View Risk Results

Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Options | Export

	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
▶	3826	ALL		592953.57	4197604.55	1.0923e-08	25YrCancerDerived_InhSoilDerm
	3827	ALL		592939.6	4197583.96	1.0	25YrCancerDerived_InhSoilDerm
	3828	ALL		592925.63	4197563.37	1.0	
	3829	ALL		592911.66	4197542.78	1.0	
	3830	ALL		592897.68	4197522.18	9.9	
	3831	ALL		592883.71	4197501.59	9.6	
	3832	ALL		592869.74	4197481	9.3176e-09	25YrCancerDerived_InhSoilDerm
	3833	ALL		593030.15	4197672.87	1.0634e-08	25YrCancerDerived_InhSoilDerm
	3834	ALL		593016.18	4197652.28	1.0526e-08	25YrCancerDerived_InhSoilDerm
	3835	ALL		593002.21	4197631.69	1.0394e-08	25YrCancerDerived_InhSoilDerm
	3836	ALL		592988.23	4197611.1	1.0238e-08	25YrCancerDerived_InhSoilDerm
	3837	ALL		592974.26	4197590.51	1.0057e-08	25YrCancerDerived_InhSoilDerm
	3838	ALL		592960.29	4197569.92	9.8584e-09	25YrCancerDerived_InhSoilDerm
	3839	ALL		592946.32	4197549.33	9.6431e-09	25YrCancerDerived_InhSoilDerm
	3840	ALL		592932.34	4197528.74	9.4063e-09	25YrCancerDerived_InhSoilDerm
	3841	ALL		592918.37	4197508.15	9.1563e-09	25YrCancerDerived_InhSoilDerm
	3842	ALL		592904.4	4197487.56	8.8900e-09	25YrCancerDerived_InhSoilDerm
	3843	ALL		592890.42	4197466.96	8.6121e-09	25YrCancerDerived_InhSoilDerm
	3844	ALL		593050.84	4197658.84	9.8329e-09	25YrCancerDerived_InhSoilDerm
	3845	ALL		593036.87	4197638.25	9.7319e-09	25YrCancerDerived_InhSoilDerm
	3846	ALL		593022.89	4197617.65	9.6128e-09	25YrCancerDerived_InhSoilDerm
	3847	ALL		593008.92	4197597.06	9.4746e-09	25YrCancerDerived_InhSoilDerm
	3848	ALL		592994.95	4197576.47	9.3141e-09	25YrCancerDerived_InhSoilDerm
	3849	ALL		592980.97	4197555.88	9.1321e-09	25YrCancerDerived_InhSoilDerm
	3850	ALL		592967	4197535.29	8.9370e-09	25YrCancerDerived_InhSoilDerm
	3851	ALL		592953.03	4197514.7	8.7249e-09	25YrCancerDerived_InhSoilDerm
	3852	ALL		592939.06	4197494.11	8.4999e-09	25YrCancerDerived_InhSoilDerm
	3853	ALL		592925.08	4197473.52	8.2623e-09	25YrCancerDerived_InhSoilDerm

Maximum Worker (Mitchell Canyon Visitor Center)

File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_Worker_Cancer_CancerRisk.csv [DESC: RISK ALL DE

Appendix D
HARP Model Risk Tables

Appendix D
HARP Model Risk Tables
September 2020

COMPASS LAND GROUP

Cancer Risk

	A	B	C	D	E	F	G	H	I	J	K	T
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Cancer Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra											
2	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK	SOIL_RISK	DERMAL_RISK	MMILK_RISK	
3	1	ALL	UCART1	591349.6	4196869	9.07E-10	30YrCancerDerived	7.48E-10	1.53E-10	6.21E-12	1.10E-14	
4	2	ALL	UCART1	591399.6	4196869	9.52E-10	30YrCancerDerived	7.85E-10	1.61E-10	6.52E-12	1.15E-14	
5	3	ALL	UCART1	591449.6	4196869	1.00E-09	30YrCancerDerived	8.26E-10	1.69E-10	6.87E-12	1.21E-14	
6	4	ALL	UCART1	591499.6	4196869	9.98E-10	30YrCancerDerived	8.23E-10	1.68E-10	6.81E-12	1.20E-14	
7	5	ALL	UCART1	591549.6	4196869	9.86E-10	30YrCancerDerived	8.13E-10	1.65E-10	6.71E-12	1.18E-14	
8	6	ALL	UCART1	591599.6	4196869	9.91E-10	30YrCancerDerived	8.18E-10	1.66E-10	6.74E-12	1.18E-14	
9	7	ALL	UCART1	591649.6	4196869	1.09E-09	30YrCancerDerived	8.96E-10	1.82E-10	7.40E-12	1.29E-14	
10	8	ALL	UCART1	591699.6	4196869	1.20E-09	30YrCancerDerived	9.92E-10	2.02E-10	8.22E-12	1.42E-14	
11	9	ALL	UCART1	591749.6	4196869	1.34E-09	30YrCancerDerived	1.10E-09	2.26E-10	9.17E-12	1.58E-14	
12	10	ALL	UCART1	591799.6	4196869	1.49E-09	30YrCancerDerived	1.23E-09	2.53E-10	1.03E-11	1.75E-14	
13	11	ALL	UCART1	591849.6	4196869	1.67E-09	30YrCancerDerived	1.37E-09	2.84E-10	1.15E-11	1.96E-14	
14	12	ALL	UCART1	591899.6	4196869	1.90E-09	30YrCancerDerived	1.56E-09	3.26E-10	1.33E-11	2.23E-14	
15	13	ALL	UCART1	591949.6	4196869	2.26E-09	30YrCancerDerived	1.85E-09	3.92E-10	1.59E-11	2.65E-14	
16	14	ALL	UCART1	591999.6	4196869	2.79E-09	30YrCancerDerived	2.27E-09	5.05E-10	2.05E-11	3.37E-14	
17	15	ALL	UCART1	592049.6	4196869	3.88E-09	30YrCancerDerived	3.03E-09	8.14E-10	3.31E-11	5.39E-14	
18	16	ALL	UCART1	592099.6	4196869	5.62E-09	30YrCancerDerived	4.14E-09	1.42E-09	5.77E-11	9.34E-14	
19	17	ALL	UCART1	592149.6	4196869	6.66E-09	30YrCancerDerived	4.94E-09	1.65E-09	6.70E-11	1.08E-13	
20	18	ALL	UCART1	592199.6	4196869	7.69E-09	30YrCancerDerived	5.85E-09	1.77E-09	7.19E-11	1.16E-13	
21	19	ALL	UCART1	592249.6	4196869	9.00E-09	30YrCancerDerived	6.96E-09	1.96E-09	7.97E-11	1.30E-13	
22	20	ALL	UCART1	592299.6	4196869	1.12E-08	30YrCancerDerived	8.84E-09	2.28E-09	9.25E-11	1.53E-13	
23	21	ALL	UCART1	592349.6	4196869	1.86E-08	30YrCancerDerived	1.51E-08	3.35E-09	1.36E-10	2.22E-13	
24	22	ALL	UCART1	592399.6	4196869	2.78E-08	30YrCancerDerived	2.28E-08	4.75E-09	1.93E-10	2.97E-13	
25	23	ALL	UCART1	592449.6	4196869	2.80E-08	30YrCancerDerived	2.30E-08	4.81E-09	1.96E-10	3.00E-13	
26	24	ALL	UCART1	592499.6	4196869	3.19E-08	30YrCancerDerived	2.62E-08	5.44E-09	2.21E-10	3.35E-13	
27	25	ALL	UCART1	592549.6	4196869	1.15E-08	30YrCancerDerived	8.87E-09	2.49E-09	1.01E-10	1.64E-13	
28	26	ALL	UCART1	592599.6	4196869	8.88E-09	30YrCancerDerived	6.51E-09	2.28E-09	9.26E-11	1.48E-13	

Cancer Risk (continued)

	A	B	C	D	E	F	G	H	I	J	K	T
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Cancer Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra											
2	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK	SOIL_RISK	DERMAL_RISK	MMILK_RISK	
3602	3600	ALL	UCART1	594299.6	4199819	2.83E-08	30YrCancerDerived	2.41E-08	4.04E-09	1.64E-10	3.62E-13	
3603	3601	ALL		593132	4199836	2.80E-08	30YrCancerDerived	2.39E-08	3.98E-09	1.61E-10	3.63E-13	
3604	3602	ALL		591936	4199666	2.18E-08	30YrCancerDerived	1.85E-08	3.16E-09	1.28E-10	2.79E-13	
3605	3603	ALL		593825	4199053	6.43E-08	30YrCancerDerived	5.49E-08	9.06E-09	3.67E-10	8.34E-13	
3606	3604	ALL		593130	4199838	2.80E-08	30YrCancerDerived	2.38E-08	3.97E-09	1.61E-10	3.63E-13	
3607	3605	ALL		592205	4199759	2.22E-08	30YrCancerDerived	1.89E-08	3.17E-09	1.29E-10	2.85E-13	
3608	3606	ALL		590731	4201446	6.15E-09	30YrCancerDerived	5.17E-09	9.38E-10	3.81E-11	7.77E-14	
3609	3607	ALL					30YrCancerDerived	2.17E-07	3.00E-08	1.21E-09	3.37E-12	
3610	3608	ALL					30YrCancerDerived	2.45E-07	3.37E-08	1.37E-09	3.81E-12	
3611	3609	ALL					30YrCancerDerived	2.66E-07	3.65E-08	1.48E-09	4.14E-12	
3612	3610	ALL					30YrCancerDerived	2.83E-07	3.87E-08	1.57E-09	4.40E-12	
3613	3611	ALL		592998.1	4198921	3.40E-07	30YrCancerDerived	2.97E-07	4.07E-08	1.65E-09	4.62E-12	
3614	3612	ALL		592998.8	4198897	3.54E-07	30YrCancerDerived	3.10E-07	4.23E-08	1.71E-09	4.81E-12	
3615	3613	ALL		592999.5	4198874	3.66E-07	30YrCancerDerived	3.20E-07	4.38E-08	1.77E-09	4.98E-12	
3616	3614	ALL		593000.2	4198850	3.76E-07	30YrCancerDerived	3.29E-07	4.50E-08	1.83E-09	5.12E-12	
3617	3615	ALL		593000.9	4198827	3.85E-07	30YrCancerDerived	3.37E-07	4.61E-08	1.87E-09	5.24E-12	
3618	3616	ALL		593001.6	4198803	3.93E-07	30YrCancerDerived	3.44E-07	4.71E-08	1.91E-09	5.34E-12	
3619	3617	ALL					30YrCancerDerived	3.49E-07	4.79E-08	1.94E-09	5.42E-12	
3620	3618	ALL					30YrCancerDerived	3.53E-07	4.85E-08	1.97E-09	5.48E-12	
3621	3619	ALL					30YrCancerDerived	3.56E-07	4.91E-08	1.99E-09	5.54E-12	
3622	3620	ALL					30YrCancerDerived	3.59E-07	4.96E-08	2.01E-09	5.57E-12	
3623	3621	ALL		593005	4198686	4.13E-07	30YrCancerDerived	3.61E-07	5.00E-08	2.03E-09	5.60E-12	
3624	3622	ALL		593005.7	4198663	4.15E-07	30YrCancerDerived	3.63E-07	5.04E-08	2.04E-09	5.62E-12	
3625	3623	ALL		593006.4	4198639	4.17E-07	30YrCancerDerived	3.64E-07	5.08E-08	2.06E-09	5.65E-12	
3626	3624	ALL		593012.8	4199032	2.12E-07	30YrCancerDerived	1.85E-07	2.58E-08	1.05E-09	2.87E-12	
3627	3625	ALL		592987.7	4199057	1.80E-07	30YrCancerDerived	1.57E-07	2.21E-08	8.97E-10	2.43E-12	

Discrete Receptors (3601 – 3606)

Maximum Residential

Appendix D
HARP Model Risk Tables
September 2020

COMPASS LAND GROUP

Chronic Risk

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Chronic Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra																				
2	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
3	1	ALL	UCART1	591349.6	4196869	NonCance	1.02E-05	1.03E-05	1.93E-09	9.53E-08	1.61E-10	1.04E-05	1.33E-05	1.02E-05	0.00E+00	0.00E+00	0.00E+00	2.80E-06	0.00E+00	0.00E+00	1.33E-05
4	2	ALL	UCART1	591399.6	4196869	NonCance	1.07E-05	1.08E-05	2.02E-09	9.94E-08	1.69E-10	1.09E-05	1.39E-05	1.07E-05	0.00E+00	0.00E+00	0.00E+00	2.93E-06	0.00E+00	0.00E+00	1.39E-05
5	3	ALL	UCART1	591449.6	4196869	NonCance	1.13E-05	1.14E-05	2.12E-09	1.04E-07	1.77E-10	1.15E-05	1.47E-05	1.13E-05	0.00E+00	0.00E+00	0.00E+00	3.07E-06	0.00E+00	0.00E+00	1.47E-05
6	4	ALL	UCART1	591499.6	4196869	NonCance	1.12E-05	1.13E-05	2.07E-09	1.03E-07	1.73E-10	1.14E-05	1.45E-05	1.12E-05	0.00E+00	0.00E+00	0.00E+00	3.06E-06	0.00E+00	0.00E+00	1.45E-05
7	5	ALL	UCART1	591549.6	4196869	NonCance	1.10E-05	1.11E-05	2.01E-09	1.02E-07	1.68E-10	1.12E-05	1.43E-05	1.10E-05	0.00E+00	0.00E+00	0.00E+00	3.02E-06	0.00E+00	0.00E+00	1.43E-05
8	6	ALL	UCART1	591599.6	4196869	NonCance	1.11E-05	1.12E-05	1.99E-09	1.02E-07	1.66E-10	1.13E-05	1.44E-05	1.11E-05	0.00E+00	0.00E+00	0.00E+00	3.03E-06	0.00E+00	0.00E+00	1.44E-05
9	7	ALL	UCART1	591649.6	4196869	NonCance	1.21E-05	1.23E-05	2.18E-09	1.10E-07	1.82E-10	1.24E-05	1.58E-05	1.21E-05	0.00E+00	0.00E+00	0.00E+00	3.29E-06	0.00E+00	0.00E+00	1.58E-05
10	8	ALL	UCART1	591699.6	4196869	NonCance	1.35E-05	1.36E-05	2.43E-09	1.20E-07	2.03E-10	1.37E-05	1.75E-05	1.35E-05	0.00E+00	0.00E+00	0.00E+00	3.62E-06	0.00E+00	0.00E+00	1.75E-05
11	9	ALL	UCART1	591749.6	4196869	NonCance	1.51E-05	1.52E-05	2.72E-09	1.31E-07	2.27E-10	1.53E-05	1.95E-05	1.51E-05	0.00E+00	0.00E+00	0.00E+00	3.99E-06	0.00E+00	0.00E+00	1.95E-05
12	10	ALL	UCART1	591799.6	4196869	NonCance	1.69E-05	1.70E-05	3.06E-09	1.43E-07	2.55E-10	1.71E-05	2.17E-05	1.69E-05	0.00E+00	0.00E+00	0.00E+00	4.41E-06	0.00E+00	0.00E+00	2.17E-05
13	11	ALL	UCART1	591849.6	4196869	NonCance	1.89E-05	1.91E-05	3.47E-09	1.57E-07	2.90E-10	1.93E-05	2.43E-05	1.89E-05	0.00E+00	0.00E+00	0.00E+00	4.88E-06	0.00E+00	0.00E+00	2.43E-05
14	12	ALL	UCART1	591899.6	4196869	NonCance	2.18E-05	2.19E-05	4.05E-09	1.75E-07	3.38E-10	2.21E-05	2.78E-05	2.18E-05	0.00E+00	0.00E+00	0.00E+00	5.50E-06	0.00E+00	0.00E+00	2.78E-05
15	13	ALL	UCART1	591949.6	4196869	NonCance	2.62E-05	2.64E-05	5.07E-09	2.01E-07	4.23E-10	2.65E-05	3.33E-05	2.62E-05	0.00E+00	0.00E+00	0.00E+00	6.43E-06	0.00E+00	0.00E+00	3.33E-05
16	14	ALL	UCART1	591999.6	4196869	NonCance	3.37E-05	3.39E-05	7.52E-09	2.37E-07	6.28E-10	3.41E-05	4.24E-05	3.37E-05	0.00E+00	0.00E+00	0.00E+00	7.75E-06	0.00E+00	0.00E+00	4.24E-05
17	15	ALL	UCART1	592049.6	4196869	NonCance	5.43E-05	5.46E-05	1.83E-08	2.94E-07	1.53E-09	5.49E-05	6.61E-05	5.43E-05	0.00E+00	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	6.61E-05
18	16	ALL	UCART1	592099.6	4196869	NonCance	9.48E-05	9.51E-05	4.32E-08	3.60E-07	3.61E-09	9.55E-05	1.11E-04	9.48E-05	0.00E+00	0.00E+00	0.00E+00	1.31E-05	0.00E+00	0.00E+00	1.11E-04
19	17	ALL	UCART1	592149.6	4196869	NonCance	1.10E-04	1.11E-04	4.89E-08	4.32E-07	4.09E-09	1.11E-04	1.30E-04	1.10E-04	0.00E+00	0.00E+00	0.00E+00	1.57E-05	0.00E+00	0.00E+00	1.30E-04
20	18	ALL	UCART1	592199.6	4196869	NonCance	1.18E-04	1.19E-04	4.70E-08	5.34E-07	3.92E-09	1.19E-04	1.41E-04	1.18E-04	0.00E+00	0.00E+00	0.00E+00	1.89E-05	0.00E+00	0.00E+00	1.41E-04
21	19	ALL	UCART1	592249.6	4196869	NonCance	1.31E-04	1.32E-04	4.75E-08	6.63E-07	3.96E-09	1.32E-04	1.58E-04	1.31E-04	0.00E+00	0.00E+00	0.00E+00	2.29E-05	0.00E+00	0.00E+00	1.58E-04
22	20	ALL	UCART1	592299.6	4196869	NonCance	1.52E-04	1.53E-04	4.81E-08	9.07E-07	4.02E-09	1.54E-04	1.87E-04	1.52E-04	0.00E+00	0.00E+00	0.00E+00	3.00E-05	0.00E+00	0.00E+00	1.87E-04
23	21	ALL	UCART1	592349.6	4196869	NonCance	2.23E-04	2.25E-04	4.83E-08	1.56E-06	4.04E-09	2.26E-04	2.81E-04	2.23E-04	0.00E+00	0.00E+00	0.00E+00	5.14E-05	0.00E+00	0.00E+00	2.81E-04
24	22	ALL	UCART1	592399.6	4196869	NonCance	3.17E-04	3.19E-04	4.87E-08	1.99E-06	4.06E-09	3.21E-04	3.97E-04	3.17E-04	0.00E+00	0.00E+00	0.00E+00	7.22E-05	0.00E+00	0.00E+00	3.97E-04
25	23	ALL	UCART1	592449.6	4196869	NonCance	3.21E-04	3.23E-04	5.02E-08	1.95E-06	4.19E-09	3.25E-04	4.01E-04	3.21E-04	0.00E+00	0.00E+00	0.00E+00	7.21E-05	0.00E+00	0.00E+00	4.01E-04
26	24	ALL	UCART1	592499.6	4196869	NonCance	3.63E-04	3.65E-04	5.36E-08	2.15E-06	4.47E-09	3.68E-04	4.53E-04	3.63E-04	0.00E+00	0.00E+00	0.00E+00	8.10E-05	0.00E+00	0.00E+00	4.53E-04
27	25	ALL	UCART1	592549.6	4196869	NonCance	1.66E-04	1.67E-04	5.99E-08	8.39E-07	5.00E-09	1.68E-04	2.01E-04	1.66E-04	0.00E+00	0.00E+00	0.00E+00	2.91E-05	0.00E+00	0.00E+00	2.01E-04
28	26	ALL	UCART1	592599.6	4196869	NonCance	1.52E-04	1.53E-04	7.03E-08	5.29E-07	5.87E-09	1.53E-04	1.78E-04	1.52E-04	0.00E+00	0.00E+00	0.00E+00	2.01E-05	0.00E+00	0.00E+00	1.78E-04

Chronic Risk (continued)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Chronic Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra																				
2	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
3618	3616	ALL		593001.6	4198803	NonCance	3.13E-03	3.21E-03	9.76E-08	8.53E-05	8.15E-09	3.27E-03	5.10E-03	3.13E-03	0.00E+00	0.00E+00	0.00E+00	1.89E-03	0.00E+00	0.00E+00	5.10E-03
3619	3617	ALL		593002.3	4198780	NonCance	3.18E-03	3.27E-03	1.02E-07	8.65E-05	8.48E-09	3.32E-03	5.18E-03	3.18E-03	0.00E+00	0.00E+00	0.00E+00	1.92E-03	0.00E+00	0.00E+00	5.18E-03
3620	3618	ALL		593003	4198757	NonCance	3.22E-03	3.31E-03	1.06E-07	8.74E-05	8.85E-09	3.37E-03	5.25E-03	3.22E-03	0.00E+00	0.00E+00	0.0				3
3621	3619	ALL		593003.7	4198733	NonCance	3.26E-03	3.35E-03	1.11E-07	8.80E-05	9.25E-09	3.41E-03	5.30E-03	3.26E-03	0.00E+00	0.00E+00	0.0				3
3622	3620	ALL		593004.3	4198710	NonCance	3.29E-03	3.38E-03	1.16E-07	8.84E-05	9.69E-09	3.44E-03	5.34E-03	3.29E-03	0.00E+00	0.00E+00	0.0				3
3623	3621	ALL		593005	4198686	NonCance	3.32E-03	3.41E-03	1.22E-07	8.86E-05	1.02E-08	3.47E-03	5.38E-03	3.32E-03	0.00E+00	0.00E+00	0.0				3
3624	3622	ALL		593005.7	4198663	NonCance	3.34E-03	3.43E-03	1.28E-07	8.88E-05	1.07E-08	3.49E-03	5.41E-03	3.34E-03	0.00E+00	0.00E+00	0.0				3
3625	3623	ALL		593006.4	4198639	NonCance	3.37E-03	3.46E-03	1.35E-07	8.89E-05	1.13E-08	3.52E-03	5.44E-03	3.37E-03	0.00E+00	0.00E+00	0.00E+00	1.98E-03	0.00E+00	0.00E+00	5.44E-03
3626	3624	ALL		593012.8	4199032	NonCance	1.71E-03	1.76E-03	6.98E-08	4.50E-05	5.83E-09	1.79E-03	2.76E-03	1.71E-03	0.00E+00	0.00E+00	0.00E+00	1.00E-03	0.00E+00	0.00E+00	2.76E-03
3627	3625	ALL		592987.7	4199057	NonCance	1.47E-03	1.51E-03	6.75E-08	3.78E-05	5.64E-09	1.53E-03	2.36E-03	1.47E-03	0.00E+00	0.00E+00	0.00E+00	8.47E-04	0.00E+00	0.00E+00	2.36E-03
3628	3626	ALL		593021.1	4198992	NonCance	2.04E-03	2.10E-03	7.36E-08	5.46E-05	6.15E-09	2.13E-03	3.31E-03	2.04E-03	0.00E+00	0.00E+00	0.00E+00	1.21E-03	0.00E+00	0.00E+00	3.31E-03
3629	3627	ALL		593021.8	4198968	NonCance	2.19E-03	2.25E-03	7.60E-08	5.90E-05	6.35E-09	2.29E-03	3.56E-03	2.19E-03	0.00E+00	0.00E+00	0.00E+00	1.31E-03	0.00E+00	0.00E+00	3.56E-03
3630	3628	ALL		593022.4	4198945	NonCance	2.32E-03	2.38E-03	7.85E-08	6.26E-05	6.56E-09	2.42E-03	3.77E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	1.39E-03	0.00E+00	0.00E+00	3.77E-03
3631	3629	ALL		593023.1	4198921	NonCance	2.43E-03	2.49E-03	8.12E-08	6.57E-05	6.78E-09	2.54E-03	3.95E-03	2.43E-03	0.00E+00	0.00E+00	0.00E+00	1.46E-03	0.00E+00	0.00E+00	3.95E-03
3632	3630	ALL		593023.8	4198898	NonCance	2.52E-03	2.59E-03	8.41E-08	6.82E-05	7.02E-09	2.64E-03	4.10E-03	2.52E-03	0.00E+00	0.00E+00	0.00E+00	1.52E-03	0.00E+00	0.00E+00	4.10E-03
3633	3631	ALL		593024.5	4198874	NonCance	2.61E-03	2.68E-03	8.72E-08	7.05E-05	7.28E-09	2.73E-03	4.24E-03	2.61E-03	0.00E+00	0.00E+00	0.00E+00	1.57E-03	0.00E+00	0.00E+00	4.24E-03
3634	3632	ALL		593025.2	4198851	NonCance	2.68E-03	2.75E-03	9.05E-08	7.24E-05	7.56E-09	2.80E-03	4.36E-03	2.68E-03	0.00E+00	0.00E+00	0.00E+00	1.61E-03	0.00E+00	0.00E+00	4.36E-03
3635	3633	ALL		593025.9	4198828	NonCance	2.75E-03	2.82E-03	9.40E-08	7.39E-05	7.85E-09	2.87E-03	4.46E-03	2.75E-03	0.00E+00	0.00E+00	0.00E+00	1.64E-03	0.00E+00	0.00E+00	4.46E-03
3636	3634	ALL		593026.6	4198804	NonCance	2.80E-03	2.88E-03	9.79E-08	7.52E-05	8.17E-09	2.93E-03	4.54E-03	2.80E-03	0.00E+00	0.00E+00	0.00E+00	1.67E-03	0.00E+00	0.00E+00	4.54E-03
3637	3635	ALL		593027.3	4198781	NonCance	2.85E-03	2.92E-03	1.02E-07	7.62E-05	8.52E-09	2.98E-03	4.62E-03	2.85E-03	0.00E+00	0.00E+00	0.00E+00	1.70E-03	0.00E+00	0.00E+00	4.62E-03
3638	3636	ALL		593028	4198757	NonCance	2.89E-03	2.97E-03	1.07E-07	7.70E-05	8.89E-09	3.02E-03	4.68E-03	2.89E-03	0.00E+00	0.00E+00	0.00E+00	1.71E-03	0.00E+00	0.00E+00	4.68E-03
3639	3637	ALL		593028.6	4198734	NonCance	2.92E-03	3.00E-03	1.11E-07	7.76E-05	9.30E-09	3.05E-03	4.73E-03	2.92E-03	0.00E+00	0.00E+00	0.00E+00	1.73E-03	0.00E+00	0.00E+00	4.73E-03
3640	3638	ALL		593029.3	4198710	NonCance	2.95E-03	3.03E-03	1.17E-07	7.79E-05	9.75E-09	3.08E-03	4.77E-03	2.95E-03	0.00E+00	0.00E+00	0.00E+00	1.74E-03	0.00E+00	0.00E+00	4.77E-03
3641	3639	ALL		593030	4198687	NonCance	2.98E-03	3.06E-03	1.23E-07	7.82E-05	1.02E-08	3.11E-03	4.80E-03	2.98E-03	0.00E+00	0.00E+00	0.00E+00	1.74E-03	0.00E+00	0.00E+00	4.80E-03
3642	3640	ALL		593030.7	4198663	NonCance	3.01E-03	3.09E-03	1.29E-07	7.83E-05	1.08E-08	3.14E-03	4.83E-03	3.01E-03	0.00E+00	0.00E+00	0.00E+00	1.75E-03	0.00E+00	0.00E+00	4.83E-03
3643	3641	ALL		593031.4	4198640	NonCance	3.03E-03	3.11E-03	1.37E-07	7.85E-05	1.14E-08	3.16E-03	4.87E-03	3.03E-03	0.00E+00	0.00E+00	0.00E+00	1.76E-03	0.00E+00	0.00E+00	4.87E-03

Maximum Residential

Appendix D
HARP Model Risk Tables
September 2020

COMPASS LAND GROUP

Acute Risk

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Acute Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra																				
2	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
3	1	ALL	UCART1	591349.6	4196869	NonCance	2.20E-04	2.34E-04	4.33E-03	0.00E+00	0.00E+00	2.34E-04	2.00E-04	0.00E+00	1.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.33E-03
4	2	ALL	UCART1	591399.6	4196869	NonCance	2.17E-04	2.31E-04	4.26E-03	0.00E+00	0.00E+00	2.31E-04	1.97E-04	0.00E+00	1.45E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-03
5	3	ALL	UCART1	591449.6	4196869	NonCance	2.10E-04	2.23E-04	4.07E-03	0.00E+00	0.00E+00	2.23E-04	1.88E-04	0.00E+00	1.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.07E-03
6	4	ALL	UCART1	591499.6	4196869	NonCance	1.98E-04	2.11E-04	3.82E-03	0.00E+00	0.00E+00	2.11E-04	1.77E-04	0.00E+00	1.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-03
7	5	ALL	UCART1	591549.6	4196869	NonCance	1.83E-04	1.94E-04	3.54E-03	0.00E+00	0.00E+00	1.94E-04	1.64E-04	0.00E+00	1.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.54E-03
8	6	ALL	UCART1	591599.6	4196869	NonCance	2.24E-04	2.36E-04	3.97E-03	0.00E+00	0.00E+00	2.36E-04	1.82E-04	0.00E+00	1.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-03
9	7	ALL	UCART1	591649.6	4196869	NonCance	2.19E-04	2.32E-04	4.21E-03	0.00E+00	0.00E+00	2.32E-04	1.94E-04	0.00E+00	1.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.21E-03
10	8	ALL	UCART1	591699.6	4196869	NonCance	2.30E-04	2.42E-04	4.43E-03	0.00E+00	0.00E+00	2.42E-04	2.04E-04	0.00E+00	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.43E-03
11	9	ALL	UCART1	591749.6	4196869	NonCance	2.45E-04	2.59E-04	4.73E-03	0.00E+00	0.00E+00	2.59E-04	2.18E-04	0.00E+00	1.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.73E-03
12	10	ALL	UCART1	591799.6	4196869	NonCance	2.51E-04	2.66E-04	4.84E-03	0.00E+00	0.00E+00	2.66E-04	2.24E-04	0.00E+00	1.65E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.84E-03
13	11	ALL	UCART1	591849.6	4196869	NonCance	2.26E-04	2.42E-04	4.57E-03	0.00E+00	0.00E+00	2.42E-04	2.12E-04	0.00E+00	1.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.57E-03
14	12	ALL	UCART1	591899.6	4196869	NonCance	2.23E-04	2.41E-04	4.71E-03	0.00E+00	0.00E+00	2.41E-04	2.20E-04	0.00E+00	1.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.71E-03
15	13	ALL	UCART1	591949.6	4196869	NonCance	2.69E-04	2.93E-04	5.95E-03	0.00E+00	0.00E+00	2.93E-04	2.79E-04	0.00E+00	2.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.95E-03
16	14	ALL	UCART1	591999.6	4196869	NonCance	4.11E-04	4.43E-04	8.69E-03	0.00E+00	0.00E+00	4.43E-04	4.06E-04	0.00E+00	2.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.69E-03
17	15	ALL	UCART1	592049.6	4196869	NonCance	1.03E-03	1.07E-03	1.39E-02	0.00E+00	0.00E+00	1.07E-03	6.25E-04	0.00E+00	4.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-02
18	16	ALL	UCART1	592099.6	4196869	NonCance	3.14E-03	3.20E-03	2.27E-02	0.00E+00	0.00E+00	3.20E-03	9.26E-04	0.00E+00	7.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.27E-02
19	17	ALL	UCART1	592149.6	4196869	NonCance	3.47E-03	3.54E-03	2.62E-02	0.00E+00	0.00E+00	3.54E-03	1.08E-03	0.00E+00	8.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-02
20	18	ALL	UCART1	592199.6	4196869	NonCance	3.70E-03	3.82E-03	4.22E-02	0.00E+00	0.00E+00	3.82E-03	1.85E-03	0.00E+00	1.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.22E-02
21	19	ALL	UCART1	592249.6	4196869	NonCance	3.63E-03	3.75E-03	4.06E-02	0.00E+00	0.00E+00	3.75E-03	1.78E-03	0.00E+00	1.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E-02
22	20	ALL	UCART1	592299.6	4196869	NonCance	3.74E-03	3.88E-03	4.50E-02	0.00E+00	0.00E+00	3.88E-03	1.99E-03	0.00E+00	1.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.50E-02
23	21	ALL	UCART1	592349.6	4196869	NonCance	5.78E-03	6.09E-03	9.71E-02	0.00E+00	0.00E+00	6.09E-03	4.45E-03	0.00E+00	3.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.71E-02
24	22	ALL	UCART1	592399.6	4196869	NonCance	7.85E-03	8.28E-03	1.44E-01	0.00E+00	0.00E+00	8.28E-03	6.62E-03	0.00E+00	4.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-01
25	23	ALL	UCART1	592449.6	4196869	NonCance	8.19E-03	8.62E-03	1.49E-01	0.00E+00	0.00E+00	8.62E-03	6.84E-03	0.00E+00	5.07E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-01
26	24	ALL	UCART1	592499.6	4196869	NonCance	8.40E-03	8.87E-03	1.56E-01	0.00E+00	0.00E+00	8.87E-03	7.19E-03	0.00E+00	5.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-01
27	25	ALL	UCART1	592549.6	4196869	NonCance	3.50E-03	3.62E-03	3.84E-02	0.00E+00	0.00E+00	3.62E-03	1.68E-03	0.00E+00	1.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.84E-02
28	26	ALL	UCART1	592599.6	4196869	NonCance	3.00E-03	3.05E-03	2.17E-02	0.00E+00	0.00E+00	3.05E-03	8.88E-04	0.00E+00	6.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-02

Acute Risk (continued)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	*HARP - HRACalc v19044 9/15/2020 10:22:35 AM - Acute Risk - Input File: C:\HARP2\Projects\CLAYTON_HRA\hra\Clayton_HRA_HRAInput.hra																				
2	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
3709	3707	ALL		593057.6	4198364	NonCance	1.82E-02	1.93E-02	3.39E-01	0.00E+00	0.00E+00	1.93E-02	1.56E-02	0.00E+00	1.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-01
3710	3708	ALL		593060.2	4198339	NonCance	1.82E-02	1.93E-02	3.38E-01	0.00E+00	0.00E+00	1.93E-02	1.56E-02	0.00E+00	1.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.38E-01
3711	3709	ALL		593062.8	4198314	NonCance	1.77E-02	1.87E-02	3.29E-01	0.00E+00	0.00E+00	1.87E-02	1.52E-02	0.00E+00	1.12E-02	0.00E+00	0.00				
3712	3710	ALL		593065.4	4198290	NonCance	1.69E-02	1.79E-02	3.16E-01	0.00E+00	0.00E+00	1.79E-02	1.46E-02	0.00E+00	1.08E-02	0.00E+00	0.00				
3713	3711	ALL		593067.9	4198265	NonCance	1.67E-02	1.77E-02	3.16E-01	0.00E+00	0.00E+00	1.77E-02	1.46E-02	0.00E+00	1.08E-02	0.00E+00	0.00				
3714	3712	ALL		593069.6	4198489	NonCance	1.72E-02	1.81E-02	3.06E-01	0.00E+00	0.00E+00	1.81E-02	1.41E-02	0.00E+00	1.04E-02	0.00E+00	0.00				
3715	3713	ALL		593072.2	4198465	NonCance	1.71E-02	1.81E-02	3.10E-01	0.00E+00	0.00E+00	1.81E-02	1.43E-02	0.00E+00	1.05E-02	0.00E+00	0.00				
3716	3714	ALL		593074.8	4198440	NonCance	1.74E-02	1.84E-02	3.17E-01	0.00E+00	0.00E+00	1.84E-02	1.46E-02	0.00E+00	1.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.17E-01
3717	3715	ALL		593077.3	4198415	NonCance	1.78E-02	1.88E-02	3.26E-01	0.00E+00	0.00E+00	1.88E-02	1.50E-02	0.00E+00	1.11E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01
3718	3716	ALL		593079.9	4198391	NonCance	1.79E-02	1.90E-02	3.31E-01	0.00E+00	0.00E+00	1.90E-02	1.53E-02	0.00E+00	1.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-01
3719	3717	ALL		593082.5	4198366	NonCance	1.79E-02	1.90E-02	3.33E-01	0.00E+00	0.00E+00	1.90E-02	1.54E-02	0.00E+00	1.14E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-01
3720	3718	ALL		593085.1	4198342	NonCance	1.75E-02	1.85E-02	3.27E-01	0.00E+00	0.00E+00	1.85E-02	1.51E-02	0.00E+00	1.11E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.27E-01
3721	3719	ALL		593087.6	4198317	NonCance	1.67E-02	1.77E-02	3.12E-01	0.00E+00	0.00E+00	1.77E-02	1.44E-02	0.00E+00	1.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.12E-01
3722	3720	ALL		593090.2	4198292	NonCance	1.64E-02	1.74E-02	3.11E-01	0.00E+00	0.00E+00	1.74E-02	1.44E-02	0.00E+00	1.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.11E-01
3723	3721	ALL		593092.8	4198268	NonCance	1.60E-02	1.70E-02	3.08E-01	0.00E+00	0.00E+00	1.70E-02	1.42E-02	0.00E+00	1.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-01
3724	3722	ALL		593094.5	4198492	NonCance	1.68E-02	1.77E-02	2.99E-01	0.00E+00	0.00E+00	1.77E-02	1.37E-02	0.00E+00	1.02E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E-01
3725	3723	ALL		593097.1	4198467	NonCance	1.71E-02	1.80E-02	3.05E-01	0.00E+00	0.00E+00	1.80E-02	1.40E-02	0.00E+00	1.04E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.05E-01
3726	3724	ALL		593099.6	4198443	NonCance	1.74E-02	1.83E-02	3.14E-01	0.00E+00	0.00E+00	1.83E-02	1.44E-02	0.00E+00	1.07E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.14E-01
3727	3725	ALL		593102.2	4198418	NonCance	1.75E-02	1.85E-02	3.19E-01	0.00E+00	0.00E+00	1.85E-02	1.47E-02	0.00E+00	1.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-01
3728	3726	ALL		593104.8	4198393	NonCance	1.75E-02	1.85E-02	3.23E-01	0.00E+00	0.00E+00	1.85E-02	1.49E-02	0.00E+00	1.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-01
3729	3727	ALL		593107.4	4198369	NonCance	1.71E-02	1.82E-02	3.19E-01	0.00E+00	0.00E+00	1.82E-02	1.47E-02	0.00E+00	1.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-01
3730	3728	ALL		593109.9	4198344	NonCance	1.64E-02	1.74E-02	3.08E-01	0.00E+00	0.00E+00	1.74E-02	1.42E-02	0.00E+00	1.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-01
3731	3729	ALL		593112.5	4198320	NonCance	1.62E-02	1.72E-02	3.08E-01	0.00E+00	0.00E+00	1.72E-02	1.42E-02	0.00E+00	1.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-01
3732	3730	ALL		593115.1	4198295	NonCance	1.57E-02	1.67E-02	3.02E-01	0.00E+00	0.00E+00	1.67E-02	1.40E-02	0.00E+00	1.03E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.02E-01
3733	3731	ALL		593117.7	4198270	NonCance	1.49E-02	1.59E-02	2.93E-01	0.00E+00	0.00E+00	1.59E-02	1.36E-02	0.00E+00	9.98E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.93E-01
3734	3732	ALL		593033.3	4198229	NonCance	1.68E-02	1.78E-02	3.18E-01	0.00E+00	0.00E+00	1.78E-02	1.47E-02	0.00E+00	1.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-01

Maximum Residential

Appendix E
Annual PM2.5 Emissions Modeling

Table 1
Summary of Annual DPM Emissions
for PM2.5 Modeling

CEMEX Construction Materials Pacific, LLC.
Clayton Quarry Reclamation Plan Amendment Project
Health Risk Assessment

AVERAGE ANNUAL PM2.5 TOTAL EMISSIONS (TONS/YEAR)

Quarry Area Reclamation

Year	Calendar Year	PM2.5 Total (tons/yr)		
1	2022	0		
2	2023	0		
3	2024	0		
4	2025	0.0577		
5	2026	0		
6	2027	0		
7	2028	0		
8	2029	0		
9	2030	0		
10	2031	0		
11	2032	0		
12	2033	0		
13	2034	0		
14	2035	0		
15	2036	0		
16	2037	0		
17	2038	0		
18	2039	0		
19	2040	0		
20	2041	0		
21	2042	0		
22	2043	0		
23	2044	0		
24	2045	0		
25	2046	0		
26	2047	0		
27	2048	0		
28	**2049**	**0.02082**	4.16E+01	lbs/yr
29	2050	0	4.75E-03	lbs/hr
30	2051	0	2.16E+00	grams/hr
			5.99E-04	grams/sec (Q)
			74,437	Area (m2)
			8.05E-09	Q/A
			Q/A = input for AERMOD	

Plant Area Reclamation

Year	Calendar Year	PM2.5 Total (tons/yr)		
1	2022	0.01023		
2	2023	0		
3	2024	0		
4	2025	0		
5	2026	0		
6	2027	0		
7	2028	0		
8	2029	0		
9	2030	0		
10	2031	0		
11	2032	0		
12	2033	0		
13	2034	0		
14	2035	0		
15	2036	0		
16	2037	0		
17	2038	0		
18	2039	0		
19	2040	0		
20	2041	0		
21	2042	0		
22	2043	0		
23	2044	0		
24	2045	0		
25	2046	0		
26	2047	0		
27	2048	0		
28	**2049**	**0.15634**	3.13E+02	lbs/yr
29	2050	0	3.57E-02	lbs/hr
30	2051	0	1.62E+01	grams/hr
			4.50E-03	grams/sec (Q)
			207,514	Area (m2)
			2.17E-08	Q/A
			Q/A = input for AERMOD	

Drainage Improvement Area

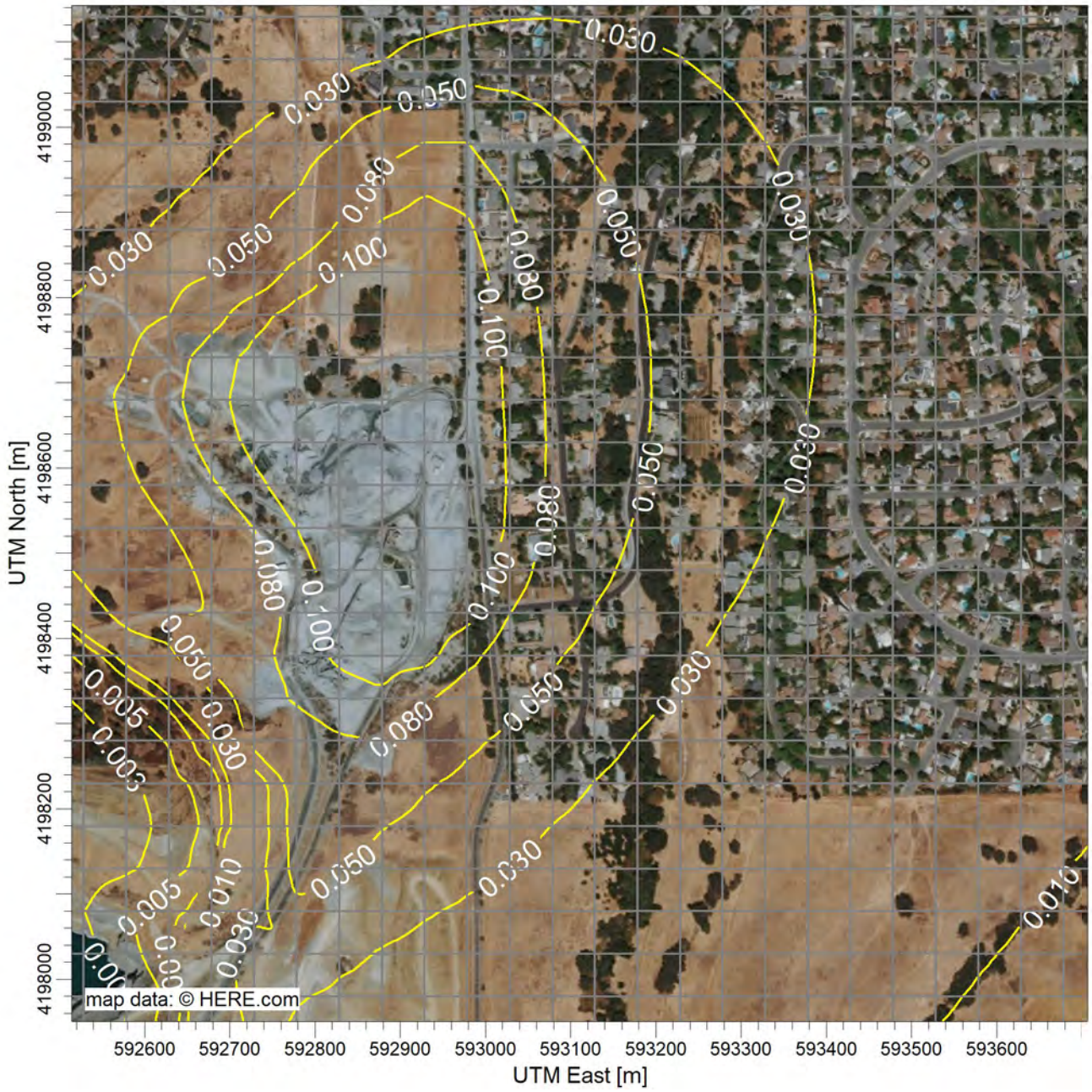
Year	Calendar Year	PM2.5 Total (tons/yr)		
1	2022	0		
2	2023	0		
3	2024	0		
4	2025	0		
5	2026	0		
6	2027	0		
7	2028	0		
8	2029	0		
9	2030	0		
10	2031	0		
11	2032	0		
12	2033	0		
13	2034	0		
14	2035	0		
15	2036	0		
16	2037	0		
17	2038	0		
18	2039	0		
19	2040	0		
20	2041	0		
21	2042	0		
22	2043	0		
23	2044	0		
24	2045	0		
25	2046	0		
26	2047	0		
27	2048	0		
28	**2049**	**0.00043**	8.60E-01	lbs/yr
29	2050	0	9.82E-05	lbs/hr
30	2051	0	4.46E-02	grams/hr
			1.24E-05	grams/sec (Q)
			14,878	Area (m2)
			8.32E-10	Q/A
			Q/A = input for AERMOD	

Source:
Air and Greenhouse Gas Emissions Study (Compass Land Group, July 2, 2020).

Notes:
1. Results from Appendix A-2, Annual Results. Year 28 (2049) result is CalEEMod proxy for

PROJECT TITLE:

C:\Lakes\Projects\P012 Clayton PM2.5\ClaytonPM2.isc



COMMENTS: Note: The Max modeled concentration of 0.13 ug/m3 is located on-site.	SOURCES: **3**	COMPANY NAME: **Compass Land Group**	
	RECEPTORS: **3600**	MODELER: **Yasha Saber**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:7,500 0 0.2 km	
	MAX: **0.130 ug/m^3**	DATE: **9/16/2020**	PROJECT NO.: **P012**

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.9.0
** Lakes Environmental Software Inc.
** Date: 9/15/2020
** File: C:\Lakes\Projects\P012 Clayton PM2.5\ClaytonPM2.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Lakes\Projects\P012 Clayton PM2.5\ClaytonPM2.isc
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   POLLUTID PM_2.5
   RUNORNOT RUN
   ERRORFIL ClaytonPM2.err
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PLANT        AREAPOLY   592770.173  4198085.729      220.680
** DESCRSRC Plant Reclamation Area
   LOCATION QUARRY       AREAPOLY   592771.893  4198084.842      220.190
** DESCRSRC Quarry Area Reclamation
   LOCATION DRAINAGE     AREAPOLY   592739.954  4198014.120      217.020
** DESCRSRC Drainage Improvement Area
** Source Parameters **
   SRCPARAM PLANT         2.17E-08     5.000        51
   AREAVERT PLANT        592770.173 4198085.729 592725.300 4198108.972
   AREAVERT PLANT        592738.213 4198147.712 592755.646 4198179.672
   AREAVERT PLANT        592772.110 4198234.230 592776.507 4198252.186
   AREAVERT PLANT        592778.373 4198278.079 592778.840 4198286.709
   AREAVERT PLANT        592776.040 4198293.708 592775.574 4198301.872
   AREAVERT PLANT        592774.874 4198303.971 592770.675 4198306.071
```

```
   AREAVERT PLANT        592757.379 4198296.973 592741.517 4198287.409
   AREAVERT PLANT        592729.154 4198285.776 592717.723 4198287.643
   AREAVERT PLANT        592708.788 4198291.958 592696.418 4198295.051
   AREAVERT PLANT        592692.088 4198299.380 592682.810 4198303.091
   AREAVERT PLANT        592663.780 4198343.114 592666.691 4198356.212
   AREAVERT PLANT        592668.874 4198361.305 592673.240 4198371.493
   AREAVERT PLANT        592682.700 4198382.408 592695.070 4198387.501
   AREAVERT PLANT        592709.623 4198390.412 592726.360 4198391.140
   AREAVERT PLANT        592740.913 4198396.961 592747.567 4198439.269
   AREAVERT PLANT        592725.052 4198494.962 592700.847 4198527.356
   AREAVERT PLANT        592650.762 4198563.131 592619.280 4198600.337
   AREAVERT PLANT        592574.919 4198674.749 592570.626 4198689.058
   AREAVERT PLANT        592572.057 4198730.557 592586.367 4198740.574
   AREAVERT PLANT        592802.448 4198859.347 592811.034 4199005.309
   AREAVERT PLANT        592822.482 4199011.033 592964.150 4199009.602
   AREAVERT PLANT        592969.874 4199003.878 592975.598 4198706.230
   AREAVERT PLANT        592977.029 4198644.698 592994.201 4198484.426
   AREAVERT PLANT        592982.753 4198435.772 592951.271 4198375.670
   AREAVERT PLANT        592879.722 4198317.000 592811.183 4198167.807
   AREAVERT PLANT        592799.758 4198137.926
   SRCPARAM QUARRY        8.05E-09     5.000        16
   AREAVERT QUARRY       592771.893 4198084.842 592725.126 4198107.656
   AREAVERT QUARRY       592689.765 4198047.200 592635.012 4198032.371
   AREAVERT QUARRY       592620.183 4198015.261 592620.183 4197992.447
   AREAVERT QUARRY       592629.309 4197983.322 592544.898 4197785.985
   AREAVERT QUARRY       592453.644 4197647.963 592363.531 4197627.431
   AREAVERT QUARRY       592298.512 4197504.237 592308.778 4197474.580
   AREAVERT QUARRY       592354.405 4197462.032 592550.602 4197592.070
   AREAVERT QUARRY       592635.012 4197733.514 592650.981 4197806.517
   SRCPARAM DRAINAGE      8.32E-10     5.000         6
   AREAVERT DRAINAGE     592739.954 4198014.120 592777.597 4198022.105
   AREAVERT DRAINAGE     592891.665 4198304.993 593000.029 4198389.403
   AREAVERT DRAINAGE     592994.326 4198424.764 592865.429 4198324.385
   SRCGROUP ALL
SO FINISHED
**
************************************
** AERMOD Receptor Pathway
************************************
**
**
RE STARTING
   INCLUDED ClaytonPM2.rou
RE FINISHED
**
************************************
** AERMOD Meteorology Pathway
************************************
```

```
**
**
ME STARTING
   SURFFILE "Met Data\Clayton.sfc"
   PROFFILE "Met Data\Clayton PFL.pfl"
   SURFDATA 66666 2015
   UAIRDATA 66666 2015
   PROFBASE 192.0 METERS
ME FINISHED
**
*************************************
** AERMOD Output Pathway
*************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL ClaytonPM2.AD\AN00GALL.PLT 31
   SUMMFILE ClaytonPM2.sum
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

                                          ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Other Options Specified:
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: PM_2.5

**Model Calculates ANNUAL Averages Only

**This Run Includes: 3 Source(s);   1 Source Group(s); and   3600 Receptor(s)

               with: 0 POINT(s), including
                          0 POINTCAP(s) and   0 POINTHOR(s)
                and: 0 VOLUME source(s)
                and: 3 AREA type source(s)
                and: 0 LINE source(s)
                and: 0 RLINE/RLINEXT source(s)
                and: 0 OPENPIT source(s)
                and: 0 BUOYANT LINE source(s) with   0 line(s)

**Model Set To Continue RUNning After the Setup Testing.

```
**The AERMET Input Meteorological Data Version Date:  19191

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   192.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      3.9 MB of RAM.

**Input Runstream File:          aermod.inp
**Output Print File:             aermod.out

**Detailed Error/Message File:   ClaytonPM2.err
**File for Summary of Results:   ClaytonPM2.sum
```

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PLANT	0	0.21700E-07	592770.2	4198085.7	220.7	5.00	51	0.00	NO	
QUARRY	0	0.80500E-08	592771.9	4198084.8	220.2	5.00	16	0.00	NO	
DRAINAGE	0	0.83200E-09	592740.0	4198014.1	217.0	5.00	6	0.00	NO	

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
ALL	PLANT , QUARRY , DRAINAGE ,

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

591528.5,	591578.5,	591628.5,	591678.5,	591728.5,	591778.5,	591828.5,	591878.5,	591928.5,	591978.5,
592028.5,	592078.5,	592128.5,	592178.5,	592228.5,	592278.5,	592328.5,	592378.5,	592428.5,	592478.5,
592528.5,	592578.5,	592628.5,	592678.5,	592728.5,	592778.5,	592828.5,	592878.5,	592928.5,	592978.5,
593028.5,	593078.5,	593128.5,	593178.5,	593228.5,	593278.5,	593328.5,	593378.5,	593428.5,	593478.5,
593528.5,	593578.5,	593628.5,	593678.5,	593728.5,	593778.5,	593828.5,	593878.5,	593928.5,	593978.5,
594028.5,	594078.5,	594128.5,	594178.5,	594228.5,	594278.5,	594328.5,	594378.5,	594428.5,	594478.5,

*** Y-COORDINATES OF GRID ***
(METERS)

4196879.5,	4196929.5,	4196979.5,	4197029.5,	4197079.5,	4197129.5,	4197179.5,	4197229.5,	4197279.5,	4197329.5,
4197379.5,	4197429.5,	4197479.5,	4197529.5,	4197579.5,	4197629.5,	4197679.5,	4197729.5,	4197779.5,	4197829.5,
4197879.5,	4197929.5,	4197979.5,	4198029.5,	4198079.5,	4198129.5,	4198179.5,	4198229.5,	4198279.5,	4198329.5,
4198379.5,	4198429.5,	4198479.5,	4198529.5,	4198579.5,	4198629.5,	4198679.5,	4198729.5,	4198779.5,	4198829.5,
4198879.5,	4198929.5,	4198979.5,	4199029.5,	4199079.5,	4199129.5,	4199179.5,	4199229.5,	4199279.5,	4199329.5,
4199379.5,	4199429.5,	4199479.5,	4199529.5,	4199579.5,	4199629.5,	4199679.5,	4199729.5,	4199779.5,	4199829.5,

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
	591528.53	591578.53	591628.53	591678.53	591728.53	591778.53	591828.53	591878.53	591928.53
4199829.54	116.40	117.80	118.40	118.40	118.10	120.30	121.80	123.10	123.20
4199779.54	119.80	120.30	121.00	121.80	121.40	121.00	122.60	123.90	124.90
4199729.54	122.10	122.50	122.70	123.50	122.30	121.20	122.80	124.30	125.70
4199679.54	124.20	124.20	124.50	124.40	123.70	122.20	123.00	125.20	127.40
4199629.54	125.90	126.30	126.90	126.00	125.40	124.80	125.60	127.30	129.00
4199579.54	128.00	128.50	128.50	128.50	128.10	128.10	128.50	129.50	130.70
4199529.54	130.20	130.40	130.40	130.40	130.20	130.20	131.00	131.20	132.00
4199479.54	131.90	132.90	132.90	132.90	131.90	131.90	132.70	132.90	132.90
4199429.54	133.90	135.30	135.00	134.50	133.80	133.50	134.80	135.60	135.40
4199379.54	134.20	136.70	137.20	136.60	136.40	136.90	140.40	144.70	145.50
4199329.54	138.50	138.80	138.90	139.60	140.20	142.00	146.90	155.60	158.50
4199279.54	142.30	141.50	141.50	141.50	142.30	144.90	151.10	163.80	170.50
4199229.54	144.60	143.30	144.40	143.40	144.70	146.90	153.40	162.70	170.30
4199179.54	147.00	145.40	147.60	145.20	146.80	151.10	156.20	161.90	174.80
4199129.54	150.00	146.80	149.50	148.70	152.20	157.40	166.80	167.40	179.30
4199079.54	152.50	147.50	151.40	153.00	156.20	164.30	178.70	174.40	180.60
4199029.54	156.00	153.00	154.50	155.40	158.70	170.70	184.30	182.20	182.50
4198979.54	162.00	156.30	157.90	157.90	163.80	173.80	186.70	189.50	188.10
4198929.54	173.30	158.20	160.90	163.30	168.40	177.70	189.40	199.60	196.00
4198879.54	175.60	159.00	161.60	167.40	173.00	184.80	199.40	211.60	207.70
4198829.54	173.20	158.30	167.10	172.80	178.80	190.70	207.80	221.40	219.40
4198779.54	168.00	165.90	171.20	177.90	183.50	193.00	204.70	222.70	232.70
4198729.54	172.20	174.30	179.20	181.50	192.90	207.20	220.70	228.20	236.00
4198679.54	183.60	182.70	186.80	190.50	198.00	213.20	233.80	243.70	246.10
4198629.54	191.60	192.50	194.60	202.10	213.90	218.50	225.40	241.40	255.20
4198579.54	198.30	198.20	198.60	211.60	229.50	237.70	238.60	248.10	257.50
4198529.54	203.60	207.50	208.90	212.30	227.40	244.90	249.30	258.20	269.90
4198479.54	208.20	216.90	225.70	225.00	221.80	233.50	252.50	267.90	280.70
4198429.54	211.90	221.80	237.40	248.10	238.40	236.10	252.30	270.70	289.50
4198379.54	223.20	226.10	233.90	251.10	260.30	252.80	260.80	275.60	291.70
4198329.54	238.20	243.30	243.50	248.70	266.40	271.00	276.20	293.30	310.30
4198279.54	254.10	259.90	260.60	270.10	275.50	292.40	307.40	314.60	327.70
4198229.54	274.50	284.10	285.90	296.70	300.20	309.80	326.40	334.10	339.30
4198179.54	298.20	310.40	315.10	320.40	325.40	327.30	342.00	351.80	355.10
4198129.54	309.10	329.80	340.10	345.60	348.10	345.90	363.30	371.20	373.40

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

  Surface file: Met Data\Clayton.sfc   Met Version: 19191
  Profile file: Met Data\Clayton PFL.pfl
  Surface format: FREE
  Profile format: FREE
  Surface station no.:   66666   Upper air station no.:   66666
                Name: UNKNOWN   Name: UNKNOWN
                Year: 2015   Year: 2015

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
15	01	01	1	01	-64.0	0.652	-9.000	-9.000	-999.	1265.	386.1	1.00	1.50	1.00	4.60	21.	14.0	274.2	2.0
15	01	01	1	02	-63.2	0.562	-9.000	-9.000	-999.	1021.	249.7	1.00	1.50	1.00	4.10	28.	14.0	273.8	2.0
15	01	01	1	03	-63.3	0.562	-9.000	-9.000	-999.	1010.	249.1	1.00	1.50	1.00	4.10	54.	14.0	273.2	2.0
15	01	01	1	04	-63.4	0.562	-9.000	-9.000	-999.	1010.	248.6	1.00	1.50	1.00	4.10	53.	14.0	272.8	2.0
15	01	01	1	05	-53.7	0.475	-9.000	-9.000	-999.	792.	177.3	1.00	1.50	1.00	3.60	53.	14.0	272.2	2.0
15	01	01	1	06	-53.8	0.475	-9.000	-9.000	-999.	785.	177.0	1.00	1.50	1.00	3.60	52.	14.0	271.9	2.0
15	01	01	1	07	-43.3	0.381	-9.000	-9.000	-999.	572.	114.1	1.00	1.50	1.00	3.10	55.	14.0	271.5	2.0
15	01	01	1	08	-43.3	0.381	-9.000	-9.000	-999.	565.	113.9	1.00	1.50	0.87	3.10	63.	14.0	271.2	2.0
15	01	01	1	09	-18.5	0.526	-9.000	-9.000	-999.	915.	701.5	1.00	1.50	0.55	3.60	47.	14.0	272.8	2.0
15	01	01	1	10	34.7	0.496	0.465	0.007	103.	839.	-312.7	1.00	1.50	0.44	3.10	51.	14.0	274.9	2.0
15	01	01	1	11	69.5	0.444	0.729	0.008	198.	713.	-112.3	1.00	1.50	0.40	2.60	64.	14.0	277.0	2.0
15	01	01	1	12	89.3	0.385	0.891	0.009	282.	577.	-57.1	1.00	1.50	0.38	2.10	66.	14.0	279.2	2.0
15	01	01	1	13	92.7	0.387	0.968	0.009	348.	577.	-55.5	1.00	1.50	0.38	2.10	63.	14.0	280.5	2.0
15	01	01	1	14	79.4	0.381	0.964	0.010	401.	566.	-62.1	1.00	1.50	0.39	2.10	59.	14.0	280.8	2.0
15	01	01	1	15	50.3	0.435	0.858	0.008	446.	688.	-145.4	1.00	1.50	0.42	2.60	62.	14.0	280.8	2.0
15	01	01	1	16	8.1	0.404	0.470	0.009	452.	617.	-720.9	1.00	1.50	0.49	2.60	74.	14.0	280.1	2.0
15	01	01	1	17	-28.9	0.295	-9.000	-9.000	-999.	392.	78.7	1.00	1.50	0.71	2.60	71.	14.0	278.8	2.0
15	01	01	1	18	-30.2	0.273	-9.000	-9.000	-999.	343.	59.9	1.00	1.50	1.00	2.60	77.	14.0	277.8	2.0
15	01	01	1	19	-6.8	0.093	-9.000	-9.000	-999.	107.	10.3	0.15	6.00	1.00	2.10	104.	14.0	277.0	2.0
15	01	01	1	20	-10.5	0.115	-9.000	-9.000	-999.	93.	12.7	0.15	6.00	1.00	2.60	107.	14.0	276.5	2.0
15	01	01	1	21	-15.0	0.137	-9.000	-9.000	-999.	121.	15.2	0.15	6.00	1.00	3.10	110.	14.0	276.1	2.0
15	01	01	1	22	-26.2	0.235	-9.000	-9.000	-999.	274.	44.1	0.15	6.00	1.00	3.60	122.	14.0	275.9	2.0
15	01	01	1	23	-39.1	0.350	-9.000	-9.000	-999.	498.	97.8	0.15	6.00	1.00	4.60	120.	14.0	275.8	2.0
15	01	01	1	24	-33.1	0.296	-9.000	-9.000	-999.	388.	69.7	0.15	6.00	1.00	4.10	120.	14.0	275.2	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
15	01	01	01	14.0	1	21.	4.60	274.3	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PLANT , QUARRY , DRAINAGE ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_2.5 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)								
	592878.53	592928.53	592978.53	593028.53	593078.53	593128.53	593178.53	593228.53	593278.53
4199829.54	0.00546	0.00564	0.00576	0.00580	0.00578	0.00575	0.00573	0.00575	0.00580
4199779.54	0.00581	0.00601	0.00614	0.00618	0.00617	0.00614	0.00614	0.00617	0.00622
4199729.54	0.00620	0.00642	0.00656	0.00661	0.00660	0.00659	0.00660	0.00665	0.00671
4199679.54	0.00665	0.00688	0.00703	0.00709	0.00710	0.00710	0.00713	0.00719	0.00726
4199629.54	0.00714	0.00740	0.00757	0.00765	0.00767	0.00769	0.00774	0.00781	0.00789
4199579.54	0.00771	0.00800	0.00819	0.00829	0.00833	0.00837	0.00844	0.00853	0.00862
4199529.54	0.00836	0.00869	0.00891	0.00903	0.00910	0.00917	0.00927	0.00938	0.00948
4199479.54	0.00912	0.00949	0.00976	0.00992	0.01002	0.01013	0.01025	0.01039	0.01050
4199429.54	0.01000	0.01044	0.01077	0.01098	0.01113	0.01128	0.01145	0.01160	0.01172
4199379.54	0.01106	0.01158	0.01200	0.01228	0.01250	0.01271	0.01292	0.01308	0.01318
4199329.54	0.01235	0.01299	0.01353	0.01392	0.01422	0.01450	0.01474	0.01488	0.01491
4199279.54	0.01394	0.01477	0.01549	0.01604	0.01647	0.01681	0.01703	0.01708	0.01696
4199229.54	0.01600	0.01711	0.01814	0.0189		01983	0.01993	0.01975	0.01937
4199179.54	0.01877	0.02040	0.02193	0.0230		02382	0.02354	0.02292	0.02210
4199129.54	0.02280	0.02549	0.02789	0.0293		02899	0.02787	0.02649	0.02504
4199079.54	0.02955	0.03460	0.03836	0.0392		03524	0.03267	0.03023	0.02800
4199029.54	0.04512	0.05402	0.05867	0.0539		04179	0.03745	0.03384	0.03079
4198979.54	0.07135	0.08144	0.08083	0.0676		04768	0.04173	0.03707	0.03327
4198929.54	0.08886	0.09817	0.09405	0.0770		05252	0.04532	0.03977	0.03535
4198879.54	0.10383	0.10992	0.10327	0.0840		05626	0.04814	0.04191	0.03699
4198829.54	0.11683	0.11878	0.11001	0.0891		05901	0.05019	0.04346	0.03818
4198779.54	0.12503	0.12469	0.11463	0.0928		06091	0.05157	0.04446	0.03888
4198729.54	0.12921	0.12794	0.11727	0.09519	0.07553	0.06210	0.05235	0.04492	0.03912
4198679.54	0.13031	0.12898	0.11853	0.09660	0.07652	0.06266	0.05255	0.04484	0.03887
4198629.54	0.12942	0.12869	0.11859	0.09767	0.07693	0.06254	0.05208	0.04416	0.03814
4198579.54	0.12695	0.12738	0.11815	0.09826	0.07648	0.06145	0.05073	0.04279	0.03681
4198529.54	0.12381	0.12545	0.11719	0.09744	0.07430	0.05890	0.04829	0.04064	0.03495
4198479.54	0.12048	0.12240	0.11441	0.09224	0.06905	0.05456	0.04482	0.03787	0.03273
4198429.54	0.11640	0.11672	0.10582	0.08032	0.06094	0.04893	0.04072	0.03475	0.03030
4198379.54	0.10933	0.10617	0.08722	0.06596	0.05224	0.04310	0.03653	0.03160	0.02787
4198329.54	0.09703	0.08390	0.06675	0.05406	0.04470	0.03784	0.03266	0.02863	0.02551
4198279.54	0.07988	0.06476	0.05383	0.04537	0.03864	0.03339	0.02928	0.02598	0.02337

Project Maximum Incremental Annual Average Concentration of PM2.5 at Nearest Home Reported in Table 3

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   5 YEARS ***

** CONC OF PM_2.5   IN MICROGRAMS/M**3   **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.13031 AT (592878.53, 4198679.54, 169.00, 1173.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	0.12942 AT (592878.53, 4198629.54, 171.40, 1173.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	0.12921 AT (592878.53, 4198729.54, 166.80, 1173.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.12898 AT (592928.53, 4198679.54, 170.30, 1173.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	0.12869 AT (592928.53, 4198629.54, 172.30, 1173.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	0.12794 AT (592928.53, 4198729.54, 167.80, 1173.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	0.12738 AT (592928.53, 4198579.54, 174.40, 1173.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.12695 AT (592878.53, 4198579.54, 174.90, 1173.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.12655 AT (592828.53, 4198679.54, 169.40, 1173.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.12545 AT (592928.53, 4198529.54, 175.30, 1173.00, 0.00)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR

*** MODELOPTs: RegDFAULT CONC ELEV RURAL

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   0 Warning Message(s)
A Total of   895 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   895 Calm Hours Identified

A Total of   0 Missing Hours Identified (0.00 Percent)

   ******** FATAL ERROR MESSAGES ********
             *** NONE ***

   ********   WARNING MESSAGES   ********
             *** NONE ***

   ****
   *** AERMOD Finishes Successfully ***
   ****

APPENDIX D-3

1983 RECLAMATION PLAN BACKFILL EMISSIONS

CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC.

CLAYTON QUARRY

PRELIMINARY ESTIMATE OF AIR AND GREENHOUSE GAS EMISSIONS FOR THE 1983 RECLAMATION PLAN BACKFILL

PREPARED FOR:

CEMEX Construction Materials Pacific, LLC
2365 Iron Point Road, Suite 120
Folsom, CA 95630

FOR SUBMITTAL TO:

Contra Costa County
Department of Conservation and Development
Community Development Division
30 Muir Road
Martinez, CA 94553

COMPASS LAND GROUP

AUGUST 14, 2018

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 2

2.0 1983 PLAN IMPLEMENTATION: QUARRY PIT BACKFILL 2

3.0 METHODS AND ASSUMPTIONS 2

4.0 RESULTS 4

5.0 CONCLUSIONS 6

TABLES

Table 1 Modeled Maximum Daily Emissions of Criteria Air Pollutants and Precursors..... 5
Table 2 Modeled Annual Emissions of Criteria Air Pollutants and Precursors..... 5
Table 3 Modeled Greenhouse Gas Emissions 5

APPENDICES

Appendix A Equipment Input Parameters
Appendix B Construction Input Parameters
Appendix C CalEEMod Model Report: Daily Emissions
Appendix D CalEEMod Model Report: Annual Emissions

1.0 PURPOSE AND SCOPE

Compass Land Group ("Compass") has prepared this preliminary estimate of air and greenhouse gas emissions ("Study") in support of the CEMEX Construction Materials, LLC. ("CEMEX") Clayton Quarry Reclamation Plan Amendment Project in unincorporated Contra Costa County, California ("Project", LUP #s LP15-2030/31). As part of the Project, CEMEX proposes an amendment to its 1983 Reclamation Plan ("1983 Plan") through adoption of a *Revised Reclamation Plan.* This Study is not intended as a comprehensive study of emissions associated with implementation of either the 1983 Plan or Revised Reclamation Plan. Instead, the focus of this Study is to perform a preliminary estimate of the emissions associated with carrying out the backfill requirements of the *current* 1983 Plan. This information may be useful to understand the order of magnitude of potential emissions that could be avoided through adoption of the *Revised Reclamation Plan*.

The sections that follow provide a description of the Project, methods for air quality and greenhouse gas emissions evaluation, and preliminary emissions estimates.

2.0 1983 PLAN IMPLEMENTATION: QUARRY PIT BACKFILL

The 1983 Plan envisions mining to 500' msl with a quarry pit backfill to 650' msl with positive drainage out of the quarry pit. Subsequent to 1983 Plan approval, a Final Drainage Plan (dated May 15, 1984) was submitted in response to Condition #17 (of LUP #2054-81), which shows an approximate backfill elevation of 700' msl at the west side of the quarry and 650' msl at the east side of the quarry, with a 2% minimum slope draining toward Mitchell Canyon Road. However, a contemporary geologic model prepared by Jeff Light Geologic Consulting indicates that in order to achieve a balanced backfill scenario with positive drainage, CEMEX would need to handle approximately 17.1 MCY of overburden to backfill the quarry pit to a toe elevation of 650' msl and crest elevation of 790' msl (at the base of the western quarry high wall). Overburden materials would be excavated and transported to the quarry floor using a combination of excavators and articulating haul-trucks (i.e., a Phase 1 backfill from 500' msl to 650' msl) and scrapers (i.e., a Phase 2 backfill from 650' msl to 790' msl). Of this total, approximately 10.2 MCY would be moved in Phase 1 and 6.9 MCY would be moved in Phase 2. In both cases, it is assumed that a bulldozer, motor grader, compactor, and water pull would assist on the backfill grade.

3.0 METHODS AND ASSUMPTIONS

This Study utilizes the California Emissions Estimator Model (CalEEMod). CalEEMod is a widely accepted modeling tool maintained by the California Air Pollution Control Officers Association (CAPCOA). CalEEMod incorporates state and locally approved emission factors and methodologies for estimating both the daily maximum and annual average emissions levels for criteria pollutants and greenhouse gas emissions associated with land development projects, including mining.

In order to assess Study emissions for the 1983 Plan and 1984 Final Drainage Plan backfill requirement, CalEEMod Version 2016.3.2 was used with the assumptions set forth below.

General

1. ***Operational Emissions:*** Operational emissions associated with carrying out the backfill requirements of reclamation are modeled using the CalEEMod Construction modules, which are setup to better address conventional site grading and earthmoving activities typical of mining applications.

Site Characteristics

1. ***Project Location:*** Location is set to the County level for Contra Costa County. This sets windspeed and precipitation frequency assumptions for modeling. The Project site is located within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) and part of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is currently designated as a nonattainment area for state and national ozone standards and national particulate matter ambient air quality standards.

2. ***Lot Acreage:*** Under the 1983 Plan, the reclaimed quarry pit would encompass ±154 acres. For grading activity, this model input parameter has a negligible impact on modeled emissions outputs.

3. ***Urbanization:*** The land use setting is designated as rural, as the Project site is located in an open space environment in the unincorporated portions of Contra Costa County.

4. ***Climate Zone:*** The site is located within Climate Zone 4 based on the site's zip code.

Operational Parameters

1. ***Site Preparation:*** To carry out the backfill objectives of the 1983 Plan, site preparation would generally be limited to grading and maintenance of haul roads for overburden transport. These activities would require limited use of off-road equipment and emissions generated during this time-period would be significantly overshadowed by operational emissions once those roads are in place and backfill operations commence. Further, including routine site preparatory activities in this estimate would muddle a comparison of carrying out backfill obligations under the 1983 Plan versus not having to perform backfill under the proposed Project's Revised Reclamation Plan. For the reasons set forth above, and in order to focus this Study on the emissions associated with carrying out only the backfill requirements of the 1983 Plan, site preparation emissions are omitted from the analysis.

2. ***Production:*** The emissions analyses are based on equipment and production input parameters developed in coordination with CEMEX. Please refer to **Appendix A**, Equipment Input Parameters, and **Appendix B**, Construction Input Parameters. For Phase 1 backfill, the model is set to commence grading activity on April 1, 2019 (at the beginning of the coming dry season) and is completed by May 24, 2021. For Phase 2 backfill, the model is set to commence grading activity on May 25, 2021 and is completed by July 13,

2022. Actual final reclamation is not likely to occur for decades (until after mining is complete).

3. ***Equipment:*** CEMEX provided input into the equipment to be used to carry out the backfill requirements of the 1983 Plan and 1984 Final Drainage Plan (see **Appendix A**). Equipment horsepower ratings were obtained from CEMEX and the manufacturer (Caterpillar Handbook, Edition 37), while load factors were obtained from data provided by the California Air Resources Board.

    - ***For Phase 1 backfill from 500' msl to 650' msl,*** off-road equipment operation is assumed to include 2 excavators (Cat 385), 20 articulating haul trucks (Cat 740), 1 bulldozer (Cat D10), 1 motor grader (Cat 14M), 1 compactor (Cat 825), and 1 water pull (powered by a Cat 631 tractor). The operation will be governed by the excavator production capacity with support equipment (e.g., bulldozer) sized to match that production.

    - ***For Phase 2 backfill from 650' msl to 790' msl,*** off-road equipment operation is assumed to include 8 scrapers (Cat 637), 1 bulldozer (Cat D10), 1 motor grader (Cat 14M), 1 compactor (Cat 825), and 1 water pull (powered by a Cat 631 tractor). The operation will be governed by the scraper production capacity with support equipment (e.g., bulldozer) sized to match that production.

4. ***Energy Use:*** For purposes of carrying out the backfill requirements of the 1983 Plan, energy use is assumed to be zero.

5. ***Mitigated Construction:*** The "mitigated construction" results (as reported in Appendices C and D) reflect the use of CEMEX's existing equipment fleet, which includes Tier 3 or better engines. The mitigated construction assumptions also assume that disturbed surfaces would be wetted at least two times per day for dust control. CEMEX's current operating practices involve the use of a full-time water truck; therefore, this assumption is considered reasonable. No other mitigations have been modeled or credited in CalEEMod. Based on the foregoing, the mitigated construction results have been presented in Table 2 below as the Study's modeled emissions.

6. ***Trips and VMT:*** No material import or export is assumed as all materials used in the quarry pit backfill are assumed to be sourced on-site. Employee and vendor trips utilize model defaults and contribute only negligibly to Study emissions.

4.0 RESULTS

Study emissions estimates are summarized in Tables 1, 2, and 3 below.

TABLE 1

MODELED MAXIMUM DAILY EMISSIONS OF CRITERIA AIR POLLUTANTS AND PRECURSORS (LB/DAY)

Phase	ROG	NOx	PM_{10} (Total)	$PM_{2.5}$ (Total)	CO_2
Ph. 1	10.6	191.1	10.7	8.9	40,327.1
Ph. 2	2.2	35.4	4.7	3.0	7,342.3

Notes:

1. Detailed CalEEMod model outputs are reported in Appendix C.
2. PM Total represents the sum of fugitive and exhaust PM emissions.

TABLE 2

MODELED ANNUAL EMISSIONS OF CRITERIA AIR POLLUTANTS AND PRECURSORS (TONS/YEAR)

Year / Phase	ROG	NOx	PM_{10} (Total)	$PM_{2.5}$ (Total)	CO_2 (MT/year)
2019 /Ph. 1	1.0	18.8	1.1	0.9	3,599.4
2020 /Ph. 1	1.4	24.9	1.4	1.2	4,680.4
2021 /Ph. 2	0.7	12.4	1.0	0.7	2,349.6
2022 /Ph. 2	0.1	2.4	0.3	0.2	458.0
Total	**3.2**	**58.5**	**3.8**	**3.0**	**11,087.4**

Notes:

1. Detailed CalEEMod model outputs are reported in Appendix D.
2. PM Total represents the sum of fugitive and exhaust PM emissions.

TABLE 3

MODELED GREENHOUSE GAS EMISSIONS (METRIC TONS/YEAR)

Year / Phase	CO_2 (Total)	CH_4	N_20	CO_2E
2019 /Ph. 1	3,599.4	1.1	0.0	3,627.5
2020 /Ph. 1	4,680.4	1.5	0.0	4,717.8
2021 /Ph. 1 & 2	2,349.6	0.7	0.0	2,368.3
2022 /Ph. 2	458.0	0.1	0.0	461.6
Total	**11,087.4**	**3.4**	**0.0**	**11,175.2**

Notes:

1. Detailed CalEEMod model outputs are reported in Appendix D.

5.0 CONCLUSIONS

Based on the Study emissions estimates, implementation of the 1983 Plan's backfill requirement would generate significant levels of air quality pollutants and greenhouse gas emissions. Unlike the 1983 Plan, the proposed Project would not require backfill of the quarry pit as the quarry would be reclaimed to an open space condition that would adapt to a quarry lake over time. As such, the emissions estimated in this Study could be avoided upon County approval of the proposed Project's Revised Reclamation Plan.

Appendix A:
Equipment Input Parameters

Appendix A
Clayton Quarry Reclamation - 1983 Plan Backfill
Equipment Input Parameters

Equipment	Model (or equivalent)	HP	Tier
Phase 1 Backfill from 500' to 650' msl with haul trucks			
Excavator	CAT 385	523	3
Haul Trucks	CAT 740	457	3
Dozer	CAT D10	580	3
Motor Grader	CAT 14M3	259	3
Compactor	CAT 825	354	3
Water Pull (Scraper Tractor)	CAT 631	500	3
Phase 2 Backfill from 650' to 790' msl with scrapers			
Scrapers	CAT 637	783	3
Dozer	CAT D10	580	3
Motor Grader	CAT 14M3	259	3
Compactor	CAT 825	354	3
Water Pull (Scraper Tractor)	CAT 631	500	3

Appendix B:
Construction Input Parameters

Appendix B
Clayton Quarry Reclamation - 1983 Plan Backfill
Construction Input Parameters for Backfill Operations

Information Sources:

Quantities provided by Jeff Light Geologic Consulting (August 6, 2018).
Construction parameters developed in coordination with CEMEX.
Equipment production factors sources from Caterpillar Performance Handbook, Ed. 37.

Primary Reclamation Activity:

As reported by Jeff Light Geologic Consulting, approximately 17.1 million cubic yards of Knoxville overburden would need to be moved to carry out reclamation under the 1983 Plan and 1984 Final Drainage Plan with a backfill to elevation 790' msl at the base of the western quarry high wall. Overburden materials would be transported to the quarry floor using a combination of articulating haul-trucks (Phase 1 backfill from 500' msl to 650' msl) and scrapers (Phase 2 backfill from 650' msl to 790' msl). Of this total, approximately 10.2 million cubic yards is assumed to be moved in Phase 1 and 6.9 million cubic yards is assumed to be moved in Phase 2.

1. Phase 1 Backfill with Haul Trucks from 500' msl to 650' msl

Method:

For the first approximately 10.2 million cubic yards of backfill, this estimating method assumes an excavator will load articulating haul trucks. A bulldozer, motor grader, compactor, and water pull will assist on backfill grade. The operation will be governed by the excavator production capacity with the haul trucks and dozers sized to match that production. Although the haul distance and haul road grade will vary over time, this estimate conservatively assumes the following:

General Assumptions:

Production hours per shift:	8	hours
Shifts per day:	1	shifts
Production days per year:	250	days (5 days/week @ 50 weeks)
Efficiency:	83.3%	= 50 min hour / 60 min
Total CY moved:	10,200,000	CY

Cat 385 Production Assumptions Per Excavator:

Cat 385 excavator capacity:	7.5	CY heaped with mass excavation bucket
Cat 740 haul truck capacity:	22.9	CY loose in truck based on a 40-ton capacity
Load/Swing/Dump/Swing Cycle:	0.33	minutes
Bucket cycles per truck:	3.0	cycles
Total load time per truck:	1.0	minutes
Truck loads per hour:	60	loads @ 100% efficiency
CY per hour:	1,364	CY per excavator @ 100% efficiency
CY per hour, w/ efficiency factor:	1,136	CY per excavator adjusted for efficiency factor
CY per shift:	9,087	CY per excavator adjusted for efficiency factor

Production Summary:

Qty of production excavators:	2	Cat 385 excavators
Total production hours:	4,490	hours per excavator
Total production days:	561	days
Total production years:	2.2	years

Cat 740 Haul Truck and Haul Road Assumptions:

Haul distance:	4,000	LF est. one way (winding down toward pit floor)
Haul road grade:	10%	avg. grade
Haul road rolling resistance:	3%	firm, smooth, rolling road w/ dirt surfacing
Speed estimate, loaded:	9	mph based on Cat retarding/rimpull curve; geared down
Speed estimate, unloaded:	14	mph based on Cat retarding/rimpull curve; geared down
Truck maneuver in load area:	0.7	minutes
Travel time loaded:	5.1	minutes
Maneuver at dump point:	1.1	minutes
Travel time unloaded:	3.2	minutes
Total haul cycle time per load:	10.1	minutes
Recommended # of trucks:	20	trucks (# of excavators x (haul time / load time per truck))

2. Phase 2 Backfill with Scrapers from 650' msl to 790' msl

Method:

For the Phase 2 backfill (from 650' msl to 790' msl) this estimating method assumes that 6,900,000 cubic yards of backfill would be accomplished with scrapers given the shorter haul distances, pure overburden handle and earthmoving grades. A bulldozer, motor grader, compactor, and water pull will assist on backfill grade.

Scrapers at average haul distance 1,000 feet. Cat 637 push-pull scraper: assume 20 cy/load heaped, 2.75 min cycle time, 90% efficiency = 20 loads per hour (400 cy per hour) per scraper. Assume dozer and motor grader assisting on-grade at 4 hours each per day of scraper operation. Dozer/motor-grader operator assumed to also serve as working foreman.

General Assumptions:

Production hours per shift:	8	hours
Shifts per day:	1	shifts
Production days per year:	250	days, assuming 5 days per week 50 weeks per year
Efficiency:	83.3%	= 50 min hour / 60 min
Total CY moved:	6,900,000	CY

Cat 637 Scraper Production Assumptions:

Scraper load capacity:	20.0	CY per load (heaped)
Scraper cycle time:	2.75	minutes
CY per hour:	436	CY per scraper @ 100% efficiency
CY per hour, w/ efficiency factor:	363	CY per scraper adjusted for efficiency factor
CY per shift:	2,908	CY per scraper adjusted for efficiency factor

Production Summary:

Qty of scrapers:	8	scrapers
Total production hours:	2,373	hours
Total production days:	297	days
Total production years:	1.2	years

Appendix C:
CalEEMod Model Report: Daily Emissions

Clayton Quarry Reclamation - 1983 Plan Backfill

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	154.00	User Defined Unit	154.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Air emissions estimate assumes backfill to a toe elevation of 650' msl and crest elevation of 790' msl at the base of the western high wall.

Land Use - Quarry area to be reclaimed approx. 154 acres per Spinardi Associates.

Construction Phase - Construction assumptions and duration developed in coordination with CEMEX.

Off-road Equipment - For Phase 1, equipment type "scraper" represents Cat 631 Water Pull. Off-highway trucks represent Cat 740 Haul Trucks.

Off-road Equipment - For Phase 2, 500 hp scraper represents Cat 631 Water Pull.

Grading - No material import/export assumed.

Energy Use -

Construction Off-road Equipment Mitigation - All off-road equipment Tier 3 or better. Water exposed surfaces 2x per day.

Clayton Quarry Reclamation - 1983 Plan Backfill - Contra Costa County, Summer

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	310.00	561.00
tblConstructionPhase	NumDays	310.00	297.00
tblGrading	AcresOfGrading	841.50	154.00
tblGrading	AcresOfGrading	2,821.50	154.00
tblLandUse	LotAcreage	0.00	154.00
tblOffRoadEquipment	HorsePower	158.00	523.00
tblOffRoadEquipment	HorsePower	187.00	259.00
tblOffRoadEquipment	HorsePower	187.00	259.00
tblOffRoadEquipment	HorsePower	247.00	580.00
tblOffRoadEquipment	HorsePower	247.00	580.00
tblOffRoadEquipment	HorsePower	367.00	500.00
tblOffRoadEquipment	HorsePower	367.00	500.00
tblOffRoadEquipment	HorsePower	367.00	783.00
tblOffRoadEquipment	HorsePower	402.00	457.00

tblOffRoadEquipment	HorsePower	80.00	354.00
tblOffRoadEquipment	HorsePower	80.00	354.00
tblOffRoadEquipment	LoadFactor	0.48	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	70.00	65.00
tblTripsAndVMT	WorkerTripNumber	40.00	30.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	22.5577	237.6171	135.0669	0.4074	6.8472	8.8015	15.6487	3.4833	8.0974	11.5807	0.0000	40,327.0954	40,327.0954	12.5967	0.0000	40,642.0127
2020	21.2886	214.1222	129.5878	0.4071	6.8472	7.9321	14.7792	3.4833	7.2975	10.7808	0.0000	39,428.6395	39,428.6395	12.5896	0.0000	39,743.3785
2021	19.7811	186.1912	123.6381	0.4070	6.8472	6.9202	13.7674	3.4833	6.3666	9.8499	0.0000	39,413.1560	39,413.1560	12.5894	0.0000	39,727.8903
2022	4.6695	52.4935	36.2990	0.0757	6.8184	2.0463	8.8647	3.4350	1.8826	5.3176	0.0000	7,335.3357	7,335.3357	2.3020	0.0000	7,392.8853
Maximum	**22.5577**	**237.6171**	**135.0669**	**0.4074**	**6.8472**	**8.8015**	**15.6487**	**3.4833**	**8.0974**	**11.5807**	**0.0000**	**40,327.0954**	**40,327.0954**	**12.5967**	**0.0000**	**40,642.0127**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	10.6149	191.0635	211.6535	0.4074	3.3749	7.3506	10.7255	1.6454	7.3065	8.9519	0.0000	40,327.0954	40,327.0954	12.5967	0.0000	40,642.0127
2020	10.5228	189.9163	211.3019	0.4071	3.3749	7.2840	10.6589	1.6454	7.2453	8.8906	0.0000	39,428.6394	39,428.6394	12.5896	0.0000	39,743.3784
2021	10.4445	188.8563	211.1213	0.4070	3.3749	7.2238	10.5987	1.6454	7.1898	8.8352	0.0000	39,413.1559	39,413.1559	12.5894	0.0000	39,727.8902
2022	2.1445	34.5491	42.5190	0.0757	3.2038	1.4071	4.6109	1.5817	1.3857	2.9673	0.0000	7,335.3357	7,335.3357	2.3020	0.0000	7,392.8853
Maximum	**10.6149**	**191.0635**	**211.6535**	**0.4074**	**3.3749**	**7.3506**	**10.7255**	**1.6454**	**7.3065**	**8.9519**	**0.0000**	**40,327.0954**	**40,327.0954**	**12.5967**	**0.0000**	**40,642.0127**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**50.62**	**12.46**	**-59.35**	**0.00**	**51.28**	**9.47**	**31.03**	**53.06**	**2.19**	**21.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.4600e-003**	**1.4000e-004**	**0.0157**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**		**0.0337**	**0.0337**	**9.0000e-005**	**0.0000**	**0.0359**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.4600e-003**	**1.4000e-004**	**0.0157**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**		**0.0337**	**0.0337**	**9.0000e-005**	**0.0000**	**0.0359**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Ph 1: Backfill with Haul Trucks	Grading	4/1/2019	5/24/2021	5	561	Backfill from 500' to 650' msl
2	Ph 2: Backfill with Scrapers	Grading	5/25/2021	7/13/2022	5	297	Backfill from 650' to 790' msl

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Clayton Quarry Reclamation - 1983 Plan Backfill - Contra Costa County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Ph 1: Backfill with Haul Trucks	Excavators	2	8.00	523	0.38
Ph 1: Backfill with Haul Trucks	Graders	1	8.00	259	0.41
Ph 1: Backfill with Haul Trucks	Off-Highway Trucks	20	8.00	457	0.38
Ph 1: Backfill with Haul Trucks	Rollers	1	8.00	354	0.37
Ph 1: Backfill with Haul Trucks	Rubber Tired Dozers	1	8.00	580	0.40
Ph 1: Backfill with Haul Trucks	Scrapers	1	8.00	500	0.48
Ph 2: Backfill with Scrapers	Excavators	2	8.00	158	0.38
Ph 1: Backfill with Haul Trucks	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Ph 2: Backfill with Scrapers	Graders	1	8.00	259	0.41
Ph 2: Backfill with Scrapers	Rollers	1	8.00	354	0.38
Ph 2: Backfill with Scrapers	Rubber Tired Dozers	1	8.00	580	0.40
Ph 2: Backfill with Scrapers	Scrapers	1	8.00	500	0.37
Ph 2: Backfill with Scrapers	Scrapers	8	8.00	783	0.48
Ph 2: Backfill with Scrapers	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Ph 1: Backfill with Haul Trucks	28	65.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Ph 2: Backfill with Scrapers	16	30.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Ph 1: Backfill with Haul Trucks - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3132	0.0000	6.3132	3.3417	0.0000	3.3417			0.0000			0.0000
Off-Road	22.2983	237.4572	133.0309	0.4018		8.7980	8.7980		8.0942	8.0942		39,765.8155	39,765.8155	12.5815		40,080.3525
Total	**22.2983**	**237.4572**	**133.0309**	**0.4018**	**6.3132**	**8.7980**	**15.1112**	**3.3417**	**8.0942**	**11.4358**		**39,765.8155**	**39,765.8155**	**12.5815**		**40,080.3525**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2594	0.1600	2.0361	5.6400e-003	0.5340	3.5200e-003	0.5375	0.1416	3.2400e-003	0.1449		561.2799	561.2799	0.0152		561.6602
Total	**0.2594**	**0.1600**	**2.0361**	**5.6400e-003**	**0.5340**	**3.5200e-003**	**0.5375**	**0.1416**	**3.2400e-003**	**0.1449**		**561.2799**	**561.2799**	**0.0152**		**561.6602**

3.2 Ph 1: Backfill with Haul Trucks - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8409	0.0000	2.8409	1.5038	0.0000	1.5038			0.0000			0.0000
Off-Road	10.3555	190.9035	209.6174	0.4018		7.3471	7.3471		7.3033	7.3033	0.0000	39,765.8154	39,765.8154	12.5815		40,080.3525
Total	**10.3555**	**190.9035**	**209.6174**	**0.4018**	**2.8409**	**7.3471**	**10.1880**	**1.5038**	**7.3033**	**8.8070**	**0.0000**	**39,765.8154**	**39,765.8154**	**12.5815**		**40,080.3525**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2594	0.1600	2.0361	5.6400e-003	0.5340	3.5200e-003	0.5375	0.1416	3.2400e-003	0.1449		561.2799	561.2799	0.0152		561.6602
Total	**0.2594**	**0.1600**	**2.0361**	**5.6400e-003**	**0.5340**	**3.5200e-003**	**0.5375**	**0.1416**	**3.2400e-003**	**0.1449**		**561.2799**	**561.2799**	**0.0152**		**561.6602**

3.2 Ph 1: Backfill with Haul Trucks - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3132	0.0000	6.3132	3.3417	0.0000	3.3417			0.0000			0.0000
Off-Road	21.0521	213.9810	127.7610	0.4016		7.9286	7.9286		7.2943	7.2943		38,885.1818	38,885.1818	12.5763		39,199.5882
Total	**21.0521**	**213.9810**	**127.7610**	**0.4016**	**6.3132**	**7.9286**	**14.2418**	**3.3417**	**7.2943**	**10.6360**		**38,885.1818**	**38,885.1818**	**12.5763**		**39,199.5882**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2365	0.1412	1.8268	5.4500e-003	0.5340	3.4400e-003	0.5374	0.1416	3.1700e-003	0.1448		543.4577	543.4577	0.0133		543.7903
Total	**0.2365**	**0.1412**	**1.8268**	**5.4500e-003**	**0.5340**	**3.4400e-003**	**0.5374**	**0.1416**	**3.1700e-003**	**0.1448**		**543.4577**	**543.4577**	**0.0133**		**543.7903**

3.2 Ph 1: Backfill with Haul Trucks - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8409	0.0000	2.8409	1.5038	0.0000	1.5038			0.0000			0.0000
Off-Road	10.2863	189.7751	209.4752	0.4016		7.2805	7.2805		7.2421	7.2421	0.0000	38,885.1818	38,885.1818	12.5763		39,199.5882
Total	**10.2863**	**189.7751**	**209.4752**	**0.4016**	**2.8409**	**7.2805**	**10.1215**	**1.5038**	**7.2421**	**8.7458**	**0.0000**	**38,885.1818**	**38,885.1818**	**12.5763**		**39,199.5882**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2365	0.1412	1.8268	5.4500e-003	0.5340	3.4400e-003	0.5374	0.1416	3.1700e-003	0.1448		543.4577	543.4577	0.0133		543.7903
Total	**0.2365**	**0.1412**	**1.8268**	**5.4500e-003**	**0.5340**	**3.4400e-003**	**0.5374**	**0.1416**	**3.1700e-003**	**0.1448**		**543.4577**	**543.4577**	**0.0133**		**543.7903**

3.2 Ph 1: Backfill with Haul Trucks - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3132	0.0000	6.3132	3.3417	0.0000	3.3417			0.0000			0.0000
Off-Road	19.5629	186.0652	121.9683	0.4017		6.9169	6.9169		6.3635	6.3635		38,888.9719	38,888.9719	12.5775		39,203.4090
Total	**19.5629**	**186.0652**	**121.9683**	**0.4017**	**6.3132**	**6.9169**	**13.2301**	**3.3417**	**6.3635**	**9.7052**		**38,888.9719**	**38,888.9719**	**12.5775**		**39,203.4090**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2183	0.1260	1.6698	5.2600e-003	0.5340	3.3500e-003	0.5373	0.1416	3.0900e-003	0.1447		524.1840	524.1840	0.0119		524.4813
Total	**0.2183**	**0.1260**	**1.6698**	**5.2600e-003**	**0.5340**	**3.3500e-003**	**0.5373**	**0.1416**	**3.0900e-003**	**0.1447**		**524.1840**	**524.1840**	**0.0119**		**524.4813**

3.2 Ph 1: Backfill with Haul Trucks - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8409	0.0000	2.8409	1.5038	0.0000	1.5038			0.0000			0.0000
Off-Road	10.2262	188.7303	209.4515	0.4017		7.2204	7.2204		7.1868	7.1868	0.0000	38,888.9719	38,888.9719	12.5775		39,203.4089
Total	**10.2262**	**188.7303**	**209.4515**	**0.4017**	**2.8409**	**7.2204**	**10.0613**	**1.5038**	**7.1868**	**8.6905**	**0.0000**	**38,888.9719**	**38,888.9719**	**12.5775**		**39,203.4089**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2183	0.1260	1.6698	5.2600e-003	0.5340	3.3500e-003	0.5373	0.1416	3.0900e-003	0.1447		524.1840	524.1840	0.0119		524.4813
Total	**0.2183**	**0.1260**	**1.6698**	**5.2600e-003**	**0.5340**	**3.3500e-003**	**0.5373**	**0.1416**	**3.0900e-003**	**0.1447**		**524.1840**	**524.1840**	**0.0119**		**524.4813**

3.3 Ph 2: Backfill with Scrapers - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5720	0.0000	6.5720	3.3696	0.0000	3.3696			0.0000			0.0000
Off-Road	4.8103	56.1758	36.4366	0.0733		2.2183	2.2183		2.0408	2.0408		7,100.3835	7,100.3835	2.2964		7,157.7937
Total	**4.8103**	**56.1758**	**36.4366**	**0.0733**	**6.5720**	**2.2183**	**8.7903**	**3.3696**	**2.0408**	**5.4104**		**7,100.3835**	**7,100.3835**	**2.2964**		**7,157.7937**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1007	0.0582	0.7707	2.4300e-003	0.2464	1.5500e-003	0.2480	0.0654	1.4200e-003	0.0668		241.9311	241.9311	5.4900e-003		242.0683
Total	**0.1007**	**0.0582**	**0.7707**	**2.4300e-003**	**0.2464**	**1.5500e-003**	**0.2480**	**0.0654**	**1.4200e-003**	**0.0668**		**241.9311**	**241.9311**	**5.4900e-003**		**242.0683**

3.3 Ph 2: Backfill with Scrapers - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9574	0.0000	2.9574	1.5163	0.0000	1.5163			0.0000			0.0000
Off-Road	2.1228	35.3138	41.8704	0.0733		1.4674	1.4674		1.4412	1.4412	0.0000	7,100.3835	7,100.3835	2.2964		7,157.7937
Total	**2.1228**	**35.3138**	**41.8704**	**0.0733**	**2.9574**	**1.4674**	**4.4248**	**1.5163**	**1.4412**	**2.9575**	**0.0000**	**7,100.3835**	**7,100.3835**	**2.2964**		**7,157.7937**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1007	0.0582	0.7707	2.4300e-003	0.2464	1.5500e-003	0.2480	0.0654	1.4200e-003	0.0668		241.9311	241.9311	5.4900e-003		242.0683
Total	**0.1007**	**0.0582**	**0.7707**	**2.4300e-003**	**0.2464**	**1.5500e-003**	**0.2480**	**0.0654**	**1.4200e-003**	**0.0668**		**241.9311**	**241.9311**	**5.4900e-003**		**242.0683**

3.3 Ph 2: Backfill with Scrapers - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5720	0.0000	6.5720	3.3696	0.0000	3.3696			0.0000			0.0000
Off-Road	4.5759	52.4414	35.5891	0.0733		2.0448	2.0448		1.8812	1.8812		7,102.3958	7,102.3958	2.2971		7,159.8222
Total	**4.5759**	**52.4414**	**35.5891**	**0.0733**	**6.5720**	**2.0448**	**8.6168**	**3.3696**	**1.8812**	**5.2508**		**7,102.3958**	**7,102.3958**	**2.2971**		**7,159.8222**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0935	0.0521	0.7099	2.3400e-003	0.2464	1.5100e-003	0.2480	0.0654	1.3900e-003	0.0668		232.9399	232.9399	4.9300e-003		233.0631
Total	**0.0935**	**0.0521**	**0.7099**	**2.3400e-003**	**0.2464**	**1.5100e-003**	**0.2480**	**0.0654**	**1.3900e-003**	**0.0668**		**232.9399**	**232.9399**	**4.9300e-003**		**233.0631**

3.3 Ph 2: Backfill with Scrapers - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9574	0.0000	2.9574	1.5163	0.0000	1.5163			0.0000			0.0000
Off-Road	2.0509	34.4970	41.8091	0.0733		1.4056	1.4056		1.3843	1.3843	0.0000	7,102.3958	7,102.3958	2.2971		7,159.8222
Total	**2.0509**	**34.4970**	**41.8091**	**0.0733**	**2.9574**	**1.4056**	**4.3630**	**1.5163**	**1.3843**	**2.9006**	**0.0000**	**7,102.3958**	**7,102.3958**	**2.2971**		**7,159.8222**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0935	0.0521	0.7099	2.3400e-003	0.2464	1.5100e-003	0.2480	0.0654	1.3900e-003	0.0668		232.9399	232.9399	4.9300e-003		233.0631
Total	**0.0935**	**0.0521**	**0.7099**	**2.3400e-003**	**0.2464**	**1.5100e-003**	**0.2480**	**0.0654**	**1.3900e-003**	**0.0668**		**232.9399**	**232.9399**	**4.9300e-003**		**233.0631**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.590657	0.037535	0.185105	0.118290	0.015611	0.005013	0.010768	0.024764	0.001635	0.001742	0.005351	0.002726	0.000802

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359
Unmitigated	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359
Total	**1.4600e-003**	**1.4000e-004**	**0.0157**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0337**	**0.0337**	**9.0000e-005**		**0.0359**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.4600e-003	1.4000e-004	0.0157	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0337	0.0337	9.0000e-005		0.0359
Total	**1.4600e-003**	**1.4000e-004**	**0.0157**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0337**	**0.0337**	**9.0000e-005**		**0.0359**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix D:
CalEEMod Model Report: Annual Emissions

Clayton Quarry Reclamation - 1983 Plan Backfill

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	154.00	User Defined Unit	154.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Air emissions estimate assumes backfill to a toe elevation of 650' msl and crest elevation of 790' msl at the base of the western high wall.

Land Use - Quarry area to be reclaimed approx. 154 acres per Spinardi Associates.

Construction Phase - Construction assumptions and duration developed in coordination with CEMEX.

Off-road Equipment - For Phase 1, equipment type "scraper" represents Cat 631 Water Pull. Off-highway trucks represent Cat 740 Haul Trucks.

Off-road Equipment - For Phase 2, 500 hp scraper represents Cat 631 Water Pull.

Grading - No material import/export assumed.

Energy Use -

Construction Off-road Equipment Mitigation - All off-road equipment Tier 3 or better. Water exposed surfaces 2x per day.

Clayton Quarry Reclamation - 1983 Plan Backfill - Contra Costa County, Annual

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	310.00	561.00
tblConstructionPhase	NumDays	310.00	297.00
tblGrading	AcresOfGrading	841.50	154.00
tblGrading	AcresOfGrading	2,821.50	154.00
tblLandUse	LotAcreage	0.00	154.00
tblOffRoadEquipment	HorsePower	158.00	523.00
tblOffRoadEquipment	HorsePower	187.00	259.00
tblOffRoadEquipment	HorsePower	187.00	259.00
tblOffRoadEquipment	HorsePower	247.00	580.00
tblOffRoadEquipment	HorsePower	247.00	580.00
tblOffRoadEquipment	HorsePower	367.00	500.00
tblOffRoadEquipment	HorsePower	367.00	500.00
tblOffRoadEquipment	HorsePower	367.00	783.00
tblOffRoadEquipment	HorsePower	402.00	457.00

tblOffRoadEquipment	HorsePower	80.00	354.00
tblOffRoadEquipment	HorsePower	80.00	354.00
tblOffRoadEquipment	LoadFactor	0.48	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	70.00	65.00
tblTripsAndVMT	WorkerTripNumber	40.00	30.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	2.2200	23.4072	13.2835	0.0401	0.7256	0.8670	1.5926	0.3484	0.7976	1.1460	0.0000	3,599.3930	3,599.3930	1.1255	0.0000	3,627.5306
2020	2.7864	28.0522	16.9506	0.0533	0.9381	1.0391	1.9772	0.4604	0.9560	1.4164	0.0000	4,680.4083	4,680.4083	1.4960	0.0000	4,717.8091
2021	1.3978	13.9676	9.2476	0.0267	0.9944	0.5294	1.5238	0.4616	0.4871	0.9487	0.0000	2,349.5957	2,349.5957	0.7484	0.0000	2,368.3058
2022	0.3217	3.6225	2.4992	5.2100e-003	0.5136	0.1412	0.6548	0.2416	0.1299	0.3715	0.0000	457.9562	457.9562	0.1441	0.0000	461.5580
Maximum	**2.7864**	**28.0522**	**16.9506**	**0.0533**	**0.9944**	**1.0391**	**1.9772**	**0.4616**	**0.9560**	**1.4164**	**0.0000**	**4,680.4083**	**4,680.4083**	**1.4960**	**0.0000**	**4,717.8091**

Clayton Quarry Reclamation - 1983 Plan Backfill - Contra Costa County, Annual

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	1.0436	18.8216	20.8272	0.0401	0.3545	0.7240	1.0785	0.1642	0.7197	0.8839	0.0000	3,599.3887	3,599.3887	1.1255	0.0000	3,627.5264
2020	1.3761	24.8812	27.6551	0.0533	0.4593	0.9542	1.4135	0.2171	0.9491	1.1662	0.0000	4,680.4028	4,680.4028	1.4960	0.0000	4,717.8036
2021	0.7080	12.4450	14.1412	0.0267	0.4724	0.4852	0.9575	0.2144	0.4814	0.6957	0.0000	2,349.5930	2,349.5930	0.7484	0.0000	2,368.3031
2022	0.1475	2.3843	2.9284	5.2100e-003	0.2402	0.0971	0.3372	0.1111	0.0956	0.2067	0.0000	457.9557	457.9557	0.1441	0.0000	461.5574
Maximum	**1.3761**	**24.8812**	**27.6551**	**0.0533**	**0.4724**	**0.9542**	**1.4135**	**0.2171**	**0.9491**	**1.1662**	**0.0000**	**4,680.4028**	**4,680.4028**	**1.4960**	**0.0000**	**4,717.8036**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**51.31**	**15.23**	**-56.15**	**0.00**	**51.88**	**12.27**	**34.12**	**53.26**	**5.26**	**23.95**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-1-2019**	**6-30-2019**	8.4557	6.5545
2	**7-1-2019**	**9-30-2019**	8.5486	6.6266
3	**10-1-2019**	**12-31-2019**	8.5500	6.6279
4	**1-1-2020**	**3-31-2020**	7.6520	6.5154
5	**4-1-2020**	**6-30-2020**	7.6508	6.5143
6	**7-1-2020**	**9-30-2020**	7.7349	6.5859
7	**10-1-2020**	**12-31-2020**	7.7361	6.5870
8	**1-1-2021**	**3-31-2021**	6.6216	6.4071

9	**4-1-2021**	**6-30-2021**	4.7803	4.3405
10	**7-1-2021**	**9-30-2021**	2.0091	1.2353
11	**10-1-2021**	**12-31-2021**	2.0095	1.2358
12	**1-1-2022**	**3-31-2022**	1.8378	1.1799
13	**4-1-2022**	**6-30-2022**	1.8578	1.1925
14	**7-1-2022**	**9-30-2022**	0.2654	0.1704
		Highest	8.5500	6.6279

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3000e-004**	**1.0000e-005**	**1.4100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.7500e-003**	**2.7500e-003**	**1.0000e-005**	**0.0000**	**2.9300e-003**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.3000e-004**	**1.0000e-005**	**1.4100e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.7500e-003**	**2.7500e-003**	**1.0000e-005**	**0.0000**	**2.9300e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Ph 1: Backfill with Haul Trucks	Grading	4/1/2019	5/24/2021	5	561	Backfill from 500' to 650' msl
2	Ph 2: Backfill with Scrapers	Grading	5/25/2021	7/13/2022	5	297	Backfill from 650' to 790' msl

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Ph 1: Backfill with Haul Trucks	Excavators	2	8.00	523	0.38
Ph 1: Backfill with Haul Trucks	Graders	1	8.00	259	0.41
Ph 1: Backfill with Haul Trucks	Off-Highway Trucks	20	8.00	457	0.38
Ph 1: Backfill with Haul Trucks	Rollers	1	8.00	354	0.37
Ph 1: Backfill with Haul Trucks	Rubber Tired Dozers	1	8.00	580	0.40
Ph 1: Backfill with Haul Trucks	Scrapers	1	8.00	500	0.48
Ph 2: Backfill with Scrapers	Excavators	2	8.00	158	0.38
Ph 1: Backfill with Haul Trucks	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Ph 2: Backfill with Scrapers	Graders	1	8.00	259	0.41
Ph 2: Backfill with Scrapers	Rollers	1	8.00	354	0.38
Ph 2: Backfill with Scrapers	Rubber Tired Dozers	1	8.00	580	0.40
Ph 2: Backfill with Scrapers	Scrapers	1	8.00	500	0.37
Ph 2: Backfill with Scrapers	Scrapers	8	8.00	783	0.48
Ph 2: Backfill with Scrapers	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Ph 1: Backfill with Haul Trucks	28	65.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Ph 2: Backfill with Scrapers	16	30.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Ph 1: Backfill with Haul Trucks - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6748	0.0000	0.6748	0.3349	0.0000	0.3349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1964	23.3895	13.1035	0.0396		0.8666	0.8666		0.7973	0.7973	0.0000	3,553.3817	3,553.3817	1.1243	0.0000	3,581.4880
Total	**2.1964**	**23.3895**	**13.1035**	**0.0396**	**0.6748**	**0.8666**	**1.5414**	**0.3349**	**0.7973**	**1.1321**	**0.0000**	**3,553.3817**	**3,553.3817**	**1.1243**	**0.0000**	**3,581.4880**

3.2 Ph 1: Backfill with Haul Trucks - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0236	0.0176	0.1799	5.1000e-004	0.0508	3.5000e-004	0.0511	0.0135	3.2000e-004	0.0138	0.0000	46.0113	46.0113	1.2600e-003	0.0000	46.0427
Total	**0.0236**	**0.0176**	**0.1799**	**5.1000e-004**	**0.0508**	**3.5000e-004**	**0.0511**	**0.0135**	**3.2000e-004**	**0.0138**	**0.0000**	**46.0113**	**46.0113**	**1.2600e-003**	**0.0000**	**46.0427**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3037	0.0000	0.3037	0.1507	0.0000	0.1507	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200	18.8040	20.6473	0.0396		0.7237	0.7237		0.7194	0.7194	0.0000	3,553.3775	3,553.3775	1.1243	0.0000	3,581.4837
Total	**1.0200**	**18.8040**	**20.6473**	**0.0396**	**0.3037**	**0.7237**	**1.0274**	**0.1507**	**0.7194**	**0.8701**	**0.0000**	**3,553.3775**	**3,553.3775**	**1.1243**	**0.0000**	**3,581.4837**

3.2 Ph 1: Backfill with Haul Trucks - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0236	0.0176	0.1799	5.1000e-004	0.0508	3.5000e-004	0.0511	0.0135	3.2000e-004	0.0138	0.0000	46.0113	46.0113	1.2600e-003	0.0000	46.0427
Total	**0.0236**	**0.0176**	**0.1799**	**5.1000e-004**	**0.0508**	**3.5000e-004**	**0.0511**	**0.0135**	**3.2000e-004**	**0.0138**	**0.0000**	**46.0113**	**46.0113**	**1.2600e-003**	**0.0000**	**46.0427**

3.2 Ph 1: Backfill with Haul Trucks - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.8706	0.0000	0.8706	0.4425	0.0000	0.4425	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7578	28.0315	16.7367	0.0526		1.0387	1.0387		0.9556	0.9556	0.0000	4,621.1617	4,621.1617	1.4946	0.0000	4,658.5261
Total	**2.7578**	**28.0315**	**16.7367**	**0.0526**	**0.8706**	**1.0387**	**1.9092**	**0.4425**	**0.9556**	**1.3980**	**0.0000**	**4,621.1617**	**4,621.1617**	**1.4946**	**0.0000**	**4,658.5261**

3.2 Ph 1: Backfill with Haul Trucks - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0286	0.0207	0.2139	6.6000e-004	0.0675	4.5000e-004	0.0680	0.0180	4.2000e-004	0.0184	0.0000	59.2466	59.2466	1.4500e-003	0.0000	59.2830
Total	**0.0286**	**0.0207**	**0.2139**	**6.6000e-004**	**0.0675**	**4.5000e-004**	**0.0680**	**0.0180**	**4.2000e-004**	**0.0184**	**0.0000**	**59.2466**	**59.2466**	**1.4500e-003**	**0.0000**	**59.2830**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3918	0.0000	0.3918	0.1991	0.0000	0.1991	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3475	24.8605	27.4412	0.0526		0.9538	0.9538		0.9487	0.9487	0.0000	4,621.1562	4,621.1562	1.4946	0.0000	4,658.5206
Total	**1.3475**	**24.8605**	**27.4412**	**0.0526**	**0.3918**	**0.9538**	**1.3455**	**0.1991**	**0.9487**	**1.1478**	**0.0000**	**4,621.1562**	**4,621.1562**	**1.4946**	**0.0000**	**4,658.5206**

3.2 Ph 1: Backfill with Haul Trucks - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0286	0.0207	0.2139	6.6000e-004	0.0675	4.5000e-004	0.0680	0.0180	4.2000e-004	0.0184	0.0000	59.2466	59.2466	1.4500e-003	0.0000	59.2830
Total	**0.0286**	**0.0207**	**0.2139**	**6.6000e-004**	**0.0675**	**4.5000e-004**	**0.0680**	**0.0180**	**4.2000e-004**	**0.0184**	**0.0000**	**59.2466**	**59.2466**	**1.4500e-003**	**0.0000**	**59.2830**

3.2 Ph 1: Backfill with Haul Trucks - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3888	0.0000	0.3888	0.1776	0.0000	0.1776	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9977	9.4893	6.2204	0.0205		0.3528	0.3528		0.3245	0.3245	0.0000	1,799.2536	1,799.2536	0.5819	0.0000	1,813.8015
Total	**0.9977**	**9.4893**	**6.2204**	**0.0205**	**0.3888**	**0.3528**	**0.7415**	**0.1776**	**0.3245**	**0.5022**	**0.0000**	**1,799.2536**	**1,799.2536**	**0.5819**	**0.0000**	**1,813.8015**

3.2 Ph 1: Backfill with Haul Trucks - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0103	7.1800e-003	0.0759	2.5000e-004	0.0263	1.7000e-004	0.0265	6.9900e-003	1.6000e-004	7.1500e-003	0.0000	22.2478	22.2478	5.1000e-004	0.0000	22.2604
Total	**0.0103**	**7.1800e-003**	**0.0759**	**2.5000e-004**	**0.0263**	**1.7000e-004**	**0.0265**	**6.9900e-003**	**1.6000e-004**	**7.1500e-003**	**0.0000**	**22.2478**	**22.2478**	**5.1000e-004**	**0.0000**	**22.2604**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1750	0.0000	0.1750	0.0799	0.0000	0.0799	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5215	9.6252	10.6820	0.0205		0.3682	0.3682		0.3665	0.3665	0.0000	1,799.2514	1,799.2514	0.5819	0.0000	1,813.7993
Total	**0.5215**	**9.6252**	**10.6820**	**0.0205**	**0.1750**	**0.3682**	**0.5432**	**0.0799**	**0.3665**	**0.4465**	**0.0000**	**1,799.2514**	**1,799.2514**	**0.5819**	**0.0000**	**1,813.7993**

3.2 Ph 1: Backfill with Haul Trucks - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0103	7.1800e-003	0.0759	2.5000e-004	0.0263	1.7000e-004	0.0265	6.9900e-003	1.6000e-004	7.1500e-003	0.0000	22.2478	22.2478	5.1000e-004	0.0000	22.2604
Total	**0.0103**	**7.1800e-003**	**0.0759**	**2.5000e-004**	**0.0263**	**1.7000e-004**	**0.0265**	**6.9900e-003**	**1.6000e-004**	**7.1500e-003**	**0.0000**	**22.2478**	**22.2478**	**5.1000e-004**	**0.0000**	**22.2604**

3.3 Ph 2: Backfill with Scrapers - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5604	0.0000	0.5604	0.2720	0.0000	0.2720	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3824	4.4660	2.8967	5.8300e-003		0.1764	0.1764		0.1623	0.1623	0.0000	512.0881	512.0881	0.1656	0.0000	516.2286
Total	**0.3824**	**4.4660**	**2.8967**	**5.8300e-003**	**0.5604**	**0.1764**	**0.7368**	**0.2720**	**0.1623**	**0.4342**	**0.0000**	**512.0881**	**512.0881**	**0.1656**	**0.0000**	**516.2286**

3.3 Ph 2: Backfill with Scrapers - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.3900e-003	5.1600e-003	0.0546	1.8000e-004	0.0189	1.2000e-004	0.0190	5.0300e-003	1.1000e-004	5.1400e-003	0.0000	16.0063	16.0063	3.6000e-004	0.0000	16.0154
Total	**7.3900e-003**	**5.1600e-003**	**0.0546**	**1.8000e-004**	**0.0189**	**1.2000e-004**	**0.0190**	**5.0300e-003**	**1.1000e-004**	**5.1400e-003**	**0.0000**	**16.0063**	**16.0063**	**3.6000e-004**	**0.0000**	**16.0154**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2522	0.0000	0.2522	0.1224	0.0000	0.1224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1688	2.8074	3.3287	5.8300e-003		0.1167	0.1167		0.1146	0.1146	0.0000	512.0875	512.0875	0.1656	0.0000	516.2280
Total	**0.1688**	**2.8074**	**3.3287**	**5.8300e-003**	**0.2522**	**0.1167**	**0.3689**	**0.1224**	**0.1146**	**0.2370**	**0.0000**	**512.0875**	**512.0875**	**0.1656**	**0.0000**	**516.2280**

3.3 Ph 2: Backfill with Scrapers - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.3900e-003	5.1600e-003	0.0546	1.8000e-004	0.0189	1.2000e-004	0.0190	5.0300e-003	1.1000e-004	5.1400e-003	0.0000	16.0063	16.0063	3.6000e-004	0.0000	16.0154
Total	**7.3900e-003**	**5.1600e-003**	**0.0546**	**1.8000e-004**	**0.0189**	**1.2000e-004**	**0.0190**	**5.0300e-003**	**1.1000e-004**	**5.1400e-003**	**0.0000**	**16.0063**	**16.0063**	**3.6000e-004**	**0.0000**	**16.0154**

3.3 Ph 2: Backfill with Scrapers - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4972	0.0000	0.4972	0.2372	0.0000	0.2372	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3157	3.6185	2.4557	5.0600e-003		0.1411	0.1411		0.1298	0.1298	0.0000	444.5798	444.5798	0.1438	0.0000	448.1744
Total	**0.3157**	**3.6185**	**2.4557**	**5.0600e-003**	**0.4972**	**0.1411**	**0.6383**	**0.2372**	**0.1298**	**0.3670**	**0.0000**	**444.5798**	**444.5798**	**0.1438**	**0.0000**	**448.1744**

3.3 Ph 2: Backfill with Scrapers - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.9600e-003	4.0200e-003	0.0436	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3700e-003	1.0000e-004	4.4600e-003	0.0000	13.3765	13.3765	2.8000e-004	0.0000	13.3835
Total	**5.9600e-003**	**4.0200e-003**	**0.0436**	**1.5000e-004**	**0.0164**	**1.0000e-004**	**0.0165**	**4.3700e-003**	**1.0000e-004**	**4.4600e-003**	**0.0000**	**13.3765**	**13.3765**	**2.8000e-004**	**0.0000**	**13.3835**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2237	0.0000	0.2237	0.1068	0.0000	0.1068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1415	2.3803	2.8848	5.0600e-003		0.0970	0.0970		0.0955	0.0955	0.0000	444.5792	444.5792	0.1438	0.0000	448.1739
Total	**0.1415**	**2.3803**	**2.8848**	**5.0600e-003**	**0.2237**	**0.0970**	**0.3207**	**0.1068**	**0.0955**	**0.2023**	**0.0000**	**444.5792**	**444.5792**	**0.1438**	**0.0000**	**448.1739**

3.3 Ph 2: Backfill with Scrapers - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.9600e-003	4.0200e-003	0.0436	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3700e-003	1.0000e-004	4.4600e-003	0.0000	13.3765	13.3765	2.8000e-004	0.0000	13.3835
Total	**5.9600e-003**	**4.0200e-003**	**0.0436**	**1.5000e-004**	**0.0164**	**1.0000e-004**	**0.0165**	**4.3700e-003**	**1.0000e-004**	**4.4600e-003**	**0.0000**	**13.3765**	**13.3765**	**2.8000e-004**	**0.0000**	**13.3835**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.590657	0.037535	0.185105	0.118290	0.015611	0.005013	0.010768	0.024764	0.001635	0.001742	0.005351	0.002726	0.000802

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003
Unmitigated	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003
Total	**1.3000e-004**	**1.0000e-005**	**1.4100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.7500e-003**	**2.7500e-003**	**1.0000e-005**	**0.0000**	**2.9300e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3000e-004	1.0000e-005	1.4100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.7500e-003	2.7500e-003	1.0000e-005	0.0000	2.9300e-003
Total	**1.3000e-004**	**1.0000e-005**	**1.4100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.7500e-003**	**2.7500e-003**	**1.0000e-005**	**0.0000**	**2.9300e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX E

BIOLOGICAL RESOURCES REPORTS

APPENDIX E-1
BIOLOGICAL RESOURCES ASSESSMENT

BERKELEY
CARLSBAD
FRESNO
IRVINE
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

June 18, 2020 (Revised)
Steve Grace
Cemex
2365 Iron Point Road, #120
Folsom, CA 95630

Subject: Results of Biological Resources Assessment, Cemex Quarry
Clayton, Contra Costa County

Dear Steve:

This letter presents the results of a biological resources assessment of Cemex's Clayton Quarry Property (site) located in Clayton, Contra Costa County. The property consists of parcels 122-020-007, 122-020-013, and 122-010-016. A small inholding owned by the Contra Costa Water District (APN 122-020-006) was also assessed. This assessment has been prepared to identify biological resources present on and in the vicinity of the site, the potential presence of special-status species and their habitats on and in its immediate vicinity, and the potential biological impacts of quarry expansion.

This letter report includes: (1) a summary of relevant State and federal regulations that may apply to future activities on the site; (2) a description of the methods used to conduct the surveys; (3) a description of existing conditions; and (4) an analysis of the potential presence of special-status plant and animal species and sensitive habitats.

SITE LOCATION

The approximately 445.6-acre site is located in central Contra Costa County (Figure 1) within Sections 14, 22, and 23 of Township 01 North, Range 01 West on the 7.5-minute USGS Clayton, California quadrangle. Residential development is present to the north and east. Mt. Diablo State Park borders the site to the southeast, south, and southwest. The Hanson Aggregates Clayton Quarry is located to the west.

REGULATORY CONTEXT

The site is within the general geographic range of several special-status plant and wildlife species. Biological resources on the site may fall under the jurisdictions and regulations of the agencies listed below and described in more detail in Attachment A:

- **U.S. Fish and Wildlife Service (USFWS).** Species listed under the federal Endangered Species Act.
- **California Department of Fish and Wildlife (CDFW).** Species listed under the State Endangered Species Act, Fully Protected Species, Species of Special Concern, Streambed Alteration Agreements.
- **U.S. Army Corps of Engineers (Corps).** Fill of waters/wetlands subject to Section 404 of the Clean Water Act.

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- **Regional Water Quality Control Board (RWQCB).** Water quality certification under Section 401 of the Clean Water Act, Porter-Cologne water quality standards.

East Contra Costa County Habitat Conservation Plan (ECCCHCP)

The ECCCHCP provides a framework to protect, enhance, and restore natural resources in eastern Contra Costa County, while improving and streamlining the environmental regulatory process for infrastructure and development projects. Developed in consultation with the CDFW, USFWS, and RWQCB, the ECCCHCP enables projects to comply with State and federal regulatory requirements using consistent and standardized mitigation strategies. Although the site is within the area covered by the ECCCHCP, mining is not a covered activity under the ECCCHCP.

METHODS

LSA searched the CDFW California Natural Diversity Database (CNDDB) to obtain occurrences for special-status plants, animals, and terrestrial communities within 5 miles of the site (Figures 2a, 2b, and 2c) in 2015. LSA repeated search on May 5, 2020 to obtain updated occurrences. LSA also searched the California Native Plant Society's (CNPS) On-line Inventory of Rare and Endangered Plants to obtain observation records for special-status plants within the Clayton 7.5 minute USGS quadrangle and the eight quadrangles surrounding it (Vine Hill, Honker Bay, Antioch North, Antioch South, Tassajara, Diablo, Las Trampas Ridge, and Walnut Creek). Based on these searches, LSA compiled a list of special-status species known to occur in the vicinity of the site.

For the purposes of this report, special-status species are defined as follows:

- Species that are listed or formally proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA).
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA).
- Plant species on Lists 1B and 2 in the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2009).
- Animal species designated as Species of Special Concern by CDFW.
- Animal species designated as Fully Protected under Sections 3511 (Birds), 4700 (Mammals), 5050 (Reptiles and Amphibians), and 5515 (Fish) of the California Fish and Game Code.
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the California Environmental Quality Act (CEQA) guidelines.
- Species considered to be a taxon of special concern by local agencies.

Field surveys of the site were conducted by LSA biologist John Kunna on September 18, 2015; April 18, 2016; and December 2, 2016. During the 2015 visit, the biologist conducted a habitat assessment focused on APN 122-020-013 for California red-legged frogs (*Rana draytonii*), Alameda striped racers (*Coluber lateralis euryxanthus*)[1], and steelhead (*Oncorhynchus mykiss*). The biologist

[1] Formerly Alameda whipsnake placed in the genus *Masticophis*: see Crother, B.I. (ed.) 2012.

traversed the site on foot and also surveyed a nearby portion of Mitchell Creek within Mt. Diablo State Park on that date. During the visit on April 18, 2016, the biologist focused on APN 122-010-016 to assess the parcel's suitability for Alameda striped racer. During the visit on December 2, 2016, the biologist focused on APN 122-020-007 and the associated inholding of APN 122-020-006. Due to safety concerns, the biologist did not enter areas with active mining operations. These areas do not have the potential to support special-status species, because they have been highly disturbed.

During the visits, the biologist assessed the current conditions and evaluated the site's potential to support special-status plant or animal species. All observations were recorded in field notes and on maps. Full protocol-level surveys were not conducted. The biologist followed the guidelines for site assessments as described in the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (USFWS 2005) by identifying known records of California red-legged frogs within a 1.6 kilometer (1 mile) radius of the site. The biologist also identified the habitats within the project site and within 1 mile of the site by reviewing aerial imagery.

Nomenclature for vegetation and plant communities used in this report is based on multiple sources, primarily *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). Plant taxonomy and nomenclature follows Baldwin et al. (2012). Common and scientific names for animals are based on Crother (2012) for amphibians and reptiles, the American Ornithologists' Union (AOU) *Check-list of North American Birds* (AOU 1998) as supplemented for birds, and Bradley et al. (2014) for mammals.

The USDA Web Soil Survey (*http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx*) was reviewed to determine soil types on the site and identify if any soil types (sandy, acidic, or highly alkaline soils; serpentinite, etc.) that may support special-status plants and/or sensitive communities, including wetlands, are present.

The biologist also spoke with other LSA biologists who have worked on the site over the past several years, reviewed other LSA reports from the quarry, and reviewed current and historical aerial imagery of the site.

RESULTS

Existing Conditions

The undeveloped portions of the site support vegetation types characteristic of Mount Diablo. They include non-native grassland, chaparral, oak woodland and ruderal/disturbed.

Non-native grassland. Non-native grasslands cover most of the flatter areas of the site. Plant species composition within the non-native grassland is dominated by introduced annual grasses and broadleaf forbs. Common grass species include wild oats (*Avena barbata* and *A. fatua*), soft chess (*Bromus mollis*), and ripgut brome (*Bromus diandrus*). Common introduced broadleaf species include black mustard (*Brassica nigra*), filaree (*Erodium cicutarium*) and Italian thistle (*Carduus pycnocephalus*). Foothill needlegrass (*Stipa lepida*) and California melic (*Melica californica*) are two native grasses that grow along the margins of chaparral stands. Ithurial's spear (*Triteleia laxa*), a native wildflower, is also present. Very few other native species occur in the grassland and only in small numbers.

Chaparral. Stands of chaparral are present on steeper slopes. The chaparral vegetation type is composed of several shrub species which form a dense cover with little or no understory vegetation. Black sage (*Salvia mellifera*) is often the dominant species with chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), sticky monkeyflower (*Mimulus aurantiacus*), and yerba santa (*Eriodictyon californicum*) present around the margins of the chaparral. Deer weed (*Lotus scoparius*), an herbaceous perennial, grows in openings and along the margins of the chaparral.

Woodland. Oak woodland stands are present on slopes. The dominant trees are blue oak (*Quercus douglasii*) and valley oak (*Quercus lobata*). Grass species, similar to those found in the non-native grassland, are present in the understory. Coast live oak (*Quercus agrifolia*) and gray pine (*Pinus sabiniana*) are the dominant trees in some areas, with some California buckeye (*Aesculus californica*) and blue elderberry (*Sambucus mexicana*) also present.

Ruderal/disturbed. Much of the site has been disturbed by previous quarry activities, including previous overburden fill disposal. A variety of weedy species which have colonized these sites form a ruderal/disturbed vegetation type.

Wildlife species are found in association with those vegetation cover types which fulfill their requirements for food, water and cover. Depending on the species and its specific habitat requirements, an animal may use several vegetation cover types or just one.

Grassland is one of the three primary vegetation communities present. Common wildlife species that depend primarily on grasslands include Botta's pocket gopher, California meadow mouse, western harvest mouse, western meadowlark and lark sparrow. Species which move regularly between the grassland and adjacent habitats include brush rabbits and western bluebirds. Although they do not depend solely on it, larger mammals and birds also regularly use the grassland for hunting or feeding. This group includes bobcat, coyote, black-tailed deer, American kestrel, red-tailed hawk and great horned owl. Reptiles likely to be found in the grassland include the western fence lizard, California kingsnake, gopher snake and western yellow-bellied racer.

The chaparral is composed of shrubs with varying heights. Bird species found primarily within the chaparral include wrentit, Bewick's wren, blue-gray gnatcatcher and spotted towhee. These species remain within the shrubs, only occasionally moving into adjacent areas. Other bird species regularly move between the chaparral and adjacent grasslands or woodlands. This group includes Anna's hummingbird, scrub jay, bushtit, California towhee, dark-eyed junco, white-crowned and golden-crowned sparrows. Larger mammals, including bobcat, coyote, gray fox and deer, use the chaparral for rest and cover. A variety of small mammals are also found in the chaparral. They include brush rabbit, deer mouse, and striped skunk. Expected reptiles include western fence lizard, southern alligator lizard, western rattlesnake and Alameda striped racer. Western whiptails and coast horned lizard are also present in areas of undisturbed chaparral.

The oak woodland supports a variety of bird species that favor deciduous oaks. These species include acorn woodpecker, Nuttall's woodpecker, ash-throated flycatcher, oak titmouse, white-breasted nuthatch, western bluebird and Bullock's oriole. A variety of other bird species depend on the oaks for roosting, nesting, and feeding. The natural and excavated cavities which are present are important nest sites. Acorns are a food source for a variety of bird and mammal species.

Parcel Descriptions

APN 122-020-006. This approximately 3.5-acre in-holding parcel is owned by the Contra Costa Water District (CCWD). It is crossed by a graveled access road which leads to CCWD's Murchio Reservoir, which is covered (Photograph 1) (Attachment B). The undeveloped portion of the site is dominated by non-native annual grasses, with a few mature coast live oak trees. It appears that the undeveloped portion of the parcel is regularly mowed. The gravel road and graveled areas around the reservoir appear to be treated with herbicides to control vegetation.

APN 122-020-007. This parcel is approximately 154.2 acres in size. Soils on the parcel mainly consist of Gilroy Clay Loam, a well-drained upland soil underlain by basic igneous rock. Approximately 25 percent of this parcel is developed and used for quarrying operations, primarily the processing and storage of quarried rock. An old residence with associated ornamental trees is located near the quarry operations.

Most of the parcel is covered with non-native annual grasses, with evidence of historical use for cattle grazing. The grassland transitions into a blue oak savannah on the north-facing slope in the southwest corner of the parcel (Photographs 2 and 3). This blue oak woodland transitions into a gray pine forest near the top of the slope. A row of planted dwarf blue gum eucalyptus (*Eucalyptus globulus* var*. compacta*) lines Mitchell Canyon Road on the east side of the parcel.

Several basins that are used for collecting mining process water are present on the parcel (Photograph 4). There are several drainages that are likely subject to resource agency jurisdiction. A small pool formed by an intermittent stream and undermined culvert is present on the east side of the parcel, as shown in Photograph 5.

APN 122-020-013. This irregularly shaped parcel is approximately 181.7 acres in size. The soils on this parcel are mapped as Quarry, Los Osos clay loam, Perkins gravelly loam, and Gilroy clay loam. Almost all of the surface soil has been impacted and changed by quarrying operations.

The disturbed soils on the eastern and southern portions of the parcel are dominated by non-native introduced grasses. Mature native trees are also located within the grasslands, as shown in Photograph 6. A ravine in this area and a slope to the east supports a mature oak woodland composed of blue oak, buckeye, and valley oak. Several additional mature native trees are located in the southwestern corner of the parcel but were not inventoried.

The quarry wall on the west side of the pit is benched, as shown in Photograph 7. These benches are in the process of being reclaimed by planting California sagebrush, black sage, and blue oak. Seeds of deerweed and California buckwheat are placed on the benches. Narrowleaf goldenbush (*Ericameria linearifolia*) and coyote brush (*Baccharis pilularis*) have naturally established.

Patches of scrub vegetation have colonized areas that were previously disturbed by quarry operations, as shown in Photographs 8 and 9. The dominant plant species in these areas is coyote brush. California sagebrush has also colonized some areas. Tree tobacco (*Nicotiana glauca*), an introduced species, also quickly colonizes disturbed soils on the site, as shown in Photograph 10.

APN 122-010-016. This parcel is approximately 101.0 acres in size and located outside of areas to be disturbed by mining. The soils on this parcel are mapped primarily as Rock outcrop-Xerothents association, with a smaller amount of Gilroy clay loam. The soil is mostly gravelly or sandy. No large outcroppings were observed, but in many places some rocks were visible on the surface of the soil. Some larger rocks had fissures or rodent burrows underneath them. The topography of APN 122-010-016 is very steep, with incised canyons.

APN 122-010-016 is undisturbed, and is contiguous with large areas of protected land within Mt. Diablo State Park. Approximately half of the parcel is within designated Critical Habitat for Alameda striped racer (Critical Habitat Unit 4 Mount Diablo – Black Hills).

The dominant vegetation community on the parcel is chaparral. The chaparral is dense and nearly impenetrable in most areas, as shown in Photograph 11. Within the chaparral, the most common shrub is chamise (*Adenostoma fasciculatum*). On the south-facing slopes, the chaparral canopy is mostly open, and approximately 3 to 4 feet in height. Sunlight reaches the ground in these areas. On the slopes with less solar exposure the chaparral canopy is taller, averaging approximately 7 feet in height. The canopy in these areas is more closed, and less sunlight reaches the ground. Other shrubs within the chaparral include mountain mahogany (*Cercocarpus betuloides*), scrub oak (*Quercus berberidifolia*), sticky monkey-flower, and black sage. Lower stature plant species growing in the chaparral include Indian paintbrush (*Castilleja affinis*), and chaparral broomrape (*Orobanche bulbosa*), as shown in Photograph 12.

There are two areas on north-facing slopes in this parcel where the vegetation community is valley and foothill woodland. The dominant tree species in these areas are gray pine and coast live oak. More shaded, moister areas supported California buckeye trees. Poison oak (*Toxicodendron diversilobum*) and toyon (*Heteromeles arbutifolia*) were common understory shrubs in these areas. Mt. Diablo fairy lantern (*Calochortus pulchellus*), a CNPS Rare Plant Rank 1B.2 species, is found in these woodland areas. Cape ivy (*Delairea odorata*), an exotic invasive species also known as German ivy, is present on the parcel in the woodlands, and to a lesser extent, in the chaparral. Cape ivy is listed as a California Exotic Pest Plant Council (CalEPPC) List A-1 plant. This means it is of high concern as a weed of wildlands.

One coast horned lizard (*Phrynosoma blainvillii*) was observed in the chaparral, as shown in Photograph 13.

Both the chaparral and woodland areas have large amounts of woody debris on the ground. The parcel also has a few small patches of grassland. On the eastern side of the parcel there is a grassland with scattered oaks. This area could also be classified as an oak savannah. A smaller patch of grass occurs near the top of a southeast-facing slope on the western side of the parcel. These areas were likely grazed by cattle in historical times and are dominated by non-native annual grasses. A few small mammal burrows are present in the grasslands.

Regulated Waters and Wetlands

One ephemeral stream on parcel APN-122-020-013 has been delineated (LSA 2015) as a jurisdictional stream. The Corps provided a preliminary jurisdictional determination for this feature

on January 26, 2016. The stream is 300 feet long and varies in width from 4 to 7 feet. The stream flows into a constructed debris basin that lacks any evidence of ponding and does not support a wetland plant community. This stream was dry at the time of the 2015 site survey.

Other features that are likely subject to the jurisdiction of the Corps or RWQCB outside of the footprint of proposed mining activities and which will not be disturbed were also observed on the site, but were not delineated.

Sensitive Plant Communities

CDFW monitors the status of uncommon and declining plant communities/sensitive habitats in California. These are tracked in the CNDDB as special-status Terrestrial Communities. Many special-status natural communities support special-status plants and animals and are addressed under CEQA as habitat for those species. The only special-status terrestrial community that has a CNDDB occurrence within 5 miles of the site is Serpentine Bunchgrass. The native bunchgrass species associated with this community include *Calamagrostis ophitidis, Elymus glaucus,* and *Festuca idahoensis*. No serpentine soils or bunchgrasses were observed on the site during the site visits.

Special-Status Plant Species

The CNDDB and CNPS report 55 special-status plant species occurring in the vicinity of the property. Figure 2A depicts plant species with more than five CNDDB occurrences within 5 miles of the site and Figure 2B depicts plant species with five or fewer occurrences within 5 miles of the site. Of these 55 species, 28 were determined to have no potential to occur because the site does not have suitable habitat or is outside the range of the species. Some of these species require specific habitat components not present within or adjacent to the site (alkaline or serpentine soils, vernal pools, brackish marshes, etc.). These 28 species are listed in Attachment C. Historical land disturbance (grading, quarrying) and alterations of much of the site further reduce suitability for rare species that have restricted tolerances. The remaining 27 special-status plant species are discussed in greater detail in Table A. After further analysis, 19 of these species are either known to occur or have some potential to occur on site. These 19 species are:

- Bent-flowered fiddleneck (*Amsinckia lunaris*),
- Mount Diablo manzanita (*Arctostaphylos auriculata*)
- Contra Costa manzanita (*Arctostaphylos manzanita* ssp. *laevigata*)
- Big tarplant (*Blepharizonia plumosa*)
- Round-leaved filaree (*California macrophylla*)
- Mt. Diablo fairy lantern (*Calochortus pulchellus*)
- Hospital Canyon larkspur (*Delphinium californicum* subsp. *interius*)
- Mt. Diablo buckwheat (*Eriogonum truncatum*)
- Fragrant fritillary (*Fritillaria liliacea*)
- Toren's grimmia (*Grimmia torenii*)
- Diablo helianthella (*Helianthella castanea*)
- Showy madia (*Madia radiata*)
- Hall's bush mallow (*Malacothamnus hallii*)
- Woodland wooly threads (*Monolopia gracilens*)
- Lime Ridge navarretia (*Navarretia gowenii*)

- Rock sanicle (*Sanicula saxatilis*)
- Chaparral ragwort (*Senecio aphanactis*)
- Mt. Diablo jewel-flower (*Streptanthus hispidus*)
- Oval-leaved viburnum (*Viburnum ellipticum*)

Special-Status Animal Species

Based on CNDDB records and LSA's knowledge of wildlife in the Clayton area, there are 19 special-status wildlife species (Table B) with records and/or expected to occur in the vicinity of the site. Figure 2C depicts the locations of CNDDB occurrences within 5 miles of the site. Conditions on the site are suitable for 13 of these species: California red-legged frog (*Rana draytonii*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), American peregrine falcon (*Falco peregrinus*), white-tailed kite (*Elanus leucurus*), Alameda striped racer (*Coluber constrictor lateralis*), coast horned lizard (*Phrynosoma blainvillii*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), ring-tailed cat (*Bassariscus astutus*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), Crotch bumble bee (*Bombus crotchii*) and western bumble bee (*Bombus occidentalis*).

California red-legged frog. The California red-legged frog is federally listed as threatened and is also considered a Species of Special Concern by CDFW. The site is within the current and historic range of the species. There are 34 CNDDB occurrences with 5 miles of the site. California red-legged frogs are known to occur in Mitchell Creek, which provides non-breeding aquatic habitat approximately 0.25 mile from the southeastern site boundary. In 2006, breeding was detected at a constructed cattle pond known as Bruce Lee Reservoir 0.3 mile east of the site. There is no suitable breeding or other aquatic habitat within the site.

The undeveloped portions of the site provide suitable upland and dispersal habitat. There are currently no complete barriers between Bruce Lee Reservoir or Mitchell Creek and the site, so there is potential for frogs to move into the site, particularly during the wet season. The non-native grasslands on the site have few burrows or large downed woody debris that could provide cover for California red-legged frogs.

Burrowing owl. The burrowing owl is considered a Species of Special Concern by CDFW. Burrowing owls live in underground burrows within grassland habitats and are tolerant of human activity. Few burrows suitable for use by burrowing owl were observed on the property during the site visits, and no evidence of burrowing owl use (pellets, feathers) was detected. Most of the grasslands are not suitable for burrowing owls because the vegetation is too tall. Burrowing owls are present in Contra Costa County and they could forage in the grasslands and sparsely vegetated areas on the site.

Golden eagle. The golden eagle is considered Fully Protected by CDFW. It is also protected by the Bald and Golden Eagle Protection Act, which was enacted in 1940. In California, the golden eagle is a year-round resident inhabiting primarily hilly and mountainous terrain in open areas, including Contra Costa County. Hilly terrain is preferred over flat areas because updrafts support takeoff and soaring. Golden eagles nest primarily in large trees in California, but also utilize cliffs and transmission towers. Prey items include medium to large sized mammals and birds. Preferred habitat for golden eagles generally includes suitable nest sites and sufficient prey availability.

LSA biologists often observe golden eagles flying over the site. The closest known nest site is approximately two miles southwest of the quarry (Kolar and Wiens 2020) The benches on the quarry walls and large trees nearby are suitable nesting habitat.

American peregrine falcon. The American peregrine falcon is considered Fully Protected by CDFW. It was formerly listed under both the California and federal Endangered Species Acts, but was delisted from both in 1999 after recoveries in population size. The falcons nest on cliffs as well as structures like building ledges and bridges. Sometimes they use abandoned nests built by common ravens or raptors. They feed almost exclusively on birds, which they often catch in flight.

LSA biologists have observed American peregrine falcons flying over the site, and they nest at Castle Rock approximately 3.25 miles to the southwest (Bell 2020). If nesting had happened in recently years it would have been detected by biologists. The quarry walls are potentially suitable nesting habitat where potholes/ledges are present.

White-tailed kite. The white-tailed kite is considered Fully Protected by CDFW. The species could nest in the trees and large shrubs on or adjacent to the site. The white-tailed kite is commonly seen hovering over grasslands, where it hunts for small mammals and reptiles that form the bulk of its diet. An LSA biologist has seen the species in Mitchell Canyon immediately southeast of the site.

Crotch bumble bee. On June 12, 2019, the California Fish and Game Commission (Commission) voted to accept a petition from the Xerces Society (2018) to consider listing four subspecies of bumble bee, including the Crotch bumble bee, under CESA. As a result of this decision, the Crotch bumble bee is a state candidate endangered species; as such, it is temporarily afforded the same protection as state-listed threatened or endangered species.

The range of Crotch bumble bee historically extended throughout the southern two-thirds of California, from coastal California east to the Sierra-Cascade crest and south into Mexico, but recent data indicates that this species is absent from the center of its historical range due to extensive agricultural intensification and urbanization (Xerces Society 2018).

In California, Crotch bumble bees inhabit open grassland and scrub habitats. Suitable habitat is based on the availability of flowers on which to forage throughout the duration of the colony (spring through fall), colony nest sites, and overwintering sites for the queens (Xerces Society 2018). Bumble bees are generalist foragers (i.e., they do not depend on any one flower type). Crotch bumble bees, like most bumble bee species, nest underground (e.g., in abandoned rodent holes) (Xerces Society 2009). The flight period for Crotch bumble bee queens is from late February to late October, peaking in early April and again in July. The flight period for workers and males extends between late March and September (Xerces Society 2018).

Although it is unlikely to occur on the project site, this species cannot be entirely discounted without additional survey work. However, it should be noted that any effects of the proposed project on this species are unlikely to rise to the level of “substantial effect” given the small footprint of the project relative to the amount of high-quality protected habitat in Mt. Diablo State Park and other nearby protected lands. The quarry area once reclaimed will be revegetated with native plants that will provide suitable habitat for the species.

Western bumble bee. The western bumble bee is also one of the four bumble bee species which is now being considered for listing.

The western bumble bee feeds upon nectar and pollen from a variety of plants species, but is most adapted to native plant species. It nests in abandoned rodent burrows and bird nests. The flight period in California is from early February to late November, peaking in late June and late September. The flight period for workers and males is from early April to early November. Little is known about sites where queens overwinter, but it is likely in underground areas protected from temperature extremes and flooding during winter rains. The species is currently restricted to high elevation sites in the Sierra Nevada and scattered coastal areas (Williams et. al. 2014).

Although it is unlikely to occur on the project site, this species cannot be entirely discounted without additional survey work. However, it should be noted that any effects of the proposed project on this species are unlikely to rise to the level of "substantial effect" given the small footprint of the project relative to the amount of high-quality protected habitat in Mt. Diablo State Park and other nearby protected lands. There are no known management efforts specifically designed to conserve or recover the species.

Pallid bat. The pallid bat is considered a Species of Special Concern by CDFW. It is common throughout lowlands in most of California, especially in open areas with rock outcroppings for roosting. Pallid bats also roost in tree cavities and man-made structures such as mine tunnels, buildings, and the underside of bridges. These bats feed primarily on insects and arachnids, which they catch both in the air and on the ground. The CNDDB contains three occurrences of the species within 5 miles of the site. The closest of these records was mapped to 2.27 miles from the site boundary. This observation was made in 1917 and the original collection information said the specimen came from "Pine Canyon, near Mt. Diablo". The most recent of these observations was made in 1942. Pallid bats are cryptic, and rarely observed. They have more recently been reported from Curry Canyon on the east side of Mt. diablo. No sign of bats (guano and staining) on the buildings or trees on the site was detected during site surveys.

San Francisco dusky-footed woodrat. This is a subspecies that is classified as a State Species of Special Concern. These woodrats build conspicuous large stick houses. The woodrat is one of the few animals that can feed on oak leaves, despite their high tannin content. They also feed on a variety of fruits, nuts, seeds, and foliage. Woodrats are considered a keystone species, because their houses also provide shelter for a variety of other small animal species. Woodrats are a prey item for owls, snakes, and carnivorous mammals. San Francisco dusky-footed woodrats could be present on parcels 122-020-007 and 122-010-016.

Ring-tailed cat. The ring-tailed cat is a CDFW Fully Protected species. The species is not listed under either the California or federal Endangered Species Acts and it is not a State Species of Special Concern. Ring-tailed cats are not tracked by the CNDDB. Ring-tailed cats are nocturnal and arboreal and therefore are rarely seen by people. Favored habitat consists of areas with many rock outcroppings or cliffs and large trees that have cavities. Ring-tailed cats are adept climbers and avoid moving through open grasslands where they would have difficulty escaping predators. During the day, ring-tailed cats sleep in dens such as tree hollows, rock crevices, and abandoned burrows

created by other animals. A single ring-tailed cat will use several dens, and move between them regularly.

Although there are no recent confirmed sightings of a ring-tailed cat in the region, there is potential that they occur in the undeveloped portions of the site on parcels 122-020-007 and 122-010-016, where they could den in hollow logs or in burrows.

Townsend's big-eared bat. The Townsend's big-eared bat is classified as a State Species of Special Concern. It lives throughout all of California, with the exception of the highest elevations of the Sierra Nevada. It prefers to roost in caves or man-made structures that offer similar protection, such as mines, buildings, and bridges. The roosts may be in a wide variety of vegetation communities, including coastal redwood forests, oak woodlands, inland deserts, and mixed coniferous/deciduous forests. The CNDDB contains three occurrences of the species within 5 miles of the site. The closest of these occurrences is mapped to 2.06 miles from the site boundary and is based on four specimens that were collected in 1938. The exact location of where the specimens were collected is unknown, so the observation was mapped generally to the location of Mt. Diablo. No sign of bats (guano and staining) on the buildings or trees on the site was detected during the site surveys.

Alameda striped racer. The Alameda striped racer (formerly Alameda whipsnake) is a State- and federally listed threatened species that primarily occurs in areas that support scrub communities, including mixed chaparral, chamise-redshank chaparral, and coastal scrub. This species also occurs in annual grassland and oak woodlands that lie adjacent to scrub communities. Within these plant communities, specific habitat features needed by Alameda striped racers include, but are not limited to, small mammal burrows, rock outcrops, talus, and cover types that provide temperature regulation, shelter from predators, egg-laying sites, and winter hibernation refuges. Many of these same elements are important in maintaining prey species (e.g., western fence lizards).

Numerous Alameda striped racer observations have been documented near the site, including from the vicinity of the Mitchell Canyon entrance to the State Park. The CNDDB records for this species are shown on Figure 2C. Alameda striped racers are most likely to be found in association with the chaparral and rock outcroppings on the site. They are less likely to be found in the non-native annual grasslands and developed areas of the site.

Coast horned lizard. The coast horned lizard is classified as a State Species of Special Concern. One coast horned lizard was observed on APN 122-010-016 in an area of chaparral vegetation, as shown in Photograph 13. This species is unlikely to be found in densely vegetated non-native annual grasslands. It is likely present on-site in openings in or along the margins of chaparral.

POTENTIAL IMPACTS

Regulated Waters and Wetlands

The 300-foot long ephemeral stream was presumed to be jurisdictional under the Corp's preliminary jurisdictional determination (2016) and will be permanently filled with mining overburden spoils. This stream is a water of the State and a water of the United States.

Wildlife Movement and Nursery Sites

The site is not within a major wildlife migratory corridor. The reclamation of the mine would not interfere substantially with the movement of any native resident or migratory fish or wildlife species. Bird nests could be considered nursery sites, and they reclamation activities have the potential to impact nesting birds.

Conflicts with Local Policies and Ordinances

Contra Costa County has a tree protection ordinance. The Clayton Quarry Arborist Report (LSA 2020) details impacts to trees on the site. Because trees will be removed, the quarry will need to obtain a tree removal permit and comply with the terms therein for impacts or removal of protected trees. Therefore, the project will not conflict with the ordinance.

Habitat Conservation Plan / Natural Community Conservation Plan

The site is within the area covered by the ECCCHCP, but mining is not a covered activity under the ECCCHCP. Because the mine reclamation is a mining activity, the provisions of the ECCCHCP do not apply.

Special-Status Species

It is expected that most of the wildlife living near the quarry are acclimated to the ongoing quarry operations. Activities could potentially disrupt active bird nests on or adjacent to the site if any were present when the activities occur. Nests could be destroyed or abandoned.

Additional vegetation removal and new ground disturbance in the grasslands, chaparral, or wooded areas could result in the injury or death of individuals of special-status species if they are present when activities occur, including the Alameda striped racer, coast horned lizard, California red-legged frog, and San Francisco dusky-footed woodrat. For federally listed species (Alameda striped racer and California red-legged frog) the loss of habitat is also considered “harm” under the ESA.

While there have been no documented observations of Crotch or western bumble bee within the site, no focused surveys have been conducted to date, the site is within the range for these species, and the annual grassland areas with small mammal burrows provide potentially suitable underground nesting habitat. Furthermore, the chaparral and woodland areas could potentially provide floral resources/foraging habitat for Crotch and western bumble bee. Should Crotch or western bumble bee colonies or overwintering queens be present in underground nests in work areas, work activities could adversely affect this species and its habitat. This is considered a potentially significant impact.

RECOMMENDATIONS

In order to avoid and minimize impacts to special-status species and nesting birds, avoidance and minimization measures would need to be implemented. Additional measures, including compensatory mitigation, may be required by a USFWS Biological Opinion or Habitat Conservation Plan (HCP) and/or CDFW Incidental Take Permit.

Avoidance and Minimization Measures

Most of the following avoidance and minimization measures are adapted from the ECCCHCP conditions on covered activities for new activities within the site:

- A qualified botanist will conduct botanical surveys prior to the commencement of any activities that may modify undisturbed natural vegetation, such as clearing, mowing, or ground-breaking activities in affected areas. The surveys will be floristic in nature and timed to occur during the appropriate phenological period for each target species. If special-status plants are discovered, species-specific plans will be developed to avoid, minimize, and mitigate impacts to less-than-significant levels.
- A qualified biologist approved by the USFWS and the CDFW will conduct a preconstruction survey for special-status vertebrate species within 48 hours of the initiation of any construction activities (e.g., staging, clearing, grading, tree trimming or removal). If a special-status species is detected, all work will be halted until the animal has left the work area.
- Prior to building demolition or tree removal or pruning, a qualified biologist shall conduct surveys for bat roosts in structures and trees with large cavities. In the event bat roosts are detected, a plan to mitigate impacts to the bats would have to be developed and implemented.
- A temporary wildlife exclusion fence shall be installed around the perimeter of any previously undisturbed area prior to the initiation of new ground-disturbing activities to discourage small wildlife from entering the site. The fence shall have escape funnels pointing outwards to allow small wildlife to exit the work area.
- A qualified biologist will be present for all initial ground-disturbing activities.
- To prevent the entrapment of Alameda striped racers and other wildlife, monofilament plastics shall not be used for erosion control.
- A qualified biologist shall conduct a preconstruction survey for nesting birds no more than 7 days prior to the initiation of construction related activity (e.g., staging, clearing, grading, tree trimming or removal) if this activity occurs between February 1 and July 31.
- If active bird nests are found on or adjacent to the site, an exclusion zone should be established around the nest as specified by the qualified biologist. The exclusion zone should be centered on the nest. Active nests should be monitored weekly to ensure that the exclusion zones are intact and that the young are developing. The exclusion zones should remain in place until the young have fledged and are foraging independently as determined by a qualified biologist.
- If an active burrowing owl burrow is detected and an effective exclusion area for burrowing owls cannot be established, an experienced burrowing owl biologist will develop a site specific plan to minimize the potential to affect the reproductive success of the owls.
- To avoid take of Crotch and western bumblebee species, a qualified biologist shall conduct a take avoidance survey for active bumblebee colony nesting sites prior to each phase of construction. Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in

the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as binoculars. If no Crotch or western bumble bees or potential Crotch or western bumble bees are detected, no further mitigation is required. If potential Crotch or western bumble bees are seen but cannot be identified, the quarry should obtain authorization from CDFW to use nonlethal netting methods to capture bumble bees to identify them to species. If protected bumble bee nests are found, a plan to protect bumble bee nests and individuals shall be developed and implemented in consultation with CDFW.

- The quarry shall obtain required permits to impact the ephemeral stream from the relevant regulatory agencies, including the Corps, CDFW, and Regional Water Quality Control Board. These permits will include conditions and Best Management Practices that the quarry shall implement during construction. Through implementation of the measures, impacts to this jurisdictional feature will be less than significant. These permits may also specify mitigation, which the quarry shall provide as specified by the agencies. The quarry will mitigate for impacts to jurisdictional waters on the site. The impacted feature shall be mitigated at a minimum 1:1 ratio consistent with the Corps "no net loss" policy. The Project applicant will obtain the necessary permits from the Corps, CDFW, and Regional Water Quality Control Board for any fill of the jurisdictional area. All terms of the permits shall be implemented as a condition of the Project. If permits require mitigation at a higher ratio than 1:1, that requirement will be met.

- If required by the USFWS, the quarry shall obtain take coverage for federally listed species (Alameda striped racer and California red-legged frog). This may be from a Section 7 Consultation resulting in a Biological Opinion (BO) or a Section 10 consultation resulting in a Habitat Conservation Plan (HCP). All avoidance, minimization, and mitigation measures in the BO or HCP shall be implemented as a condition of the Project.

- If necessary, a qualified biologist approved under an active BO or HCP will be contracted to trap and move federally listed species (Alameda striped racer and California red-legged frog) to nearby suitable habitat.
- If required by CDFW, the quarry shall obtain a California Endangered Species Act Section 2081 Incidental Take Permit (ITP) for the Alameda striped racer associated with new disturbances. If further surveys warrant their inclusion, the permit should cover Crotch and/or western bumble bee as well. All avoidance, minimization, and mitigation measures in the ITP shall be implemented as a condition of the Project.

Please contact me if you have any questions or require additional information.

Sincerely,
LSA Associates, Inc.

Malcolm J. Sproul
Principal

Enclosures: Figure 1: Parcel Map
Figure 2a: CNDDB Plants Part 1
Figure 2b: CNDDB Plants Part 2
Figure 2c: CNDDB Animal Occurrences
Attachment A – Regulatory Context
Attachment B – Photographs
Attachment C – Special-Status Plants with no Potential to Occur
Table A: Special-Status Plant Species with Records Near the Site
Table B: Special-Status Wildlife Species with Records Near the Site

Cc: Yasha Saber

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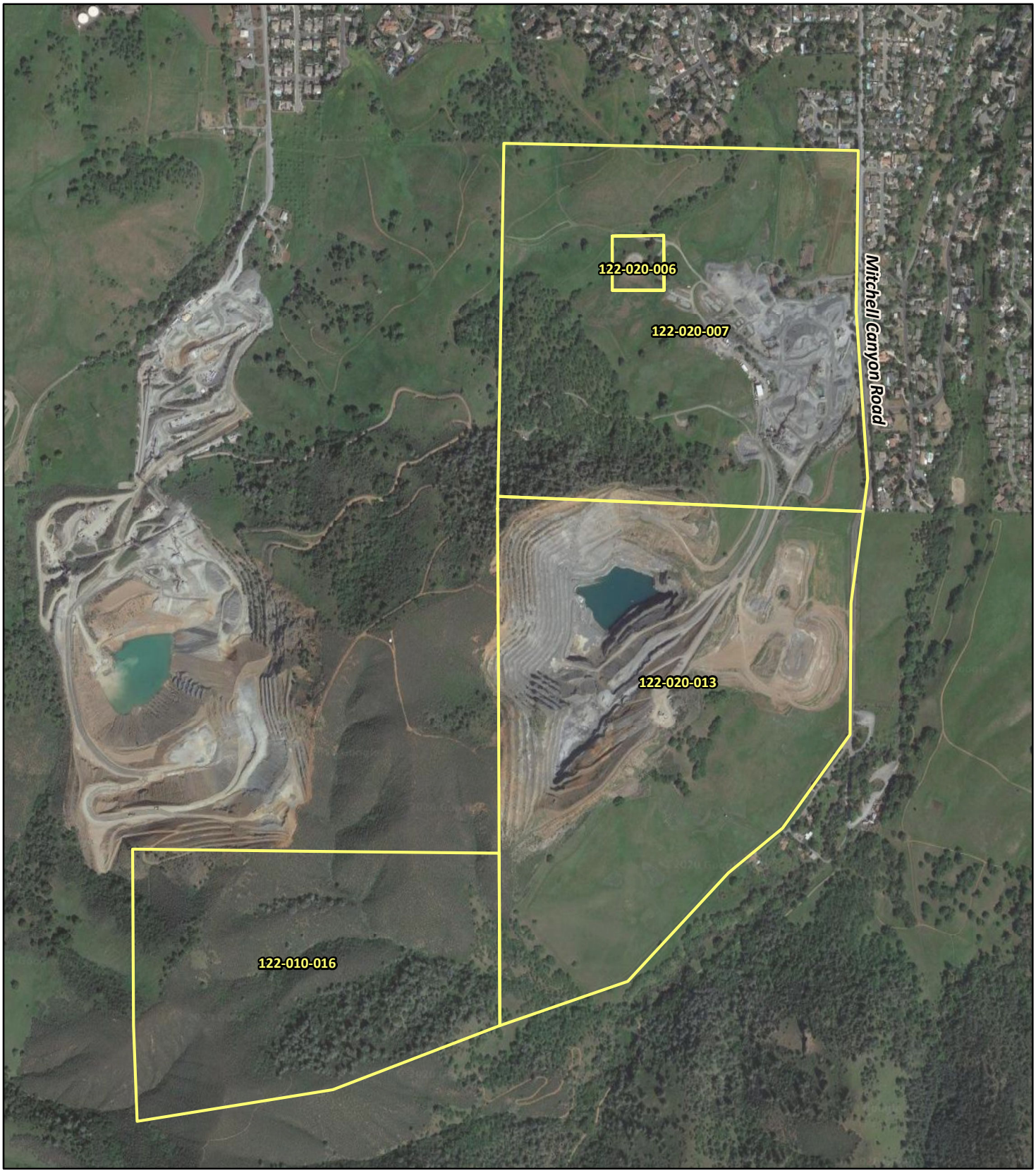
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LSA

LEGEND

Selected Parcels

FIGURE 1

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0 500 1000

FEET

Results of Biological Resources Assessment
Cemex Quarry Clayton, Contra Costa County, California

Parcel Map

SOURCE: Aerial Image from Google (2020).

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Project Site

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LEGEND

Project Parcels

5-mile Radius around Project Parcels

CNDDB Plant Occurrences (species with more than 5 records within 5 miles)

- Brewer's western flax
- Contra Costa manzanita
- Diablo helianthella
- Hall's bush-mallow
- Hospital Canyon larkspur
- Mt. Diablo fairy-lantern
- Mt. Diablo jewelflower
- Mt. Diablo manzanita
- Mt. Diablo phacelia
- woodland woollythreads

N

0 3000 6000

FEET

SOURCE: CDFW CNDDB (5/2020); Aerial Image USDA NAIP (2018).

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FIGURE 2A

Results of Biological Resources Assessment
Cemex Quarry Clayton, Contra Costa County, California

CNDDB Plant Occurrences: Part 1

Contra Costa goldfields #11
San Joaquin spearscale #87
Jepson's coyote-thistle #4
large-flowered fiddleneck #9
showy golden madia #27
chaparral ragwort #14
large-flowered fiddleneck #3
big tarplant #55
Antioch Dunes evening-primrose #11
caper-fruited tropidocarpum #10
big tarplant #68
large-flowered fiddleneck #2
Congdon's tarplant #2
Lime Ridge navarretia #3
Lime Ridge eriastrum #1
big tarplant #65
Lime Ridge navarretia #2
Lime Ridge eriastrum #1
Project Site
Lime Ridge eriastrum #2
Mt. Diablo buckwheat #2
big tarplant #44
Mt. Diablo bird's-beak #5
rock sanicle #14
slender silver moss #7
chaparral harebell #24
rock sanicle #4
Mt. Diablo bird's-beak #1
rock sanicle #4
rock sanicle #5
Mt. Diablo bird's-beak #1
chaparral harebell #25
Serpentine Bunchgrass #16
chaparral harebell #26
rock sanicle #1
most beautiful jewelflower #9
rock sanicle #5
slender-leaved pondweed #16
Toren's grimmia #6
fragrant fritillary #74
rock sanicle #1
coastal triquetrella #2
Mt. Diablo buckwheat #1
fragrant fritillary #34
most beautiful jewelflower #10
rock sanicle #1
oval-leaved viburnum #27
chaparral harebell #27
Toren's grimmia #5
fragrant fritillary #34
most beautiful jewelflower #1
Mt. Diablo phacelia #1
oval-leaved viburnum #4
chaparral harebell #34
oval-leaved viburnum #3

CNDDB Plants	
(species with fewer than 6 records within 5 miles)	
Antioch Dunes evening-primrose	Lime Ridge navarretia
big tarplant	most beautiful jewelflower
caper-fruited tropidocarpum	Mt. Diablo bird's-beak
chaparral harebell	Mt. Diablo buckwheat
chaparral ragwort	oval-leaved viburnum
coastal triquetrella	rock sanicle
Congdon's tarplant	San Joaquin spearscale
Contra Costa goldfields	showy golden madia
fragrant fritillary	slender silver moss
Jepson's coyote-thistle	slender-leaved pondweed
large-flowered fiddleneck	Toren's grimmia
Lime Ridge eriastrum	

LSA

LEGEND

Project Parcels

5-mile Radius around Project Parcels

CNDDB Plant Occurrences
(species with fewer than 6 records within 5 miles)

Plant Species

FIGURE 2B

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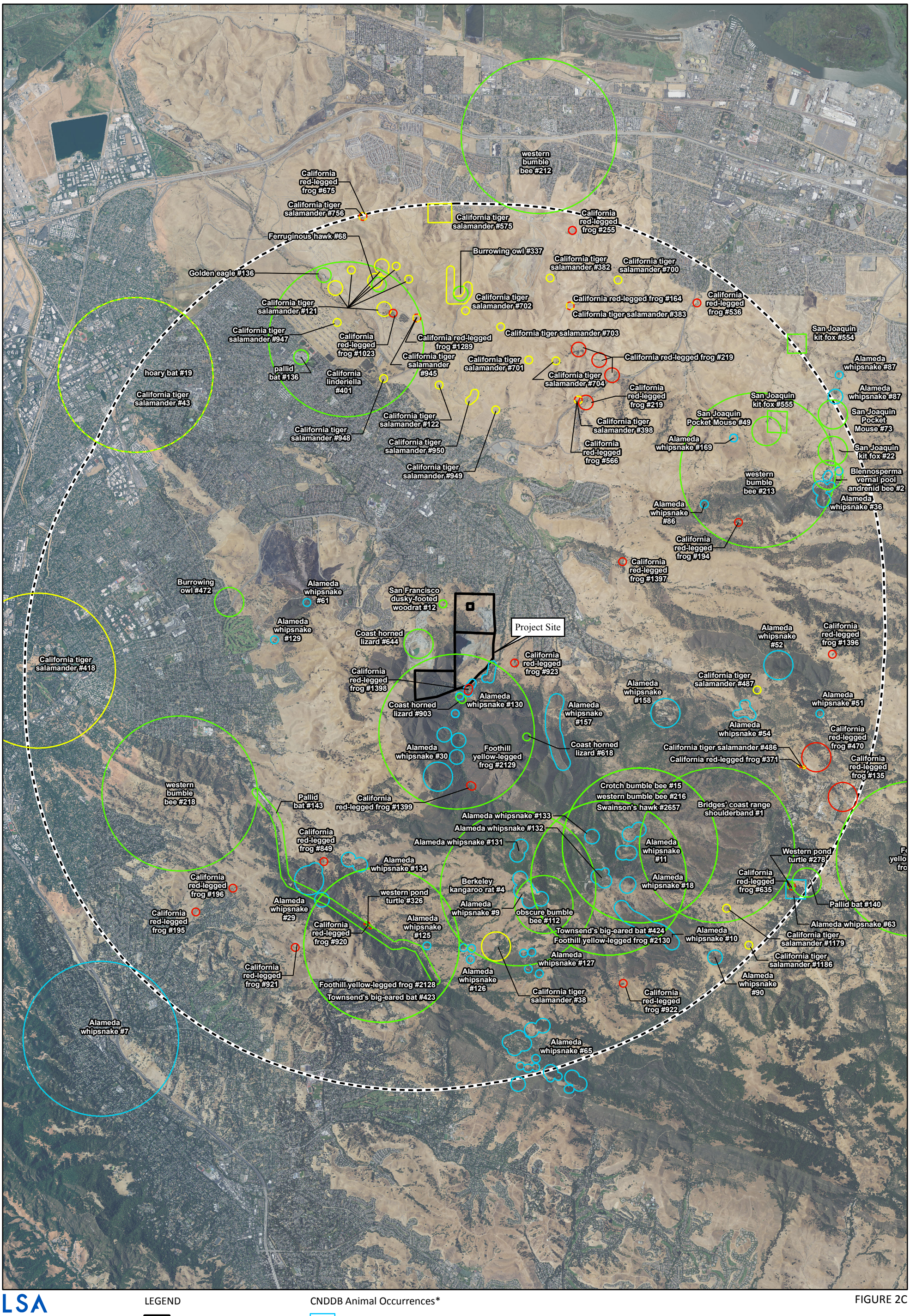
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SOURCE: CDFW CNDDB (5/2020); Aerial Image USDA NAIP (2018).

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Results of Biological Resources Assessment
Cemex Quarry Clayton, Contra Costa County, California

CNDDB Plant Occurrences: Part 2



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Project Parcels

5-mile Radius around Project Parcels

CNDDB Animal Occurrences*

Alameda whipsnake (29 occurrences)

California red-legged frog (24 occurrences)

California tiger salamander (24 occurrences)

CNDDB Animal Occurrences of Species with fewer than 5 Occurrences

* Sensitive species occurrences not shown: American peregrine falcon #56; Prairie falcon # 467, 468, 470, 471, 491.

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FEET

SOURCE: CDFW CNDDB (05/2020); Aerial Image USDA NAIP (2018).

FIGURE 2C

Results of Biological Resources Assessment
Cemex Quarry Clayton, Contra Costa County, California

CNDDB Animal Occurrences

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ATTACHMENT A: REGULATORY CONTEXT

The site is within the general geographical range of several special-status plant and wildlife species. Biological resources on the site may fall under the jurisdictions and regulations of the agencies listed below.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over federally listed threatened and endangered species under the federal Endangered Species Act. The Endangered Species Act protects listed species from harm or "take" which is broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An activity can be defined as a "take" even if it is unintentional or accidental.

An endangered species is one which is in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the foreseeable future. In addition to endangered and threatened species, which are legally protected under the federal Endangered Species Act, the USFWS maintains a list of candidate species. Candidate species are specifically included on a list published in the federal register. Federal candidate species are not afforded legal protection under the federal Endangered Species Act.

The USFWS is also responsible for enforcement of the Bald and Golden Eagle Protection Act.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) has jurisdiction over State-listed threatened, endangered, and rare (plant) species under the State Endangered Species Act. In addition, candidate species proposed for listing under the State act are also protected until a determination is made on the listing proposal. The State and federal lists are generally similar, although a few species present on one list may be absent from the other list. The State also maintains lists of special-status wildlife species identified as Species of Special Concern. These are species whose status is being monitored due to one or more threats. Species on these lists are not afforded legal protection.

The CDFW also exerts jurisdiction over the bed and bank of watercourses according to the provisions of Section 1601 to 1603 of the Fish and Game Code. The CDFW typically requires a Streambed Alteration Agreement for the fill or removal of material from any natural drainage. The jurisdiction of the CDFW under Section 1600 of the Fish and Game Code extends to the top of bank of a stream.

U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (Corps) is responsible for regulating the discharge of fill material into waters of the United States. Waters of the U.S. and their lateral limits are defined in 33 Code of Federal Regulations (CFR) Part 328.3 (a) and include streams that are tributary to navigable waters and their adjacent wetlands. Wetlands that are not adjacent to waters of the U.S. are termed "isolated wetlands" and may be subject to Corps jurisdiction.

In general, a Corps permit must be obtained before placing fill in wetlands or other waters of the U.S. The type of permit depends on the acreage involved and the purpose of the proposed fill. Nationwide Permits are available for projects that are anticipated to have minimal impacts on waters of the U.S. and wetlands and meet the general terms of the specific Nationwide Permit and the standard conditions for all Nationwide Permits. An Individual Permit is required for projects that result in more than a "minimal" impact on wetlands. The Corps will be required to consult with the USFWS under Section 7 of the Endangered Species Act if a project subject to Clean Water Act permitting will result in take of a federally listed species. If the Corps determines that a project will not take any federally listed species the USFWS could concur and the Corps could proceed with issuing the permit.

Regional Water Quality Control Board

Pursuant to Section 401 of the Clean Water Act, projects that require a permit from the Corps under Section 404 must also obtain water quality certification from the Regional Water Quality Control Board (RWQCB). This certification ensures that the project will uphold State water quality standards. The RWQCB requires mitigation for any loss of jurisdictional area. For State waters that are not otherwise regulated by the Corps under Section 404, the RWQCB issues Waste Discharge Requirements, or waivers thereof, consistent with the Porter-Cologne Water Quality Control Act.

National Oceanic and Atmospheric Administration: Fisheries

Like the USFWS, the National Oceanic and Atmospheric Administration: Fisheries (NOAA) has jurisdiction over federally listed threatened and endangered species under the federal Endangered Species Act. The NOAA jurisdiction is restricted to marine and anadromous wildlife species such as salmon and steelhead.

Attachment B: Photographs



Photograph 1: Murchio Reservoir at left on parcel APN 122-020-006. A portion of the active quarry is shown at right.



Photograph 2: The nonnative grassland, showing a blue oak savannah farther up the hill and foothill pines near the top of the slope.



Photograph 3: A view of the blue oak savannah on APN 122-020-007.



Photograph 4: Water treatment basin.



Photograph 5: A small pool formed by an intermittent stream.



Photograph 6: Grasslands with trees near the center of APN 122-020-013.



Photograph 7: The benches on the west side of the quarry pit. One of the pictured benches has been planted with gray pines.



Photograph 8: A previously disturbed area near the quarry pit that has been colonized with coyote brush and other chaparral plant species.



Photograph 9: Chaparral with woody debris near the top of the ravine on APN 122-020-013.



Photograph 10: A small tree tobacco plant growing in a disturbed area.



Photograph 11: A view of typical undisturbed chaparral in APN 122-010-016.



Photograph 12: A chaparral broomrape plant in APN 122-010-016.



Photograph 13: A coast horned lizard in APN 122-010-016.

Attachment C: Special-Status Plant Species with No Potential to Occur

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Astragalus tener var. *tener* Alkali milk-vetch	-/-/1B.2	Occurs in mesic alkaline and adobe clay soils in valley and foothill grassland, adjacent to vernal pools. Elevation: 1-60 m. Blooms: March-June.	None. The conditions of the site are unlike those required for this species and the elevation range associated with this species relates to those of delta grasslands.
Atriplex cordulata var. *cordulata* Heartscale	-/-/1B	Saline or alkaline soils in chenopod scrub, meadows, and seeps. Sandy soils in valley and foothill grassland. Elevation: 0-70 m. Blooms: April-October	None. No potential to occur on the site due to lack of suitable alkaline soils.
Atriplex depressa Brittlescale	-/-/1B	Mesic areas in alkaline soils and alkaline seeps in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, and vernal pools. Elevation: 1-320 m. Blooms: April-October.	None. No potential to occur on the site due to lack of suitable alkaline soils.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	-/-/1B	Grazed and un-grazed annual grassland. Alkaline or saline soils sometimes described as heavy white clay (saline clay soil). Elevation: 1-230 m. Blooms: May-October	None. No potential to occur on the site due to lack of suitable habitat (alkaline soils).
Chloropyron molle subsp. *molle* [*Cordylanthus mollis* subsp. *mollis*] Soft bird's-beak	FE/CR/1B	Coastal salt marshes and brackish marshes from northern San Francisco Bay to Suisun Bay in Napa, Solano, and Contra Costa Counties Elevation: 0 to 3 meters Blooms: July-November	None. No potential to occur on the site due to lack of suitable habitat (coastal salt marsh).
Cicuta maculata var. *bolanderi* Bolander's water-hemlock	-/-/2B.1	Coastal salt marsh, wetland-riparian. Elevation: 0 -200 m. Blooms: July-September	None. No potential to occur on the site due to lack of suitable habitat (coastal salt marsh).
Cryptantha hooveri Hoover's cryptantha	-/-/1B	Inland dunes, sandy soils in valley and foothill grassland. Elevation: 9-150 m. Blooms: April-May	None. No potential to occur on the site due to lack of suitable habitat (sandy soils). Soils on the site are primarily clay loam.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Downingia pusilla Dwarf downingia	-/-/2.2	Valley and foothill grassland (mesic), Vernal pools, roadside ditches. Elevation: 0 -150 m. Blooms: March-May	None. This species is not known to occur in Contra Costa County. No potential to occur on the site due to lack of suitable habitat.
Eriogonum nudum var. *psychicola* Antioch Dunes buckwheat	-/-/1B	Inland dunes Elevation: 3 -20 m. Blooms: July-October	None. This species prefers sandy soils and soils on the site are primarily clay loam.
Eryngium jepsonii Jepson's coyote thistle	-/CE/1B	Grows on moist clay soil in valley and foothill grassland and vernal pools. Elevation: 3 -30 m. Blooms: April-August	None. No suitable vernal pools or clay soils on the site.
Erysimum capitatum subsp. angustatum Contra Costa wallflower	FE/CE/1B	Inland dunes Elevation: 3 -30 m. Blooms: June-October	None. This species is known only from the Antioch Dunes.
Eschscholzia rhombipetala Diamond-petaled California poppy	-/-/1B	Alkaline or clay soils in valley and foothill grassland Fallow fields, and open places. Elevation: 0-975 m. Blooms: March-April.	None. No potential to occur on the site due to lack of alkaline soils.
Extriplex joaquinana [*Atriplex joaquiniana*] San Joaquin spearscale	-/-/1B	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland (alkaline soils). Elevation: 1-835 m. Blooms: April-October.	None. No potential to occur on the site due to lack of alkaline soils.
Hesperolinon breweri Brewer's western flax	-/-/1B.2	Serpentine chaparral, cismontane woodland, and valley and foothill grassland. Elevation: 30-945 m. Blooms: May-June.	None. No potential to occur on the site due to lack of suitable habitat (serpentine rock habitat).
Isocoma arguta Carquinez goldenbush	-/-/1B	Valley and foothill grassland; alkaline. Species may be present in other areas where sub-saline conditions are favorable. Elevation: 1-20 m. Blooms: August-December	None. No potential to occur on the site due to lack of suitable habitat (alkaline soils).

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Lasthenia conjugens Contra Costa goldfields	FE/-/1B	Mesic areas in valley and foothill grassland, cismontane woodland in vernal pools, swales, and moist depressions (alkaline grasslands and playa pools). Extirpated from most of its range; extremely endangered. Elevation: 0-470 m. Blooms: March-June	None. No potential to occur on the site due to lack of alkaline soils.
Lathyrus jepsonii var. *jepsonii* Delta tule pea	-/-/1B	Brackish and saltwater marsh. Elevation: 0-5 m. Blooms: April-August	None. No potential to occur on the site due to lack of coastal salt marsh.
Lilaeopsis masonii Mason's lilaeopsis	-/-/1B	Tidal zone of brackish and freshwater marshes and swamps, riparian scrub. Elevation: 0–36 meters. Blooms: April to November.	None. No potential to occur on the site due to lack of coastal salt marsh.
Limosella subulata Delta mudwort	-/-/2	Brackish and saltwater marsh. Elevation: 0–3 meters. Blooms: May to August.	None. No potential to occur on the site due to lack of coastal salt marsh.
Navarretia nigelliformis subsp. radians Shining navarretia	-/-/1B.2	Mesic valley and foothill grassland, vernal pools, depressions in clay or serpentine soils. Elevation: 65-1,000 m. Blooms: March-July	None. No suitable micro-habitat (vernal pools, alkaline soils, clay depressions) on the site.
Neostapfia colusana Colusa grass	FT/CE/1B	Vernal pools; adobe. Elevation: 5-200 m. Blooms: May-August	None. No suitable habitat (vernal pools, alkaline soils, clay depressions) on the site.
Oenothera deltoides subsp. *howellii* Antioch Dunes evening-primrose	FE/CE/1B.1	Interior sand dunes Elevation: 0-30 m. Blooms: March - September	None. This species is known only from sandy bluffs and dunes.
Plagiobothrys hystriculus Bearded popcorn-flower	-/-/1A	Alkaline meadows, margins of vernal Pools, marshes, and swamps. Elevation: 2-274 m. Blooms: Mar- May	None. No suitable habitat (vernal pools, alkaline soils, marsh) on the site.
Stuckenia filiformis subsp. *alpina* Slender-leaved pondweed	-/-/2	Marshes and swamps; shallow, clear water of lakes and drainage channels. Elevation: 300-2,150 m. Blooms: N/A	None. No potential to occur on the site due to lack of freshwater marsh.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Symphyotrichum lentum (*Aster lentus)* Suisun marsh aster	-/-/1B	Brackish marsh Elevation: 0-3 m. Blooms: June-November	None. No potential to occur on the site due to lack of brackish marsh.
Trifolium hydrophilum [Trifolium depauperatum var. *hydrophylum]* Saline clover	-/-/1B.1	Marshes and swamps, mesic alkaline valley and foothill grassland, vernal pools. Elevation: 0-300 m. Blooms: April-June	None. No potential to occur on the site due to lack of marsh.
Triquetrella californica Coastal triquetrella	-/-/1B.2	Moss that grows on light soil over rocks and boulders within the diffuse light of coastal bluff scrub and coastal scrub shrub and tree canopy. Elevation: 10-100 m Blooms: Wet season	None. No potential to occur on the site due to lack of suitable coastal scrub habitat.
Tropidocarpum capparideum Caper-fruited tropidocarpum	-/-/1B	Alkaline clay soils in low hills and valleys in in valley and foothill grassland. Elevation: 1-455 m. Blooms: March-April.	None. No potential to occur on the site due to lack of alkaline soils.

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CC - California Candidate for Listing
CR - State Rare
1A - California Native Plant Society; plants presumed extinct in California
1B - California Native Plant Society; plants rare, threatened, or endangered in California and elsewhere
2A – Rare Plant Rank 2A – Plants presumed extirpated in California, but common elsewhere
2B - Rare Plant Rank 2B – Plants rare, threatened, or endangered in California but more common elsewhere
A2 – Species of local concern, currently known from 3 to 5 regions in the two counties, or, if more, meeting other important criteria such as small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc. Protected by CEQA.

Table A: Special-Status Plant Species with Records near the Site

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Amsinckia grandiflora Large-flowered fiddleneck	FE/CE/1B	Grassy openings in cismontane woodland, valley and foothill grassland; cannot occur in dense grass. Elevation: 275-550 m. Blooms: April-May	None. The non-native annual grasslands on the site do not provide suitable habitat. The CNDDB lists one extant occurrence approximately 4.7 miles from the site. This ex situ population was planted as part of a reintroduction effort. Currently known to occur only in Black Diamond Mines Regional Preserve and the 160-acre Amsinckia grandiflora Reserve on the Site 300 Experimental Test Facility of the Lawrence Livermore National Laboratory, which was established in 2000.
Amsinckia lunaris Bent-flowered fiddleneck	-/-/1B	Occurs in coastal bluff scrub, cismontane woodland, valley and foothill grassland; openings. Elevation: 3-500 m. Blooms: March-June	Low. May occur in the grassland on the site.
Arctostaphylos auriculata Mt. Diablo manzanita	-/-/1B	Chaparral (sandstone), cismontane woodland. Elevation: 135-650 m. Blooms: January-March	Low. May occur in the chaparral and oak woodland on the site. The micro-habitat of this species is on sandstone derived soils. Soils on the site are primarily clay loam. Although there is low potential for this plant to occur, any manzanita (*Arctostaphylos* spp.) observed should be identified to species.
Arctostaphylos manzanita subsp. *laevigata* Contra Costa manzanita	-/-/1B.2	Chaparral (rocky). Elevation: 233 -1,100 m. Blooms: January-April	Low. May occur in the chaparral and rocky outcrops present in the site. Any manzanita (*Arctostaphylos* spp.) observed on the site should be identified to species.
Blepharizonia plumosa Big tarplant	-/-/1B	Valley and foothill grassland with clay to clay loam soils. Elevation: 50-505 m. Blooms: July-October	Moderate. May occur within the oak savanna understory and grassland.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
California macrophylla Round-leaved filaree	-/-/1B	Grassy openings in cismontane woodland, valley and foothill grassland with clay soils. Elevation: 15-1,200 m. Blooms: March-May	Moderate. Potential to occur on moderate slopes within the oak savanna understory and within sparse areas of annual grassland.
Calochortus pulchellus Mount Diablo fairy-lantern	-/-/1B	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland, in openings on slopes. Elevation: 30-840 m. Blooms: April-June	Present. This species was observed on APN 122-010-016.
Campanula exigua Chaparral harebell	-/-/1B.2	Chaparral (rocky, usually serpentinite). Elevation: 275-1,250 m. Blooms: May-June	None. No potential to occur on the site. The species has an affinity to grow on serpentine and rocky slopes on Mt. Diablo. There is no serpentine in the site area.
Cordylanthus nidularius Mt. Diablo bird's-beak	-/CR/1B	Chaparral, serpentine. Elevation: 600 -800 m. Blooms: July-August	None. No potential to occur on the site. The species has a high affinity for serpentine soils, which are not present on the site.
Delphinium californicum subsp. *interius* Hospital Canyon larkspur	-/-/1B.2	Generally associated with drainages within chaparral, grassy (and sometimes mesic) openings of cismontane woodland. Elevation: 230-1,095 m. Blooms: April-June	Moderate. Some potential to occur on slopes within chaparral, and oak savanna understory, and within mesic areas of grassland.
Dirca occidentalis Western leatherwood	-/-/1B	Broadleafed upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian forest, and in riparian woodland on brushy slopes. Generally in the fog belt. Elevation: 30-395 m. Blooms: January-March	None. Although appropriate vegetation communities are present, this species only occurs in the fog belt areas in the hills of the San Francisco Bay area. The site is too arid for this species to occur.
Eriastrum ertterae Lime Ridge eriastrum	-/-/1B.1	Hard packed sand in openings at edge of chaparral (alkaline or semi-alkaline). Elevation: 200 - 290 m. Blooms: June - July	None. Although chaparral habitat is present, this species prefers hard packed sand. Soils on the site are primarily clay loam.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Eriogonum truncatum Mt. Diablo buckwheat	-/-/1B	Dry, exposed clay or sandy substrates in chaparral, coastal scrub, and grassland. Elevation: 200-400 m. Blooms: April-September	Low. *Eriogonum truncatum* was presumed extinct until it was re-discovered on Mount Diablo in 2005 and at Black Diamond Regional Preserve in 2016.
Fritillaria liliacea Fragrant fritillary	-/-/1B	Coastal scrub, valley and foothill grassland, and coastal prairie. Most often on serpentine soils, but not exclusively as other various soils reported, though usually heavy clay. Elevation: 3-410 m. Blooms: February-April	Low. May occur in mesic, annual grassland on the site.
Grimmia torenii Toren's grimmia	-/-/1B	This is a moss which grows in rocky openings, on boulders, and rock walls of carbonate or volcanic base in chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 325-1,160 m. Blooms: Wet season	Low. May occur in the limited undisturbed rocky opening on the site.
Helianthella castanea Diablo helianthella	-/-/1B	Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland; usually in chaparral/oak woodland interface in rocky (azonal) soils, and often in partial shade. Elevation: 60–1300 m. Blooms: March-June	Moderate. May occur in annual grassland, chaparral, and oak woodland.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Juglans hindsii Northern California black walnut	-/-/1B	Deep alluvial soil in riparian forest and riparian woodland. Elevation: 0-395 m. Blooms: April-May	None. Site lacks suitable riparian habitat. *Juglans hindsii* has been widely used as a rootstock for grafting *J. regia* and has been planted extensively in many parts of California for this purpose. It is now naturalized in many areas where it apparently did not occur before the introduction of commercial walnut growing approximately 175 years ago. When encountered, a determination of rarity depends whether the tree is true native or a hybrid. This may be inferred by the size of the tree, location relative to known populations, or of a tree known to be planted prior to 1840. Otherwise, genetic investigation is the most reliable method for determining native status and thus rarity.
Madia radiata Showy madia	-/-/1B.1	Valley and foothill grassland and openings in cismontane woodland. Elevation: 25-1,215 m. Blooms: March-May	Low. May occur within the oak savanna.
Malacothamnus hallii Hall's bush mallow	-/-/1B.2	Chaparral, coastal scrub. Some populations on serpentine. Elevation: 10-760 m. Blooms: May-September (October)	Low. The species has an affinity to grow on serpentine and rocky slopes on Mt. Diablo.
Monolopia gracilens Woodland wooly threads	-/-/1B.2	Openings in broadleaf upland forest, chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland; Serpentine. Elevation: 100-1200 m. Blooms: March-July	Low. May occur within openings of the oak savanna and chaparral. Surveys for this species are recommended.
Navarretia gowenii Lime Ridge navarretia	-/-/1B.1	Chaparral, clay and serpentine soils. Elevation: 180-305 Blooms: May-June	Low. May occur on clay soils in grasslands and chaparral.
Phacelia phacelioides Mt. Diablo phacelia	-/-/1B	Chaparral and cismontane woodland/rocky; strong indicator of serpentine soils. Elevation: 500-1,370 m. Blooms: April-May	None. No potential to occur on the site due to lack of serpentine rock.

Species	Status* (Federal/State/ CRPR)	Habitat/Ecology/Elevation/Blooming Period	Potential to Occur
Sanicula saxatilis Rock sanicle	-/CR/1B.2	Rocky ridges or talus, broadleaved upland forest, chaparral, valley and foothill grassland. Elevation: 620-1,175 m. Blooms: April-May.	Low. Present nearby on Mt. Diablo.
Senecio aphanactis Chaparral ragwort	-/-/2	Alkaline terraces and rocky areas in cismontane woodland, chaparral, and coastal scrub. Elevation: 15-800 m. Blooms: January-April	Low. May occur on woodland edge and in chaparral.
Streptanthus glandulosus subsp. *glandulosus* [*S. albidus* ssp. *peramoenus*] Bristly jewelflower	-/-/1B.2,A2	Serpentine or metamorphic (Franciscan formation) soils on rocky, generally barren openings on slopes in chaparral, cismontane woodland, and valley and foothill grassland. Elevation: 150-1,400 m. Blooms: April-July	None. No potential to occur on the site due to lack of serpentine rocks.
Streptanthus hispidus Mt. Diablo jewel-flower	-/-/1B.3	Chaparral, valley and foothill grassland/rocky. Elevation: 365-1,200 m. Blooms: March-June	Low. May occur in undisturbed rocky areas within chaparral.
Viburnum ellipticum Oval-leaved viburnum	-/-/2.3	Generally found on north facing slopes in chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 215-1400 m. Blooms: May - June	Low. May occur on woodland edge and in chaparral.

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Table B: Special-Status Wildlife Species with Potential to Occur on or Near the Site

Species	Status*	Habitat Requirements	Potential to Occur on Site
Fish			
Oncorhynchus mykiss Steelhead Population: Northern California DPS (Central California Coast Steelhead)	FT/--	Found in coastal streams in central California, including the drainages of San Francisco, San Pablo, and Suisun Bays. Individuals within this DPS spawn during the winter only, mature in the ocean, and return to freshwater streams during late fall and winter. Requires cool, swift moving streams with clean, unsilted gravel beds for spawning and egg deposition.	None. There are no CNDDB records within 5 miles of the project area. Other sources have recorded observations of trout in Mitchell Creek, a tributary of Mount Diablo Creek. Mitchell Creek is a seasonal stream. There is no suitable aquatic habitat on the site.
Amphibians			
Ambystoma californiense California tiger salamander	FT/CT	Adults spend most of their life in underground burrows. Breeds in vernal pools and ponds, including cattle stock ponds. Breeds after the first rains in late fall and early winter, when the wet season allows the salamander to migrate to the nearest pond, a journey that may be as far as 1 mile and take several days. Lays eggs in small clusters or singly, which hatch after 14 to 21 days.	None. The nearest CNDDB occurrence is over 2 miles north of the site and is separated from the site by extensive residential development.
Rana draytonii California red-legged frog	FT/CSC	Inhabits permanent and temporary pools, streams, freshwater seeps, and marshes in lowlands and foothills. Uses adjacent upland habitat for foraging and refuge. Breeds during the wet season from December through March in slow parts of streams, lakes, reservoirs, ponds, and other waters with emergent vegetation. Lays 300 to 4,000 eggs in a large cluster, which is attached to plants near the water surface. Requires water for 4 to 7 months for tadpoles to complete metamorphosis.	Moderate. CRLF have been observed in Mitchell Creek. They could disperse through portions of the site on rainy nights.
Rana boylii Foothill yellow-legged frog	--/CCT/CSC	Rarely leaves riparian corridors. Breed and deposit eggs shortly after streams reach peak flow in the spring after the winter rains end. Egg masses are typically attached to the downstream side or boulders or cobble, in a sunny, shallow section of low-gradient stream. Breeding rarely occurs in well-shaded (>90 percent closed canopy) sites.	None. There are four CNDDB occurrences within 5 miles of the project site. The closest occurrence is based on an observation made in Mitchell Creek in 1912. This occurrence is considered extirpated, and the CNDDB lists the other three occurrences as “possibly extirpated”. The species has not been detected at any of these localities since 1953. The ephemeral stream on the site is not suitable for the species.

Species	Status*	Habitat Requirements	Potential to Occur on Site
Reptiles			
Actinemys (=Emys) marmorata Western pond turtle	--/CSC	Permanent or nearly permanent water (fresh to brackish) in a wide variety of habitat types. Requires basking sites and upland areas for egg laying.	None. The ponds and seasonal drainages on the site are not suitable for turtles.
Coluber lateralis euryxanthus Alameda striped racer	FT/CT	Lives primarily in scrub and chaparral communities, but has also been observed in nearby grasslands and woodlands. Feeds primarily on lizards. Most active in the spring and fall. Retreats from hot temperatures in the summer and cold temperatures in the winter into burrows or other underground refuges.	High. There are numerous CNDDB occurrences within 1 mile of the site. The site is contiguous with large expanses of suitable habitat, and suitable habitat is present.
Phrynosoma blainvillii Coast horned lizard	--/CSC	Found in a variety of vegetation communities including annual grasslands, woodlands, and chaparral. Feeds primarily on ants but eats other small insects as well.	High/Present. One coast horned lizard was observed on APN 122-010-016.
Birds			
Athene cunicularia Burrowing owl	--/CSC	Nearly or quite level grassland, prairie, and desert floor with short or sparse vegetation. Subterranean nester that generally uses existing mammal burrows (especially of ground squirrels), but will also excavate its own burrows.	Low. Few suitable burrows observed on site. The vegetation is too tall in most of grasslands on the site, and most of the site has steeper slopes than burrowing owls prefer.
Buteo swainsoni Swainson's hawk	--/CT	Nests in riparian areas. Forages in open areas, including agricultural fields.	None. There is only one Swainson's hawk CNDDB occurrence within 5 miles of the site. It is based on a specimen collected in 1898, and the location of the collection was recorded only as "Mt. Diablo." No Swainson's hawk nesting has been observed by LSA biologists over many years of work on the site. All recent records are from the plains along the San Joaquin Valley side of Mt. Diablo.
Aquila chrysaetos Golden eagle	-/-/CFP	Hunts in rolling foothills and mountain areas. Usually nests in trees but will also use cliffs and electrical transmission towers in open areas.	Moderate. LSA biologists often see golden eagles in the area, but these birds have established territories and use the same nest year after year.
Falco peregrinus American peregrine falcon	FD/CD/CFP	A variety of open habitats including coastlines, mountains, marshes, bay shorelines, and urban areas. Nest on cliffs, bridges, and tall buildings. Feeds almost exclusively on birds.	Moderate. Known to nest on the Castle Rocks, approximately 3.25 miles southwest of the project site. The cliffs on the site may provide potential nesting habitat where

Species	Status*	Habitat Requirements	Potential to Occur on Site
			there are small ledges on vertical faces. LSA biologists often see the species flying in the area but no nesting has occurred on the site.
Elanus leucurus White-tailed kite	-/-/CFP	Open grasslands, meadows, or marshes; require dense-topped trees or shrubs for nesting and perching. Tolerates human activity and is known to nest in residential neighborhoods in the Bay Area.	Moderate. Suitable nesting and foraging habitat present. Grasslands on the site support a large prey base of small mammals.
Mammals			
Vulpes macrotis mutica San Joaquin kit fox	FE/CT	Found primarily in areas with short vegetation in the southern San Joaquin Valley. Feeds on kangaroo rats and other small rodent species, but will also consume insects, hares, mice, and lizards. Lives in dens that it either excavates itself or moves into atypical dens including human structures.	None. There are no nearby records within the last 20 years. No suitably sized burrows were seen in the site.
Bassariscus astutus Ring-tailed cat	-/-/CFP	Widely distributed but rarely seen due to its nocturnal and secretive habits. Found from Oregon to Mexico in a range of habitats, from sea level to over 9,000 feet elevation. Catholic diet that includes rodents and other small animals, fruits, nuts, and vegetation.	Low. This species is not tracked by the CNDDB and there is little evidence on its current distribution.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	--/CSC	Primarily found along riparian areas within chaparral and woodlands. Feeds mainly on woody plants but also eats acorns, grasses, and fungi. Builds conspicuous stick houses in trees and on the ground.	Moderate. Suitable habitat is present. May occur in wooded areas.
Corynorhinus townsendii Townsend's big-eared bat	--/CSC	This species distribution is limited by suitable roosting sites, which include caves, mines, tunnels, buildings, and other human-made structures. Feeds primarily upon moths.	Low. The CNDDB contains two occurrences within 5 miles of the site.
Antrozous pallidus Pallid bat	--/CSC	Roost in caves, tunnels, and occasionally buildings and hollow trees. Forages over a variety of habitats.	Low. May roost in structures associated with the quarry.
Invertebrates			
Bombus crotchii *Crotch bumble bee*	--/CCE	Open grassland and scrub habitats. Primarily nests underground. Occurs primarily in California, from coastal California east to the Sierra-Cascade crest and south into Mexico.	Low. There is only one CNDDB occurrence within 5 miles of the site, and it is based on a collection of bumble bees on Mt. Diablo in 1951.
Bombus occidentalis Western bumble bee	--/CCE	Feeds upon nectar and pollen from a variety of plants species, but is most adapted to native plant species. Nests in abandoned rodent burrows and bird nests. The flight period in	Low. Undisturbed portions of the quarry may support suitable habitat in the form of native plants, nesting

Species	Status*	Habitat Requirements	Potential to Occur on Site
		California is from early February to late November, peaking in late June and late September. The flight period for workers and males is from early April to early November. The species is currently restricted to high elevation sites in the Sierra Nevada and scattered coastal areas.	birds, and rodent burrows, but the species is likely extirpated from Contra Costa County.[1] There are four CNDDB occurrences within 5 miles of the site, but the most recent sighting was in 1974.

*Status:

FE = Federally listed as endangered
FT = Federally listed as threatened
FD: Federally delisted

CT = California State listed as threatened;
CFP = California Fully Protected;
CCE = California candidate endangered
CCT = California candidate threatened
CSC = California species of special concern
CD= California delisted

[1] Williams, P. H., R. W. Thorp, L. L. Richardson, and S. R. Colla. 2014. The Bumble Bees of North America: An Identification Guide. Princeton University Press, Princeton.

APPENDIX E-2
ARBORIST REPORT

CARLSBAD
FRESNO
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

June 17, 2020

Steve Grace
Cemex
2365 Iron Point Road, #120
Folsom, CA 95630

Sent Via Email

Subject: Arborist Report, Cemex Clayton Quarry

Dear Mr. Grace:

This arborist report provides the results of a tree survey and an analysis of trees that may be impacted by the disposal of fill on the southeast side of the Clayton Quarry. The quarry is located in unincorporated Contra Costa County (County), south of the City of Clayton (Figure 1). This arborist report was prepared according to the provisions and policies of Contra Costa County's Protected Tree Ordinance (Ordinance).[1] The tree survey identified, mapped, and assessed the condition of all trees within and adjacent to the fill disposal area (Figure 2). The tree analysis identifies trees to be removed and retained based on the limits of the fill disposal area.

METHODS

LSA certified arborist, Timothy Milliken (International Society of Arboriculture Certification #WE5539A), conducted the tree survey on May 12, and June 4, 2015. The tree survey involved recording the species, trunk diameter at breast height (DBH; in inches as measured 4.5 feet above natural grade), and condition of all the trees within the study area. If an individual tree had multiple trunks, the diameters of all the trunks were totaled. Individual surveyed trees were mapped and numbered on the site plan (Figure 2) and marked in the field using numbered tree tags that correspond with the tree numbers provided in Figure 2.

The health and structural condition of each tree were classified as follows:

- Good: Trees with good health and structure that have potential for longevity on site;
- Fair: Trees with somewhat declining health and/or structural defects; or
- Poor: Trees in poor health or with significant structural defects that cannot be mitigated. Trees in this category are expected to continue to decline.

[1] Chapter 816-6 of the Contra Costa County Code, Tree Protection and Preservation; Particular reference to §816-6.1004; Chapter 816-4, Heritage Tree Preservation; and Policy 8-6 of the Conservation Element of the General Plan, pg. 8-15.

The arborist also determined which trees in the study area qualify as "heritage" and/or "protected" as defined by the Ordinance and determined as follows:

- **Heritage tree.** A tree seventy-two (72) inches or greater in circumference (22.9 inches in diameter) measured four and one-half (4-1/2) feet above the natural grade or any tree or a group of trees particularly worthy of protection and specifically designated as a heritage tree by the board of supervisors pursuant to the provisions of this chapter, because of:

  (A) Having historical or ecological interest or significance; or

  (B) Being dependent upon each other for health or survival; or

  (C) Being considered an outstanding specimen of its species as to such factors as location, size, age, rarity, shape, or health.

- **Protected tree.** A subject tree that is adjacent to or part of a riparian, foothill woodland, or oak savanna area, or part of four or more trees, that measures twenty (20) inches or larger in circumference (6.4 inches in diameter) at breast height (measured 4.5 feet above natural grade). Subject trees include any California buckeye (*Aesculus californica*), California juniper (*Juniperus californica*), coast live oak (*Quercus agrifolia*), blue oak (*Quercus douglasii*), valley oak (*Quercus lobata*), or native blue or red elderberry (*Sambucus nigra* subsp. *caerulea* or *S. racemosa* var. *racemosa*). Heritage trees are also protected trees by this definition.

LSA used a PDF of the grading plan to designate a survey area which was overlaid on a map with aerial imagery. The arborist brought this map into the field and numbered the trees as they were inventoried. Tree locations were also recorded using a submeter accurate GPS unit. Because GPS reception is poor under the canopy of mature trees, the arborist used a TruPulse 360R laser rangefinder with the GPS to calculate offsets to the tree locations while standing outside of the tree canopies. Trees that had any grading within the drip line were considered to be permanently impacted.

LSA also reviewed the current Contra Costa County General Plan's Conservation Element to ensure that any future tree removal on the site would be consistent with its goals.

RESULTS

A total of 123 trees were surveyed in the study area representing 6 species (Table A, Figure 2). All tree species in the study area are native to the region. A total of 120 of the surveyed trees are considered "protected" trees as defined by the Ordinance and 3 are non-protected. Additionally, 86 of these "protected" trees are also considered to be "heritage" trees by the Ordinance. The trunk diameter/circumference of 3 trees do not meet the protected tree definition and are classified as non-protected. Table B contains additional information on the protected, non-protected, and heritage trees identified within the study area including: tree ID number; common and scientific name; trunk circumference; trunk diameter; condition; heritage tree status; protected tree status; and impact category (removal or retained). Based on a comparison of the tree map and the project plan, the project will remove 77 protected trees (including 52 heritage trees). The project will also

remove 2 non-protected trees. The project will have no impact (retain) on 44 trees (43 protected trees and 1 non-protected tree).

Permanent Impacts to Trees. The project will permanently remove 77 protected trees including 8 California buckeye (6 heritage, 2 protected), 2 coast live oak (heritage), 63 blue oak (40 heritage, 23 protected), 3 valley oak (heritage), and 1 blue elderberry (heritage). The project will also remove 2 non-protected blue oak trees.

No Impact. A total of 44 trees (43 protected trees and 1 non-protected tree) identified within the study area will not be impacted by the project. Trees that will be retained include 1 California juniper (protected), 1 coast live oak (heritage), 37 blue oak (29 heritage, 7 protected, and 1 non-protected), and 5 valley oak (4 heritage, 1 protected).

Table A: Summary of Trees in the Study Area

Species Classification	Trees Within Study Area	Remove	Retain
California buckeye (*Aesculus californica*)			
Heritage	6	6	–
Protected	2	2	–
California juniper (*Juniperus californica*)			
Protected	1	–	1
Coast live oak (*Quercus agrifolia*)			
Heritage	3	2	1
Blue oak (*Quercus douglasii*)			
Heritage	69	40	29
Not protected	3	2	1
Protected	30	23	7
Valley oak *(Quercus lobata)*			
Heritage	7	3	4
Protected	1	–	1
Blue elderberry (*Sambucus nigra* subsp. *caerulea*)			
Heritage	1	1	–
Total	**123**	**79**	**44**

Source: LSA (2020).
Note: A heritage tree is any tree 72 inches or greater in circumference (22.9 inches in diameter) measured 4.5 feet above the natural grade, and a protected tree is any locally native tree that measures 20 inches or larger in circumference (6.4 inches in diameter) at breast height (measured 4.5 feet above natural grade). Heritage trees are also considered protected trees.

CONCLUSIONS

The project requires the removal of 77 protected trees (including 52 heritage) and the retention of 44 trees (34 heritage, 9 protected, and 1 non-protected). The planned removal of protected trees will be reviewed by the County. The County, at its discretion, may require mitigation for the removal of protected trees. The General Plan Conservation Element includes the following goals:

8-6. Significant trees, natural vegetation, and wildlife populations generally shall be preserved.

8-28. Efforts shall be made to identify and protect the County's mature native oak, bay, and buckeye trees.

The General Plan Vegetation and Wildlife Implementation Measures include:

8-h. Amend the ordinance to require developers to pay mitigation costs according to an adopted schedule, such as requiring, where appropriate, and to the extent legally permissible, that three new trees be planted for every one mature tree removed as part of a development. Replacement trees should be the same or a similar species as the tree removed, and should be native species or naturalized species which are well-adapted to the site's conditions without posing a threat of invasion into surrounding lands.

To offset impacts related to protected tree removal, LSA recommends replacing the protected trees onsite with a mix of the same species at a 3:1 ratio.

Tree planting should be monitored for successful establishment of installed trees. Establishment will be considered successful if 50 percent of the number of plantings required by the County have become established with no significant intervention for at least two years.[2]

TREE PROTECTION MEASURES

The following standard recommendations are made to protect retained trees during project construction.

Tree Avoidance. The project plan should avoid as many protected trees as feasible. The project plan should incorporate placement of tree protection fencing outside of the avoided trees' drip line. Preserved trees on the project site should be avoided during construction by following best management practices as outlined in the following paragraphs.

Tree Maintenance During Construction, Root Zones. Tree roots often extend far beyond the canopy drip line. Excavation work within the drip line of avoided trees shall not be allowed.

Tree Protection Fencing. Prior to the start of fill disposal, Tree Protection Fencing (TPF) should be installed. The TPF should be maintained during the entire fill disposal process to prevent direct damage to trees and their growing environment. The TPF should consist of blaze orange barrier fencing supported by metal "T rail" fence posts. The TPF should be placed at a distance that is at or outside of the drip lines of avoided trees. The TPF should be installed as part of the site preparation before fill disposal or tree removal/trimming begins and should be installed under the supervision of a qualified arborist. The TPF should not be altered in any way that would increase the encroachment on the avoided trees during fill activities.

[2] Significant intervention in the context of this performance standard is considered to include new plantings and ongoing regular excess of watering necessary to establish a planting (i.e., twice monthly or more frequently through the dry season). Periodic watering to assist established trees during drought or excessive heat is not considered to meet the "substantial intervention" standard for this project.

Use of Heavy Equipment. Heavy machinery should not be allowed to operate (excavation, grading, drainage and leveling) or park within the drip line of avoided trees unless approved by a qualified arborist.

Storage of Construction Materials and Debris. Fill materials should not be placed against the trunks of avoided trees. Disposal or depositing of oil, gasoline, chemicals or other harmful materials within the drip line is prohibited.

Incidental Damage to Protected Trees. The attachment of wires, signs, and ropes to any protected tree is strictly prohibited. Workers may be allowed to rest under trees, but they must not injure trees by any means. The County shall be notified if any damage occurs to a retained tree during fill disposal so that proper treatment may be administered.

Trimming. All pruning of protected trees shall be performed by a licensed contractor familiar with International Society of Arboriculture pruning guidelines and shall comply with the guidelines established by the International Society of Arboriculture, Best Management Practices, Tree Pruning, and any special conditions as determined by a certified arborist or the County's Director. A certified arborist shall coordinate all activities involving protected trees.

SUMMARY

- A total of 123 trees were identified in the survey area;
- The project will require the removal of 77 protected trees;
- Of the 77 protected trees to be removed, 52 are heritage trees;
- The County may require replacement of protected trees at a ratio of 3:1.
- Recommended mitigation for removal of protected trees includes planting and maintaining (until established) 231 trees on site, consisting of a mix of the same species that will be removed: California buckeye, coast live oak, blue oak, valley oak, and blue elderberry.

Please feel free to contact me or Malcolm Sproul if you have questions or comments.

Sincerely,

LSA Associates, Inc.



John Kunna
Senior Biologist

Attachments: Figure 1: Regional and Project Location
Figure 2: Tree Map
Table B: Tree Table



LSA

FIGURE 1

N

0 1000 2000

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Cemex Clayton Quarry
Contra Costa County, California

Regional and Project Location

SOURCE: ESRI StreetMap North America (2012).

I:\CMX1501\GIS\Maps\Tree Survey\Figure 1_Regional and Project Location.mxd (6/26/2015)

LSA

LEGEND

Tree to Remain

Tree to be Removed

Limit of Grading

N

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SOURCE: USGS Orthoimagery (04/2011).

I:\CMX1501\GIS\Maps\Tree Survey\Figure 2_Tree Survey.mxd (6/26/2015)

FIGURE 2

Cemex Clayton Quarry
Contra Costa County, California

Tree Survey

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
1	Blue oak *(Quercus douglasii)*	195	62	Fair	Yes	Yes	Retain
2	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Retain
3	Blue oak *(Quercus douglasii)*	188	60	Good	Yes	Yes	Retain
4	Valley oak *(Quercus lobata)*	188	60	Good	Yes	Yes	Retain
5	Valley oak *(Quercus lobata)*	226	72	Good	Yes	Yes	Retain
6	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
7	California juniper *(Juniperus californica)*	38	12	Good	Yes	No	Retain
8	Valley oak *(Quercus lobata)*	75	24	Good	Yes	Yes	Retain
9	Valley oak *(Quercus lobata)*	94	30	Good	Yes	Yes	Retain
10	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
11	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Retain
12	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
13	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
14	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
15	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
16	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
17	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Retain
18	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Retain
19	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
20	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
21	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain
22	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Retain
23	Blue oak *(Quercus douglasii)*	31	10	Good	Yes	No	Retain
24	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Retain

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
25	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Retain
26	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
27	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
28	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Retain
29	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Retain
30	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Retain
31	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Retain
32	Blue oak *(Quercus douglasii)*	19	6	Good	No	No	Retain
33	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
34	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
35	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
36	Blue oak *(Quercus douglasii)*	19	6	Good	No	No	Remove
37	Blue oak *(Quercus douglasii)*	132	42	Good	Yes	Yes	Remove
38	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
39	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
40	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
41	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
42	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
43	Blue oak *(Quercus douglasii)*	31	10	Good	Yes	No	Remove
44	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
45	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
46	Blue oak *(Quercus douglasii)*	19	6	Good	No	No	Remove
47	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
48	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
49	Blue oak *(Quercus douglasii)*	31	10	Poor	Yes	No	Remove
50	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
51	Blue oak *(Quercus douglasii)*	25	8	Good	Yes	No	Remove
52	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
53	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
54	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
55	Blue oak *(Quercus douglasii)*	44	14	Good	Yes	No	Remove
56	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
57	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
58	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
59	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
60	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
61	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
62	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
63	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
64	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
65	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
66	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
67	Blue oak *(Quercus douglasii)*	226	72	Good	Yes	Yes	Remove
68	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
69	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
70	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
71	Blue oak *(Quercus douglasii)*	94	30	Good	Yes	Yes	Remove
72	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
73	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
74	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
75	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
76	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
77	Blue oak *(Quercus douglasii)*	163	52	Good	Yes	Yes	Remove
78	California buckeye *(Aesculus californica)*	31	10	Good	Yes	No	Remove
79	California buckeye *(Aesculus californica)*	163	52	Good	Yes	Yes	Remove
80	California buckeye *(Aesculus californica)*	75	24	Good	Yes	Yes	Remove
81	California buckeye *(Aesculus californica)*	57	18	Good	Yes	No	Remove
82	California buckeye *(Aesculus californica)*	163	52	Fair	Yes	Yes	Remove
83	California buckeye *(Aesculus californica)*	151	48	Good	Yes	Yes	Remove
84	California buckeye *(Aesculus californica)*	151	48	Good	Yes	Yes	Remove
85	California buckeye *(Aesculus californica)*	113	36	Fair	Yes	Yes	Remove
86	Valley oak *(Quercus lobata)*	151	48	Good	Yes	Yes	Remove
87	Valley oak *(Quercus lobata)*	188	60	Good	Yes	Yes	Remove
88	Blue elderberry (*Sambucus nigra* subsp. *caerulea*)	94	30	Good	Yes	Yes	Remove
89	Coast live oak *(Quercus agrifolia)*	151	48	Good	Yes	Yes	Remove
90	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
91	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
92	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
93	Blue oak *(Quercus douglasii)*	31	10	Good	Yes	No	Remove
94	Blue oak *(Quercus douglasii)*	31	10	Good	Yes	No	Remove
95	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
96	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
97	Blue oak *(Quercus douglasii)*	31	10	Good	Yes	No	Remove
98	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
99	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
100	Blue oak *(Quercus douglasii)*	38	12	Good	Yes	No	Remove
127	Blue oak *(Quercus douglasii)*	57	18	Good	Yes	No	Remove
128	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
129	Blue oak *(Quercus douglasii)*	163	52	Good	Yes	Yes	Remove
130	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Remove
131	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
132	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
133	Valley oak *(Quercus lobata)*	57	18	Good	Yes	No	Retain
134	Coast live oak *(Quercus agrifolia)*	163	52	Fair	Yes	Yes	Retain
135	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Retain
136	Blue oak *(Quercus douglasii)*	75	24	Good	Yes	Yes	Retain
137	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
138	Blue oak *(Quercus douglasii)*	188	60	Good	Yes	Yes	Remove
139	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
140	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
141	Blue oak *(Quercus douglasii)*	100	32	Good	Yes	Yes	Retain
142	Blue oak *(Quercus douglasii)*	188	60	Good	Yes	Yes	Retain
143	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Retain
144	Blue oak *(Quercus douglasii)*	100	32	Good	Yes	Yes	Retain
145	Blue oak *(Quercus douglasii)*	113	36	Good	Yes	Yes	Remove
146	Coast live oak *(Quercus agrifolia)*	75	24	Poor	Yes	Yes	Remove

Table B: Trees on the Cemex Clayton Quarry Project Site

Tree #	Common Name (*Species Name*)	Circumference (inches)	Diameter (inches)	Condition	Protected	Heritage	Remove or Retain
147	Blue oak *(Quercus douglasii)*	151	48	Good	Yes	Yes	Remove
148	Blue oak *(Quercus douglasii)*	151	48	Fair	Yes	Yes	Remove
149	Valley oak *(Quercus lobata)*	163	52	Good	Yes	Yes	Remove

Source: LSA (2020).

APPENDIX E-3

CLEAN WATER ACT JURISDICTIONAL DELINEATION

LSA ASSOCIATES, INC.
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CARLSBAD
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PALM SPRINGS
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

September 10, 2015

Katerina Galacatos
South Branch Chief
U. S. Army Corps of Engineers
1455 Market Street, 16th Floor
San Francisco, CA 94103-1398

Subject: Clean Water Act Jurisdictional Delineation
Cemex Clayton Quarry, Clayton, California

Dear Katerina:

This letter presents the results of a recent CWA jurisdictional delineation performed by LSA for a portion of the Cemex Clayton Quarry in Contra Costa County, California. Cemex requests verification of the included data and map as a Preliminary Jurisdictional Delineation pursuant to Corps RGL 08-02.

Cemex is proposing to permanently place quarry overburden spoils at a location to the south of their existing quarry pit. This location is referred to here and on project plans as the Permanent Overburden Fill Area ("Fill Area"). The Study Area for this delineation encompasses the proposed footprint of the Fill Area site plus additional surrounding area to accommodate heavy equipment traffic.

STUDY AREA DESCRIPTION

Location

The Cemex Clayton Quarry is located on the west side of Mitchell Canyon Road about one mile south of Clayton Valley Road and three-quarters of a mile north of the Mitchell Canyon entrance to Mount Diablo State Park. The site is situated within Section 23 of Township 1 North, Range 1 West on the Clayton, California 7.5-minute USGS quadrangle, and is centered at 37.921082° North Latitude and -121.946257° West Longitude. Figures 1 and 2 (attached) depict the regional location and study site location respectively.

The Study Area encompasses a ravine and a debris retention basin at the bottom of the ravine that are located adjacent to older overburden spoil piles and entirely within property owned by Cemex.

Land Use

Part of the Study Area includes older overburden spoil slopes that have been in place for an indeterminate period of time. Below the ravine a debris and sediment basin has been installed as a standard precaution should the overburden mound at the head of the ravine generate a debris flow. The remainder of the area is covered by Cemex's vested mining rights but is not currently being mined.

Plant Communities

The Study Area is composed primarily of steep, grassy hillside surrounding the ravine. Older quarry overburden deposits at the western edge of the Study Area support chaparral and ruderal cover. Black sage (*Salvia mellifera*) is the dominant species with California sagebrush (*Artemisia californica*) sticky monkeyflower (*Mimulus aurantiacus*) and yerba santa (*Eriodictyon californicum*) present around the margins of the stand, particularly along its upper elevation. Deer weed (*Lotus scoparius*), an herbaceous perennial, grows in openings and along the margins of the chaparral.

The ravine itself contains a mature riparian woodland composed of blue oak (*Quercus douglasii*), buckeye (*Aesculus californica*), and valley oak (*Quercus lobata*). The understory is composed of either chaparral species or non-native grassland. The channel in the ravine is devoid of vegetation due to canopy shading and occasional scour.

Soils

The Natural Resources Conservation Service has mapped the study area as Gilroy clay loam, 30-50 percent slopes (Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/ WebSoilSurvey.aspx, accessed on 24 June 2015). This map unit is described as a typically well-drained, shallow clay loam soil. Depth to bedrock is 20 to 40 inches.

METHODS

Clean Water Act Jurisdiction

The field investigations of potentially jurisdictional wetlands were conducted using the routine determination method provided in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the revised procedures in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Arid West Supplement; U.S. Army Corps of Engineers 2008). This methodology entails examination of specific sample points within potential wetlands for hydrophytic vegetation, hydric soils, and wetland hydrology. By the federal definition, all three parameters must be present for an area to be considered a wetland.

FIELD METHODS

LSA soil scientist Sean Lohmann investigated the site on April 23, 2015. At that time significant rainfall had not fallen in several weeks. Rainfall during the preceding winter and spring was below average overall, but December rainfall had been quite heavy and well above the historical mean.

LSA mapped the watercourse in the ravine using a global positioning system (GPS) receiver with sub-meter accuracy. No potential wetlands are present in the Study Area so LSA had no need to apply federal wetland delineation methodology.

OBSERVATIONS

Stream. The natural head of the ravine has been cut off by historic placement of quarry overburden spoils so that the channel in the ravine bottom starts abruptly at the toe of the spoil slope. From that point the channel proceeds southeast for about 300 feet before ending at the constructed debris basin. There is no scour or further evidence of surface flow after the channel reaches the basin.

As stated previously, the channel doesn't support vegetation at any point. Some segments of the channel are too deeply shaded by overhanging canopy, while others have been scoured clear of loose soil.

On April 23, 2015 the majority of the channel length was covered with a thin mud flow that must have occurred during the heavy rains in December 2014. Rainfall after December was too light to generate much runoff. The mud flow filled the channel bottom to a depth of several inches and is composed of gravelly spoils. The flow does not extend to the debris basin. In places where the mud flow overlies the previous channel and previous high water line, LSA used the width of the mud flow itself to define the jurisdictional channel width.

LSA also observed a 30-foot gully segment adjacent to the channel that was scoured out by a cascade of runoff originating near the quarry. This runoff is not channelized within the quarry but upon reaching the upper slope of the ravine the runoff converges into a cascade that has scoured a distinct gully into the side of the ravine. The gully may have been caused by the December rainfall as well because it appeared to be a recent feature. It is quite shallow and little vegetation had re-grown in scoured areas in May, 2015.

LSA is not mapping the gully as an extension of the natural channel described above because it has characteristics that are more consistent with an erosional gully feature.

Debris Basin. The debris basin is constructed on and in a mass of quarry overburden spoils. Gravelly spoils form both the bottom and surrounding walls of the basin. For this reason the basin contains no high water line and supports no wetland cover. Any water entering the basin from the ravine soaks into the coarse spoils too rapidly for any ponding or saturation to take place.

Plant cover in the basin is upland non-native grasses and weeds, similar to the plant cover on spoils elsewhere in the vicinity. There is no channel or high water line in the basin.

Wetland. There are no wetland plant communities or apparent waterbodies of any size in the Study Area. The streambed supports no wetland vegetation.

CONCLUSIONS

Potential Clean Water Act Section 404 jurisdictional features identified in the Study Area are limited to one stream. The stream is 300 feet long and covers 1,800 square feet. The stream flows into a constructed debris basin that lacks any evidence of ponding and does not support a wetland plant community.

There are no other potential waters of the United States in the Study Area.

The findings and conclusions presented in this report, including the location and extent of waters subject to regulatory jurisdiction, represent the professional opinion of LSA. Conclusions regarding the extent of Clean Water Act jurisdiction should be considered preliminary until verified by the Corps.

Please contact me at (510) 236-6810 if you have questions about our findings.

Sincerely,

LSA ASSOCIATES, INC.



Sean Lohmann
Associate

Attachments: Figure 1: Regional Location;
Figure 2: Site Location;
Figure 3: Potential Waters of the United States

cc: Ron Wilson, Cemex; Malcolm Sproul, LSA



LSA

FIGURE 1

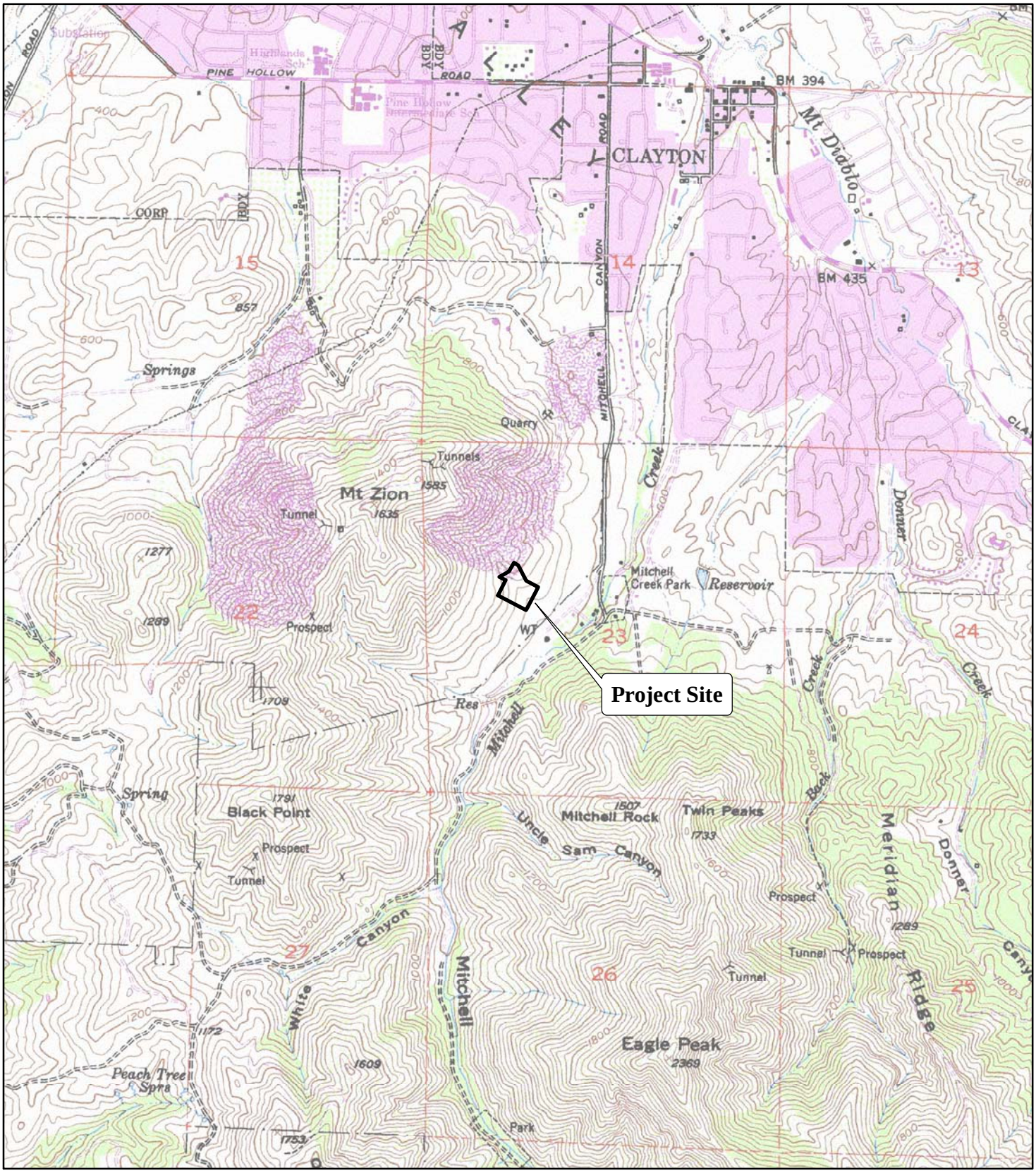
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Cemex Clayton Quarry
Contra Costa County, California

Regional Location

SOURCE: ESRI StreetMap North America (2012).

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LSA

FIGURE 2

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Cemex Clayton Quarry
Contra Costa County, California

Site Location

SOURCE: USGS 7.5-minute Topo Quad - *Clayton, Calif.* (1980).

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LSA

LEGEND

Delineation Study Area

Erosional Gully, non-jurisdictional

WATERS OF THE UNITED STATES

Other Waters

Stream Segment

FIGURE 3

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FEET

Cemex Clayton Quarry
Contra Costa County, California

Potential Waters of the United States

SOURCE: USGS Orthoimagery (04/2011).

I:\CMX1501\GIS\Maps\Delineation\Figure 3_Potential Waters of the US.mxd (7/6/2015)

APPENDIX F

GEOTECHNICAL EVALUATIONS FOR REVISED RECLAMATION PLAN

REPORT

GEOTECHNICAL EVALUATIONS FOR REVISED RECLAMATION PLAN

Clayton Quarry, Clayton, California

Submitted To:

Deborah G. Haldeman
CEMEX Construction Materials Pacific, LLC
2365 Iron Point Road, Suite 120
Folsom, California, 95630

Submitted By:

Golder Associates Inc.
425 Lakeside Drive
Sunnyvale, CA 94085

Distribution:

Deborah G. Haldeman, CEMEX
Yasha Saber, Compass Land Group
Golder Associates, Sunnyvale, CA

May 2017

Project No. 1661332

Golder Associates

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GEOTECHNICAL EVALUATIONS FOR REVISED RECLAMATION PLAN

Clayton Quarry, Clayton, California

Prepared By and Under the Direction of:

Shelby McManus
Staff Geotechnical Engineer

George Lightwood
Senior Engineer

William L. Fowler, P.G. 4401, C.E.G. 1401
Principal/Project Director

Table of Contents

1.0 INTRODUCTION 1
1.1 Site History 2
1.2 Scope of Work 3
1.2.1 Evaluation of West Pit Slope Stability (January 2015) 3
1.2.2 Evaluation of East Pit Slope Stability and Future Overburden Fill Areas (March 2016) 3
1.2.3 Geotechnical Investigation and Proposed Improvement Recommendations for the Existing Overburden Fill Area (North OFA) (October 2016) 3
1.3 Method of Work 4
1.3.1 West Quarry Wall 4
1.3.2 South OFA and East Wall Slope Stability 5
1.3.3 North OFA and Landslide Stability 5
1.4 Available Data 5
2.0 SITE DESCRIPTION 6
2.1 Site Topography and Layout 6
2.2 Climatic Conditions 6
2.3 Geologic Setting 6
2.3.1 Lithology of the Clayton Quarry 7
2.3.2 Structural Conditions 7
2.3.3 Groundwater Conditions 8
2.4 Seismicity 8
2.5 Quarry Development 9
3.0 SITE RECONNAISSANCE AND SUBSURFACE EXPLORATIONS 10
3.1 Site Reconnaissance and Mapping 10
3.1.1 Pit Slope Stability 11
3.1.2 Knoxville-Diabase Contact 11
3.1.3 North OFA Reconnaissance 11
3.2 Subsurface Explorations 12
3.2.1 2015 Drilling Program 12
3.2.2 2016 Drilling Program 13
4.0 LABORATORY TESTING 14
4.1 Point Load Tests on Rock 15
4.2 Laboratory Tests on Soil Samples 16
4.2.1 Soil Index Tests 16
4.2.2 Compaction Tests (2014) 18
4.2.3 Consolidated Undrained Triaxial Shear Tests (2014) 18
4.2.4 Torsional Ring Shear Tests (2016) 18
4.2.5 Direct Shear Tests (2016) 19

5.0 GEOTECHNICAL CHARACTERIZATION 20
5.1 Bedrock Units 20
5.1.1 Uniaxial Compressive Strength 20
5.1.2 Rock Mass Quality (GSI) 21
5.1.3 Rock Structure 22
5.1.3.1 Major Structures 23
5.1.3.2 Rock Fabric 23
5.1.3.3 Structural Domains 24
5.2 Native Soils 24
5.3 Overburden Fill 25
5.4 Groundwater Conditions 25
5.5 Slope and Bench Conditions 26
5.5.1 Overall Slope 26
5.5.2 Benches 26
5.6 Controls on Slope Stability 27
5.6.1 Seismic Slope Stability of Rock Slopes 28
5.6.2 Rockfall 28
6.0 ENGINEERING ANALYSIS OF PIT SLOPES 29
6.1 Kinematic Analyses of Overall Slopes and Benches 30
6.1.1 Kinematic Analyses of Overall Western Slope and Benches 30
6.1.1.1 Large Scale Structurally Controlled Failures 30
6.1.1.2 Bench Scale Stability (West, North, and South Walls) 31
6.1.2 Kinematic Analyses of Overall Eastern Slope and Benches 31
6.2 Limit Equilibrium Analyses of Quarry Pit Slopes 32
6.2.1 Methodology 32
6.2.2 Rock Mass Properties 33
6.2.3 Seismic Loading 34
6.2.4 Results of Analysis 35
6.3 Supplemental Analyses of Knoxville Slopes (East Wall of Quarry) 36
6.3.1 Natural Slopes versus Cut Slopes 36
6.3.2 Analyses of Shear Strength Sensitivity 37
6.3.3 Stability of Submerged Knoxville and Knoxville/Diabase Contact Zone 39
6.3.4 Potential Wave Erosion of East Wall 41
7.0 STABILITY ANALYSIS OF SOUTH OVERBURDEN FILL SLOPES 41
7.1 Methodology 41
7.2 Material Properties 42
7.3 Results 43
8.0 STABILITY ANALYSIS OF NORTH OVERBURDEN FILL AREA (OFA) SLOPE FAILURE 44

8.1 Methodology 44
8.2 Material Properties 45
8.2.1 Existing Overburden Fill 46
8.2.2 Coarse Grained Residual Soil 46
8.2.3 Fine Grained Residual Soil (Slide Plane) 46
8.2.4 Buttress (Overburden Fill) 46
8.3 Seismic Loading 47
8.4 Assumptions 47
8.5 Results of Analysis 48
9.0 SEICHE GENERATED BY ROCKFALL 48
10.0 CONCLUSIONS 49
10.1 West Quarry Slopes 50
10.2 East Quarry Slopes 51
10.3 South Overburden Fill Area (South OFA) 51
10.4 North Overburden Fill Area (North OFA) 51
10.5 Seiche Generated by Rockfall 52
11.0 USE OF THIS REPORT 52
12.0 REFERENCES 52

List of Tables

Table 2.1 Proposed Quarry Bench Configurations
Table 4.1 Summary of Laboratory Tests Performed on Soil Samples from all Testing Programs
Table 4.2 Uniaxial Compressive Strength from Point Load Tests
Table 4.3 Laboratory Results of Soil Index Tests
Table 4.4 Laboratory Results of Compaction Test
Table 4.5 Laboratory Results of Torsional Ring Shear Tests
Table 4.6 Laboratory Results Direct Shear Tests
Table 5.1 Characteristic UCS by Rock Type
Table 5.2 Geologic Strength Index (GSI) by Rock Type
Table 5.3 Description of Rock Fabric by Rock Type
Table 6.1 Rock Mass Properties for Quarry Pit Slope Stability Analyses
Table 6.2 Results of Quarry Pit Slopes Stability Analyses
Table 6.3 Material Properties for Shear Strength Sensitivity Analysis of Knoxville and Diabase
Table 6.4 Results for Steepest Slopes in Knoxville Formation Assuming Best Estimate of Shear Strength
Table 6.5 Results of Slope Stability Analyses with Reduced Shear Strength in Knoxville Formation
Table 6.6 Results of Slope Stability Analyses of Submerged Knoxville and Contact Zone
Table 7.1 Material Properties for South OFA Overburden Fill and Foundation
Table 7.2 Results of Infinite Slope Analyses for Overburden Fills
Table 7.3 Results of Proposed South OFA Slope Stability Analysis
Table 8.1 Material Properties for North OFA Stability and Slide Area
Table 8.2 Results of North OFA Ultimate Buttress Design Slope Stability Analysis

List of Figures

Figure 1.1 Site Location
Figure 1.2 Overall Site Layout
Figure 1.3 Overburden Fill Area Layout
Figure 2.1 Site Geology
Figure 2.2 Photograph of South and West Quarry Walls
Figure 2.3 Photograph of North Quarry Wall
Figure 2.4 Photograph of East Quarry Wall
Figure 2.5 Bench Configuration Terminology
Figure 5.1 Geologic Strength Index (GSI)
Figure 5.2 West Quarry Wall Bedrock Discontinuities
Figure 6.1 West Quarry Wall – Overall Slope Stability at End of Quarry Operations
Figure 6.2 West Quarry Wall – Overall Slope Stability for Reclaimed Pit with Pit Lake at 735 ft
Figure 6.3 East Quarry Wall – Overall Slope Stability at End of Quarry Operations
Figure 6.4 East Quarry Wall – Overall Slope Stability for Reclaimed Pit with Pit Lake at 735 ft
Figure 6.5 East Quarry Wall – Knoxville to Diabase Stability at End of Quarry Operations
Figure 6.6 East Quarry Wall – Knoxville to Diabase Stability for Reclaimed Pit with Pit Lake at 735 ft
Figure 6.7 East Quarry Wall – Knoxville to Contact Zone Stability at End of Quarry Operations
Figure 6.8 East Quarry Wall – Knoxville to Contact Zone Stability for Reclaimed Pit with Pit Lake at 735 ft
Figure 6.9 East Quarry Wall – Knoxville Stability at End of Quarry Operations
Figure 6.10 East Quarry Wall – Knoxville Stability for Reclaimed Pit with Pit Lake at 735 ft
Figure 6.11 Photograph of Existing Knoxville Slopes
Figure 6.12 Existing Knoxville Slopes – Overall Slope Stability
Figure 6.13 Steepest Slopes in Knoxville – Overall Slope Stability – Best Estimate of Shear Strength
Figure 6.14 Proposed Slopes in Knoxville – Overall Slope Stability at End of Operations – Reduced Shear Strength
Figure 6.15 Proposed Slopes in Knoxville – Overall Slope Stability for Reclaimed Pit with Pit Lake at 735 ft – Reduced Shear Strength
Figure 6.16 Proposed Slopes in Knoxville – Single Bench Stability at End of Operations – Reduced Shear Strength
Figure 6.17 Proposed Slopes in Knoxville – Single Bench Stability for Reclaimed Pit with Pit Lake at 735 ft – Reduced Shear Strength
Figure 6.18 Photograph of Existing Bench Slopes in Knoxville-Diabase Contact
Figure 6.19 Submerged Knoxville/Diabase Contact – Knoxville Stability for Reclaimed Pit with Pit Lake at 735 ft – Best Estimate of Shear Strength
Figure 6.20 Submerged Knoxville/Diabase Contact – Knoxville to Contact Zone Stability for Reclaimed Pit with Pit Lake at 735 ft – Best Estimate of Shear Strength
Figure 6.21 Submerged Knoxville/Diabase Contact – Knoxville Stability for Reclaimed Pit with Pit Lake at 735 ft – Reduced of Shear Strength
Figure 6.22 Submerged Knoxville/Diabase Contact – Knoxville to Contact Zone Stability for Reclaimed Pit with Pit Lake at 735 ft – Reduced Shear Strength
Figure 7.1 Proposed South OFA – Overall Slope Stability of Fill Slopes
Figure 7.2 Proposed South OFA – Fill/Foundation Contact Stability
Figure 7.3 Proposed South OFA – Foundation Stability
Figure 8.1 Slide Plane Material (Residual Soil from Knoxville) – Back Analysis of Shear Strength
Figure 8.2 North OFA Ultimate Buttress – Block Failure Stability
Figure 8.3 North OFA Ultimate Buttress – Buttress Fill Slope Stability

List of Appendices

Appendix A Exploration Data
Appendix B Laboratory Test Results
Appendix C Seiche Analysis

Appendix D North OFA Construction Drawings

1.0 INTRODUCTION

Golder Associates Inc. (Golder) is pleased to provide this Geotechnical Evaluations for Revised Reclamation Plan for the Clayton Quarry operated by Cemex Construction Materials Pacific, LLC. (Cemex) and located near Clayton, California (Figure 1.1). This report is prepared in support of a revised application for Reclamation Plan amendment for Clayton Quarry (Reclamation Plan), and consolidates the analysis and conclusions of prior Golder studies to facilitate incorporation into the proposed Reclamation Plan. Specifically, this report presents the results of field and engineering studies, provides Golder's conclusions and recommendations regarding the stability of high rock slopes within the limits of the quarry, proposes slope stability improvements for remediation of slope failures in the North Overburden Fill Area (OFA), and contains recommendations for construction of overburden fill areas to the south of the existing North OFA.

The overall purpose of this report is to provide information pertaining to the stability of reclaimed quarry slopes and OFA that will be incorporated in Cemex's Reclamation Plan for the site.

Since 2013, Golder has performed four separate phases of work to address geotechnical issues relating to slope stability and placement of overburden at Clayton Quarry. These studies included:

- The pitslope stability and rockfall hazards of the western quarry sector (i.e., diabase highwalls),
- Quarry pitslope stability on the east side of the quarry (Knoxville highwall), and
- Geotechnical investigations and stability improvements related to existing and proposed OFA's, and
- Analysis of a potential seiche related to rockfall into a future pit lake.

The following sections detail the results of Golder's studies and present Golder's recommendations for pit slope stability, placement of overburden fill at the South OFA, and remediation of the North OFA. It is Golder's understanding that our recommendations have been incorporated into Cemex's proposed Reclamation Plan for the quarry to meet the pit slope and overburden fill requirements of the Surface Mining and Reclamation Act of 1975 (SMARA). SMARA requires that reclaimed quarry slopes and overburden piles have a minimum factor-of-safety that is suitable for their proposed end use (i.e., 14 CCR section 3704). To demonstrate that the reclaimed slopes are stable, Golder performed: site visits to observe and map existing conditions, subsurface investigations, laboratory testing, and stability analyses on selected quarry and overburden fill slopes with the highest likelihood of instability. The purpose of these analyses was to demonstrate using industry-standard methods and procedures that the reclaimed slopes would be stable under both static and pseudo-static (seismic) loading.

For static loading, the minimum acceptable factor-of-safety (FOS) is typically between 1.20 and 1.30 for slopes with a low consequence of failure (Duncan and Wright, 2004; Read and Stacey, 2009). Since the proposed end use at the Quarry is open space, Golder considers a FOS value of 1.30 to be appropriate for application to the Clayton Quarry. For seismic loading, and using pseudo-static methods, Golder considers a minimum FOS value of 1.00 to be appropriate.

For the post-closure conditions of the Clayton Quarry site, the minimum factors-of-safety (FOS) are:

- Static Loading Only: FOS greater than or equal to (≥) 1.30
- Seismic Loading: FOS greater than or equal to (≥) 1.00

1.1 Site History

Development of the Clayton Quarry (previously operated by RMC – Pacific Materials) began in 1947 for mining of construction aggregates. The rock material was mined for production and processing of construction materials consisting of diabase rock. Mining of the rock material commenced on the eastern facing slope of Mount Zion. As mining continued, the high, steep slopes on the west, north and south sides of the quarry were developed. As the quarry progressed deeper, the quarry floor extended below the existing ground surface so as to create slopes on the east side of the quarry.

As the quarry expanded to the east, soil and rock materials that are not suitable for the production of construction aggregate were encountered. These overburden materials overlie the rock used for production of construction aggregate. They are excavated and placed in stockpiles on the quarry property.

Overburden materials from the quarry were primarily placed in the vicinity of the North Overburden Fill Area (OFA), bound by the quarry to the west and Mitchell Canyon Road to the east (Figure 1.2). The North OFA has been utilized since the 1960's and has a history of some instability, with a landslide documented in 2000, and more recently, renewed slope instability in the spring of 2016. The unstable slope area and head scarp locations are presented in Figure 1.3. It is Golder's understanding that previous remediation activities at the OFA included regrading, installation of subsurface drainage, and subsequent placement of embankment fill. This work was performed when the property was operated by RMC-Pacific Materials (RMC) and records of previous geotechnical work are sparse.

The topography within the OFA, including ground surface elevations of the slide area, have been modified over the last 17 years as regrading of the slope was performed and additional overburden fill was placed in the OFA. Further remedial grading is currently in progress pursuant to Contra Costa County authorization under Grading Permit BLG16-011287, to unload the head of the landslide, improve drainage, and to develop a shear key and gravity buttress in the toe of the slide area (Golder 2016c).

1.2 Scope of Work

The studies performed by Golder and described in this report were focused on the following issues:

- West quarry highwall pit slope stability
- East quarry highwall pit slope stability,
- Future overburden fill areas (South OFA)
- Stability and improvements for existing overburden fill area (North OFA)

The work was performed in a phased approach as outlined below.

1.2.1 Evaluation of West Pit Slope Stability (January 2015)

The scope of work included:

- A site meeting and visit by Golder personnel to observe and map existing conditions in the quarry and collect samples of rock and overburden materials for laboratory tests
- Laboratory tests to determine the engineering properties of the rock and overburden materials
- Engineering analyses including kinematic analyses of rock slopes and limit equilibrium analyses of rock slopes

1.2.2 Evaluation of East Pit Slope Stability and Future Overburden Fill Areas (March 2016)

The scope of work included:

- Pre-field Preparation and Records Review to obtain existing information about the site and select drilling locations
- Site reconnaissance and mapping of the contact between diabase and overlying Knoxville formation as exposed in the East highwall
- Exploratory Borings consisting of:
  - Two 30-foot deep Hollow Stem Auger (HSA) borings in the existing native slope below the ridge line on the east side of the quarry where overburden will likely be placed
  - One 100-foot deep corehole along the crest of the ridge defining the east wall of the quarry
- Laboratory tests of soil and rock samples obtained from the borings and corehole
- A slope stability analysis of overall pit slope of the east side of the quarry

1.2.3 Geotechnical Investigation and Proposed Improvement Recommendations for the Existing Overburden Fill Area (North OFA) (October 2016)

Golder's scope of work included the following tasks:

- Pre-field preparation and records review to obtain existing information about the site and select drilling locations

- Topographic survey of the slide area to develop updated topography and to develop a post-slide cross-section
- Exploratory Borings consisting of three borings to depths ranging from 40 to 80 feet below the existing ground surface (bgs) in the slide area, logging subsurface conditions, and collecting samples
- Laboratory tests of soil samples for laboratory testing to classify the site materials, verify the field logs, and characterize strengths of the existing overburden fill, slide plane material, and in situ foundation materials
- Stability analyses on a critical section through the North OFA, including a back analysis of the recent landslide
- Preparation of design plans for regrading and installation of subsurface drainage to stabilize the North OFA

The results of the above described studies were compiled into this report and provided to the Cemex team to assist with preparation of the updated Reclamation Plan for the site.

1.3 Method of Work

This study was completed in three phases which are described in chronological order in the following report sections.

1.3.1 West Quarry Wall

The work for the initial study performed by Golder in 2015 was initiated at a kickoff meeting at the Clayton Quarry plant site near Clayton, California on March 12, 2014. In attendance for the kickoff meeting were personnel from Golder, Cemex, and Spinardi Associates. Spinardi Associates (Spinardi) provides civil and environmental engineering services for Cemex's Clayton Quarry. After the meeting, Golder performed a site reconnaissance program, which included:

- Observation of rock exposures in the quarry and collection of rock strength, weathering, and rock discontinuity data
- Collection of samples of rock from the quarry slope and backfill for laboratory testing
- Observation of quarry pit slopes to identify potential rockfall hazards

After the 2014 site reconnaissance was complete, the rock samples were transported to Golder's office in Reno, Nevada where point load tests were conducted. Samples of backfill were delivered to Cooper Testing Laboratory, Inc. in Palo Alto, California for soil index, compaction, and triaxial shear strength tests. After obtaining the results of laboratory testing, Golder proceeded with our engineering analyses. The substantive information, including site observations, laboratory testing, results of engineering analyses, and conclusions have been incorporated into this report.

1.3.2 South OFA and East Wall Slope Stability

Golder began work for a study of the South OFA and east wall slope on February 17, 2015 with the start of the field drilling. The 2015 subsurface explorations consisted of two hollow-stem auger borings and one corehole drilled by Gregg Drilling of Martinez, CA under subcontract to Golder. A Golder geologist logged the soil and core samples obtained from the borings, collected soil and rock samples, and transported the samples to Golder's Sunnyvale office. Soil samples from the borings were delivered to Cooper Testing Laboratory, Inc. in Palo Alto, California for soil index tests and samples of rock core were shipped to Golder's Reno, Nevada office for point load tests. After obtaining the results of laboratory testing, Golder performed slope stability analyses to evaluate the stability of the East Wall and the proposed placement of overburden fill at the South OFA. The substantive information, including results of field and laboratory testing programs, analysis methods, and conclusions have been incorporated into this report.

1.3.3 North OFA and Landslide Stability

In 2016, Golder performed a geotechnical investigation on a landslide in the area of the North OFA to provide improvement recommendations for stability. As part of field preparation activities, Golder reviewed available previous studies relating to the landslide at the OFA. Field work for this third study commenced on August 10, 2016. Golder engineers mapped seeps, surface drainages, the approximate limits of slide material (to the extent possible due to regrading); including tension cracks or head scarps at the crest of the overburden fill area, cracking along the lateral margins, and the approximate toe of the slide as indicated by bulging and heaving ground. Continued exploration in August of 2016 consisted of three borings using both hollow stem auger and triple tube coring methods drilled by GeoEx Subsurface Exploration of Dixon, California. A Golder engineer logged the subsurface conditions, collected soil and rock samples, and transported the samples to Golder's Sunnyvale office upon completion of the field investigation. After laboratory tests were completed, Golder modeled the subsurface conditions, performed a slope stability analysis, and provided design recommendations for slide remediation. The substantive information from Golder studies, including analysis methods and conclusions have been incorporated into this report.

1.4 Available Data

Cemex and their civil engineering consultant, Spinardi Associates of Piedmont, California, provided the following data to Golder:

- Site topography and aerial photograph flown in November of 2015 (Figure 1.2)
- A mining plan and sections showing proposed reclamation and final quarry slope configurations
- Reclamation Plan sheets

Ramon Nielson (Cemex) provided information on mining practices and the specific gravity of the rock based on laboratory testing performed by Cemex. Golder also reviewed published literature, maps, and reports

prepared by the California Division of Mines and Geology (Pampeyan, 1963), the United States Geological Survey (Dibblee, 1980 and Williams, 1984), and others to provide basic data and information regarding the site geology.

2.0 SITE DESCRIPTION

2.1 Site Topography and Layout

The Clayton Quarry is located approximately 3.5 miles north-northwest of Mount Diablo in central Contra Costa County, California on the east side of Mount Zion (Figure 1.1). Mount Zion is approximately 1635 feet high, with natural slope inclinations of approximately 20 to 35 degrees to the southeast in the area of the quarry. The area in the vicinity of the quarry is drained by Mitchell Creek, an intermittent stream trending to the north-northeast, and draining the northwest-slopes of Mount Diablo and the east side of Mount Zion. The elevation of Mitchell Creek, located about 1300 to 1800 feet east of the quarry, ranges from approximately 550 to 675 feet above mean sea level.

2.2 Climatic Conditions

The climate in the area of the quarry can be characterized by mild, moist winters and hot dry summers. Data from the Western Regional Climate Center (2014) indicates that mean daily temperatures range from approximately 40 to 50 degrees Fahrenheit (F) during the winter to 70 to 80 degrees F during the summer months. Frost can occur during winter months and temperatures as high as 100 to 110 degrees F can occur during the summer. The mean annual precipitation is approximately 19 inches, and almost all precipitation falls in the winter. Pampeyan (1963) reports that light snow can occur during the winter on the mountains to an elevation of about 1000 feet.

2.3 Geologic Setting

Cemex excavates rock from diabase dikes contained within the Mt. Diablo Ophiolite, which it then crushes and screens to produce construction aggregate. The Mt. Diablo Ophiolite is a local name for the Coast Range Ophiolite, a sequence of rock that formed during the Jurassic Period in the ocean at a submarine spreading center. To the west of this ophiolite sequence, a subduction zone formed where the Pacific Plate began diving below the North American Plate. As the Pacific Plate moved under the North American Plate during the Jurassic and Cretaceous Periods, ocean floor basalts and sedimentary rocks were scraped off of the subducting slab and accreted onto the western edge of the North American Plate, forming the Franciscan Assemblage.

As subduction continued, a fore arc basin formed between the accretionary wedge comprising the Franciscan Formation and the volcanic arc to the east, now the Sierra Nevada mountain range which arose from subduction-related melting of the mantle. This shallow marine basin filled with sediments shed during Late Jurassic and Early Cretaceous uplift and erosion of the volcanic arc. The sedimentary rocks deposited

in the fore arc basin are known as the Great Valley Sequence, which overlies the Mt. Diablo Ophiolite that formed the basin floor. The Knoxville formation, which is part of this Sequence, is in contact with the diabase along the southeastern portion of the Quarry.

2.3.1 Lithology of the Clayton Quarry

Two principal rock types are contained within the Mt. Diablo Ophiolite:

- Basalt – flows and pillows formed when basaltic lava flowed onto the ocean floor at the spreading ocean ridge
- Diabase - sheeted diabase dikes injected approximately parallel to one another with no intervening country rock

The sheeted dikes transported molten rock from the magma chamber below the spreading center to the ground surface, where it was extruded on the ocean floor, forming basalt flows and pillow basalts. The Clayton Quarry produces rock products from the sheeted diabase dikes.

The sheeted dike complex is bounded to the west and east by the Jurassic Knoxville Formation (Figure 2.1). The Knoxville Formation is located in eastern portions of the quarry, and consists of micaceous shale with intermittent lenses of limestone and sandstone beds (Pampeyan, 1963). The Knoxville Formation is 140 million years old and are the oldest beds of Great Valley sequence in this area. The Great Valley deposits were thought to on-lap the Mt. Diablo ophiolite in this area as a depositional contact, however, the contact may also have experienced uplift and faulting over geologic time. This contact is not considered a Holocene-active fault.

The contact between the Knoxville Formation and the diabase dikes is characterized by altered rock-like materials derived from both the Knoxville Formation and the diabase. It typically consists of a dense, highly fractured dark green to black aphanitic rock.

Quaternary Alluvium occurs in the valley that contains Mitchell Creek east of the quarry (Dibblee, 2006). In the immediate vicinity of Mitchell Creek this alluvium consists of alluvial gravel, sand and clay.

2.3.2 Structural Conditions

The diabase sheeted dike complex mined at Clayton Quarry is within the Mt. Diablo antiform, in the upper plate of the Coast Range Thrust. The orientations of the dikes have an average dip direction of 310° and dip of 38°. These orientations are persistent over long distances because similar dike orientations are reported for the Kaiser Quarry on the west side of Mt. Zion (Figure 2.1). Pampeyan (1963) writes that joints in the diabase appear to be randomly oriented and this was confirmed by joint orientation measurements in the quarry (Golder, 2015).

The Knoxville Formation has been eroded away from the top of the dike complex, but occurs on the west and east sides in the flanks of the antiform (Unruh and others, 2007). Williams (1984) indicates the contact on the east side of the quarry between the Knoxville Formation and the sheeted dike complex to be a fault that dips east at about 60 degrees. As discussed further in the next section, field mapping by Golder and site specific drilling data evaluated by P. Cotter of Cemex (Pers. Comm. 2015) indicate that the contact dips at approximately 61 degrees to the east in the east wall of the Quarry consistent with Williams' interpretation.

2.3.3 Groundwater Conditions

Review of geologic maps and cross sections (Figure 2.1) indicates that the quarry is unlikely to encounter significant groundwater or intersect a regional aquifer. The diabase in the quarry consists of dense igneous rock with very low porosity and hydraulic conductivity. Groundwater, where encountered in such rocks, occurs only in fractures and results from surface water seeping into fractures in the rock mass on the slopes of Mount Zion. The final depth of the quarry is approximately 400 feet below Mitchell Creek, but it is unlikely that Mitchell Creek will significantly contribute to groundwater flows in the quarry due to the distance between the creek and the quarry and the hydraulic nature of the intervening rock materials. The quarry is located approximately 1300 to 1800 feet to the west of Mitchell Creek, and Mitchell Creek is underlain by a different geologic unit (Alluvium). Geologic maps (Figure 2.1) of the area indicate no faults or other geologic structures that might intercept surface water flowing in Mitchell Creek and act as conduit for groundwater flow into the quarry.

Water that occurs in the diabase exposed in the quarry consists primarily of water derived from the surface infiltration of precipitation that has percolated into discontinuities within the rock mass (i.e., seeps along fractures). This water then daylights in the quarry pit slopes. The current base of the quarry (~ el. 530 amsl) contains a small pit lake formed from seepage and runoff from existing quarry benches; however, the generally dry conditions and high rates of evaporation minimize the accumulation of water in the pit lake. Over time, surface runoff from the quarry slopes is projected to fill the quarry such that a pit lake will form (EMKO 2017). The final projected pit lake elevation of 735 feet includes an outlet pipe on the north side of the pit discharging to existing drainage courses.

2.4 Seismicity

The Clayton Quarry is located in a seismically active area of California. A review of fault data from the United States Geological Survey (USGS, 2014a) indicates that the site is located within 10 miles of the active Calaveras and Green Valley Faults which are capable of producing magnitude (Mw) 6.5 to 7.0 earthquakes. The site is located approximately 17 and 35 miles from the Hayward and San Andreas Faults, respectively, which are capable of producing magnitude 7.0 to 8.0 earthquakes.

The following seismic design parameters were selected based on a probabilistic disaggregation of USGS seismicity data for the site:

- Peak Ground Acceleration (PGA) of 0.51g (475 year return period)
- Modal design earthquake magnitude (M) of 6.57
- Modal distance (r) to the causative fault is 10.2 kilometers

These values of PGA, M, and r were used to estimate the seismic coefficients (k) for use in pseudo-static slope stability analyses (Sections 6.0, 7.0, and 8.0). In a pseudo-static analysis, the effect of the earthquake on the stability of the slope is represented by a constant horizontal acceleration that, when multiplied by the weight of the failure mass, produces a lateral de-stabilizing force that acts through the centroid of the slide mass. The horizontal acceleration (expressed as a percentage of gravity, g = 32.2 ft/s^2) that produces this lateral force is represented by a parameter called the seismic coefficient (k).

The value of k used in pseudo-static analyses is selected to reflect the anticipated level of earthquake shaking at the site, or more specifically the accelerations acting on the potential failure mass. The seismic coefficient is assumed to be less than the PGA predicted for the site because, during earthquake shaking, a time-variant spatial distribution of accelerations exists within the slope and not all points in the slope move simultaneously with the same intensity. For this study, Golder selected k to be consistent with recommendation for performing pseudo-static analyses developed by Blake, et. al. (2002).

The seismic coefficients at the Clayton Quarry site were selected based on the assumption that the rock mass in the quarry pit slopes acts as a brittle material and the overburden fill and native residual soils do not. In a brittle material, the post-peak strength is low relative to the peak strength, whereas the coarse granular overburden fill and native soils have a post-peak strength that is relatively similar to the peak strength (see Laboratory test Results in Appendix B). The lower post-peak strength in a brittle material suggest that earthquake-induced displacements are larger for the rock mass in the quarry pit than for the overburden fill and native soils. For conservatism, and to account for the larger expected displacements, Golder recommends that slopes composed of rock shall be shown stable (factor-of-safety $\geq$ 1.00) with an increased seismic coefficient over that compared to soil. Golder selected a k value equal to 0.21 g for the quarry pit slopes and k = 0.18 g for the overburden fill slopes in conformance with the procedure recommended by Blake, et. al. (2002).

2.5 Quarry Development

The quarry at the proposed end of mining is approximately 2700 feet long in a north-south direction and 1800 feet wide (Figure 1.2). The west wall of the quarry was excavated at an overall slope of 0.5H:1V (about 63 degrees) in a series of benches. The benches are 60 feet high and 30 feet wide with approximately vertical bench faces. The uppermost benches in the quarry are at an elevation of 1540 feet,

and as of April 2017, the elevation of the bottom of the quarry was at an elevation of about 530 feet. Above the current working level, the west quarry wall is a final slope. A photograph of the existing south and west quarry walls as of March 2014 is shown in Figure 2.2.

The east wall of the quarry is still being developed, and the crest of the east quarry wall ranges in elevation from approximately 900 feet to 750 feet. As of April 2017, the overall slope of the east quarry wall was about 32 to 35 degrees (approximately 1.6H:1V to 1.4H:1V). The most current aerial photograph of the quarry with an overlay of the topography (provided November 2015) is shown in Figure 1.2. Photographs of the existing east and north quarry walls as of March 2014 are shown in Figures 2.3 and 2.4. Proposed bench configurations are included in Table 2.1 below.

Table 2.1: Proposed Quarry Bench Configurations

Rock Type	Bench Face Slope	Bench Height	Catch Bench Width	Design Inter-Ramp Slope
Knoxville Formation (sandstone, siltstone, claystone)	1H:1V (45 degrees)	60 feet	30 feet	1.5H:1V (33.7 degrees)
Knoxville/Diabase Contact (Transition)	Vertical (90 degrees)	60 feet	60 feet	1H:1V (45 degrees)
Diabase	Vertical (90 degrees)	60 feet	30 feet	0.5H:1V (63.4 degrees)

Note: See Figure 2.5 for definitions of Bench Face Angle, Catch Bench and Inter-ramp Slope

The diabase is blasted so it may be excavated with loaders and/or excavators and hauled to the plant for processing. Mined soil and rock that cannot be processed into construction aggregate (overburden) is placed in Overburden Fill Areas (OFA) located on the project site. All overburden fills are currently placed outside the limits of the quarry.

Current Reclamation Plan drawings indicate that the ultimate quarry will be excavated to a final elevation of 110 feet msl. These drawings also show that the west quarry wall will be excavated at 0.5H:1V, and the east wall will be excavated at an overall slope ranging from approximately 1.5H:1V (33.7 degrees) to 0.5H:1V (63.4 degrees) depending on the material being excavated. Table 2.1 summarizes the proposed bench configurations for the east wall for each rock type encountered during excavation.

3.0 SITE RECONNAISSANCE AND SUBSURFACE EXPLORATIONS

3.1 Site Reconnaissance and Mapping

Golder performed three site field programs: (1) in March 2014 to collect rock outcrop data in the quarry, (2) in February 2015 to confirm the location of the Knoxville/Diabase contact and obtain subsurface samples

for the Knoxville, and (3) in August 2016 to evaluate the OFA foundation. Field mapping in 2015 and 2016 took place during the respective drilling programs. Golder used the data from the 2014 and 2015 mapping to supplement rock and soil data collected from the borings performed in each study.

3.1.1 Pit Slope Stability

During the site visit in March 2014, and the drilling campaign in February 2015, mapping of the west and east wall of the quarry was performed to identify signs of slope instability. In summary, review of aerial photographs and visual observation of the slopes (Figures 2.2 through 2.4) did not indicate the presence of tension cracks or other features that would indicate concern regarding the existing quarry highwall(s) with respect to global stability. Minor bench scale instabilities were observed in localized areas which are not uncommon or unexpected in a quarry of this size and scale. In general, catch benches were adequately containing talus associated with these small localized failures.

3.1.2 Knoxville-Diabase Contact

As part of the field investigation conducted in February 2015, the contact between the Knoxville Formation and the diabase was mapped in detail by a Golder staff geologist assisted by Pete Cotter of Cemex. The contact between the Knoxville Formation and the diabase dikes is characterized by altered rock-like materials derived from both the Knoxville Formation and the diabase. It typically consists of a dense, highly fractured dark green to black aphanitic rock containing slickensides on fracture surfaces.

Approximately ten contact locations were identified and marked in the field and surveyed to the site datum. This information was plotted on the site topographic map to accurately locate the geologic contact in plan view. The dip of the contact was established both through drilling by Cemex, and by visual observations and direct measurement in the field. In summary, the location and orientation of the contact is well established and accurately portrayed in Figure 1.2 of this report, and in the plan set submitted as part of the Reclamation Plan.

3.1.3 North OFA Reconnaissance

The 2016 field mapping study was performed to map seeps, surface drainages, and the approximate limits of slide material at the North OFA; mapping includes tension cracks or head scarps at the crest of the overburden fill area, cracking along the lateral margins, and the approximate toe of the slide as indicated by bulging and heaving ground.

In addition, a limited topographic survey was performed in August 2016 to update the topography in the area of regrading, measure elevations, and locate existing features for use in analysis and design of improvements. The data was collected using a Trimble Geoexplorer XH 6000 series with an accuracy on the order of ± 4 inches. Numerous points were collected in the slide area and topography was developed

from the point data. The results of the field mapping, topographic survey results, and the limits of the topographic survey are shown in Figure 1.3.

3.2 Subsurface Explorations

Golder performed two drilling programs to supplement mapping data collected in 2014, 2015, and 2016. Each drilling program is described in the following sections.

3.2.1 2015 Drilling Program

The purpose of this program was to provide subsurface data to support engineering analyses of the South OFA and the east wall of the quarry. The subsurface explorations consisted of one corehole (B-1) and two hollow stem auger (HSA) borings (B-2 and B-3) at the locations shown in Figure 1.2. Corehole B-1 was drilled to obtain information about the Knoxville rock conditions underlying the ridgeline between Mitchell Creek and the quarry. Boring B-2 and Boring B-3 were drilled approximately 700 feet southeast of the east ridge of the quarry in native ground to obtain information about foundation conditions for the proposed overburden fill.

Both the corehole and the HSA Borings were drilled using a truck-mounted Mobile B-53 drill rig provided by Gregg Drilling and Testing, Inc. under subcontract to Golder. Upon completion of the drilling, each boring was grouted with a mixture consisting of cement bentonite grout. Drilling operations were observed by a Golder geologist (under supervision by a California Certified Engineering Geologist (CEG)), who logged the borings and collected soil and rock samples from the corehole and each of the borings.

Corehole B-1 was advanced by mud rotary methods equipped with a five-foot long, HQ core barrel. The core barrel was advanced with a series of 5-foot long runs, subsequently extracted from the corehole, and preserved in core boxes. Each core run was marked with the drill footage on the core box.

The corehole log for B-1 is presented in Appendix A along with a description of Golder's rock core logging procedure and Bieniawski's (1976) Rock Mass Rating (RMR_{76}) system. Information recorded for the core included Total Core Recovery (TCR), Rock Quality Designation (RQD), fracture frequency (calculated as the natural fracture count divided by the core run length), field estimate of the Uniaxial Compressive Strength (UCS), and degree of weathering. Information collected on individual natural fractures in the core consisted of the fracture type (bedding plane, joint, etc.) shape, roughness, infill type and thickness, angle to core axis, joint roughness coefficient (JRC) and Joint Condition Rating (JCR). The JRC is a measure of fracture roughness (Barton and Chouby, 1977), and the JCR is a description of the mechanical properties of the fracture, and is used in making estimate of Bieniawski's RMR_{76}.

Borings B-2 and B-3 were drilled using HSA drilling methods. Both borings were advanced to 31.5 feet bgs. Driven samples were retrieved from the borings at 5-foot intervals using a Modified California (MC) steel

tube-lined split spoon sampler (3 inch O.D. and 2½ inch I.D.) at depths of 5, 15 and 25 feet bgs; and a Standard Penetration Test (SPT) split spoon sampler (2 inch O.D. and 1⅜ inch I.D.) was used to obtain samples at depths of 10, 20 and 30 feet (bgs). The samplers were driven 18 inches (unless otherwise noted) into the bottom of the boring using a 140-pound automatic hammer with a 30-inch drop in accordance with ASTM D 1586. Hammer blows were recorded in 6-inch intervals for each sample and are presented on the borings logs. The penetration resistance (N-value) of the soil is calculated as the sum of the number of hammer blows required to drive the sampler the final 12 inches. The N-value is an indication of the apparent density of cohesionless soils and the consistency of cohesive soils. If a total of 50 blows were recorded for a single 6-inch interval, the test was terminated and the blow count was recorded as 50 blows for the inches of penetration observed. All blow counts presented on the boring logs are uncorrected values and do not take into consideration the efficiency of the automatic hammer, overburden, or other influences.

HSA Boring logs for B-2 and B-3 are presented in Appendix A. The soils were classified according to the Unified Soil Classification System (USCS) (ASTM D2488). Soil samples collected from the borings were stored in plastic bags and sealed to minimize moisture loss, then transported to Golder's Sunnyvale, California office upon completion of the field investigation.

3.2.2 2016 Drilling Program

The 2016 borings were drilled to provide subsurface data in support of engineering analyses of the stability of the North OFA. The borings were drilled in an existing unstable overburden fill in August 2016. Boring GB-1 was drilled near the toe of the slope, GB-2 was drilled in the mid portion of the slope, and GB-3 was drilled in the vicinity of the head scarp of the existing slide. Boring locations were staked in the field by Golder's field engineer and are shown on Figure 1.2. The borings were drilled by GeoEx Subsurface Exploration (GeoEx) of Dixon, California under subcontract to Golder using a truck-mounted CME-85 drill rig using both hollow stem auger and HQ triple tube coring equipment. Boring depths ranged from 36.5 to 79.5 feet bgs and extended below the depth of the slide plane in GB-2 and GB3. Subsurface conditions were logged by a Golder field engineer (under supervision by a California CEG). Logs of the borings are presented in Appendix A and a description of the Unified Soil Classification System (USCS) used to classify the site soils during Golder's investigation is presented at the end of Appendix A.

Sample intervals varied within each of the borings. A sample interval of 5 feet was utilized within GB-1 to a depth of 20 feet with rock core obtained from 24 to 36.5 feet bgs. Continuous sampling was performed from 34 to 56.5 feet bgs within boring GB-2 and from 34 to 66.5 feet bgs within boring GB-3 with a sample interval of 5 feet in the zones above and below the continuous sample intervals. No rock coring was performed in borings GB-2 and GB-3.

Soil samples were retrieved using a Standard Penetration Test (SPT) split spoon sampler (2 inch O.D. and 1⅜ inch I.D.) and a Modified California (MC) steel tube-lined split spoon sampler (3 inch O.D. and 2½ inch

I.D.). The samplers were driven 18 inches (unless otherwise noted) into the bottom of the boring using a 140-pound automatic hammer with a 30-inch drop in accordance with ASTM D 1586 (described in Section 3.2.1). Soil samples collected from the borings were stored in coolers to minimize moisture loss and transported to Golder's Sunnyvale office upon completion of the field investigation.

When drilling through rock, core samples were collected using a 4 foot long core barrel. Rock core samples were visually logged by the Golder field engineer for rock type, recovery, rock quality designation (RQD), fractures, field estimated strength, weathering and discontinuity information. Core was boxed in cardboard core boxes.

At the completion of each borehole, the holes were backfilled with cement bentonite grout. Samples and core boxes were photographed by Golder's field engineer and transported to Golder's Sunnyvale office for further inspection.

4.0 LABORATORY TESTING

Laboratory testing was performed on soil and rock samples collected at each of the three Golder investigations (2014, 2015, and 2016). "Rock samples" are defined as samples of Diabase, Knoxville Formation, or Knoxville/Diabase Contact zone material collected as either hand samples from the 2014 field mapping or core samples from the 2015 drilling program. Samples collected from the 2015 drilling program that were tested as rock consisted of less weathered, intact core that was estimated in the field to consist of medium strong rock. Samples from the 2015 drilling program that were tested as "soil samples" consisted of residual soils derived from in-place weathering of the Knoxville Formation or weak "soil-like" intervals of sheared rock in the Knoxville Formation bedrock. Samples collected from the 2016 drilling program consisted of either overburden fill material or residual soils derived from the Knoxville Formation.

The majority of laboratory testing was performed on samples classified as soil from overburden, alluvium, or residual soils derived from the Knoxville Formation. A total of 13 soil index tests, eleven in-place moisture/density tests, one compaction test, one consolidated-undrained (CU) triaxial shear test, two torsional ring shear tests, and two direct shear tests were performed on soil samples. Table 4.1 summarizes the tests performed on soil samples from each testing program. The only tests performed on rock samples were point load tests, summarized in Section 4.1.

Table 4.1: Summary of Laboratory Tests Performed on Soil Samples from all Testing Programs

Field Visit	Station/ Boring[1]	Depth (feet)	Material Type[2]	Test Performed					
				Soil Index (ASTM D4318 & ASTM D422)	In Place Moisture/Dry Density (ASTM D2487)	Compaction (ASTM D1557)	CU Triaxial (ASTM D4767)	Torsional Ring Shear (ASTM D-6467)	Direct Shear (ASTM D 3080)
2014	x19	Surface	Overburden Fill	X					
	x20 and x21	Surface	Overburden Fill	X		X	X		
2015	B-1	91.4-92	Residual Knoxville (C)	X	X				
	B-2	5.5-6	Alluvium	X	X				
	B-2	10-11.5	Alluvium	X	X				
	B-3	5.5-6	Residual Knoxville (C)	X	X				
	B-3	10.5-11.5	Residual Knoxville (C)	X	X				
2016	GB-1	10.0-10.5	Residual Knoxville (F)	X	X				X
	GB-2	47.5-48.0	Residual Knoxville (F)	X	X			X	
	GB-2	57.5-58.0	Residual Knoxville (C)	X	X				
	GB-3	39.0-39.5	Overburden Fill	X	X				
	GB-3	62.5-63.0	Residual Knoxville (F)	X	X			X	
	GB-3	64.0-64.5	Residual Knoxville (C)	X	X				X

Notes: 1. Approximate location of borings and stations shown in Figure 1.2.
2. (F) = Fine Grained, (C) = Coarse Grained.

Material properties were developed for use in Golder's stability analyses based the results of this laboratory testing. The test results are presented in the following sections.

4.1 Point Load Tests on Rock

The Point Load Strength Index was measured by performing point load tests (ASTM D 5731) on 28 samples of diabase, 10 samples of siltstone (Knoxville Formation) and 23 samples collected from rock-like material from the contact between the diabase and Knoxville Formation in Golder's Reno Office laboratory. With the exception of two siltstone (Knoxville Formation) samples, all point load tests were performed on samples

collected from the 2014 field mapping program. The Point Load Strength Index is correlated to the uniaxial compressive strength (UCS) of intact rock. The UCS was estimated for each rock type tested by multiplying the Point Load Strength Index by a factor, N. For this project, N was assumed to equal 24, a value that is appropriate for many rock types. Point load test data for each sample is presented in Appendix B and test results are summarized in Table 4.2.

Table 4.2: Uniaxial Compressive Strength from Point Load Tests

Rock Type	Number of Tests	Unconfined Compressive Strength (psi)			
		Minimum	Average[1,2]	Maximum	Standard Deviation
Diabase (Slightly Weathered to Fresh)	25	1661	18270	39400	10330
Weathered Diabase	3	2300	5230	5580	N/A
Knoxville/Diabase Contact	23	3165	7400	11870	2720
Knoxville Formation (Siltstone)	10	1470	4540	7820	1510

Notes: 1. The two highest and lowest test results are deleted from the data set for sample sizes greater than 10.
2. The highest and lowest test results are deleted from data set for sample sizes equal to or less than 10.

4.2 Laboratory Tests on Soil Samples

All tests on soil samples were performed by Cooper Laboratories of Palo Alto, California.

4.2.1 Soil Index Tests

Soil index tests (particle size distribution and Atterberg Limits) were performed on two samples of overburden material obtained during the 2014 site visit. One sample was obtained from the base of the overburden pile (Station x19 on Figure 1.2) and may contain a larger portion of near surface weathered rocks from the Knoxville Formation than typical backfill. The second sample consisted of material obtained at locations X20 and X21 on Figure 1.2. These samples are considered more representative of typical overburden material and were combined for testing to obtain shear strength properties of the overburden fill material.

Soil samples obtained from Corehole B-1 and HSA borings B-2 and B3 during the 2015 site visit were tested for soil index properties and in-place moisture and density. Samples collected from B-1 and B-3 consisted of residual soils derived from the Knoxville formation. Samples from B-2 were identified as alluvium and/or slope wash (colluvium).

Soil index and in-place moisture/density tests were also performed on six samples from the 2016 drilling program, one sample from overburden fill, three from the slide plane material (residual clay or colluvium

derived from the Knoxville Formation), and two from the more granular weathered Knoxville Formation below the residual clays.

The results of all soil index tests performed on samples from 2014, 2015, and 2016 field work are presented in Appendix B and summarized in Table 4.3.

Table 4.3: Laboratory Results of Soil Index Tests

Field Visit	Station/ Boring[1]	Depth (feet)	Material type[2]	Sample Type[3]	Water Content (%)	Dry Density[4,5] (pcf)	Atterberg Limits[6]			USCS Symbol[7]
							LL	PL	PI	
2014	x19	Surface	Overburden Fill	Bucket	-	-	38	26	12	SC
	x20 and x21	Surface	Overburden Fill	Bucket	-	-	26	17	9	GC
2015	B-1	91.4-92	Residual Knoxville (C)	Core	10.6	NR	25	18	7	SC-SM
	B-2	5.5-6	Slope Wash	MC	13.0	120	36	18	18	SC
	B-2	10-11.5	Slope Wash	SPT	15.9	NR	41	20	21	CL
	B-3	5.5-6	Residual Knoxville (C)	MC	31.4	106	51	22	29	CH
	B-3	10.5-11.5	Residual Knoxville (C)	SPT	18.5	124	39	24	15	CL
2016	GB-1	10.0-10.5	Residual Knoxville (F)	MC	23.8	99	48	24	24	CL
	GB-2	47.5-48.0	Residual Knoxville (F)	MC	26.8	98	73	23	50	CH
	GB-2	57.5-58.0	Residual Knoxville (C)	MC	13.6	120	37	19	18	SC
	GB-3	39.0-39.5	Overburden	MC	12.0	119	34	19	15	SC
	GB-3	62.5-63.0	Residual Knoxville (F)	MC	24.9	101	66	23	43	CH
	GB-3	64.0-64.5	Residual Knoxville (C)	MC	19.2	106	40	21	19	SC

Notes: 1. Approximate location of borings and stations shown in Figure 1.2.
2. (F) = Fine Grained, (C) = Coarse Grained.
3. Bucket samples consist of loosely collected near surface material; Core samples are intact and collected directly from the core barrel; MC=Modified California sampler, SPT=Standard Penetration Test sampler.
4. NR = Not Reported
5. Assumed G_s=2.7 for determination of Dry Density
6. LL = Liquid Limit, PL = Plastic Limit, PI = Plasticity Index
7. USCS = Unified Soil Classification System

4.2.2 Compaction Tests (2014)

The relationship between moisture content and the dry unit weight of compacted overburden fill was obtained by performing a Modified Proctor Compaction Test (ASTM D1557 – Method B) on the sample collected in 2014 from locations x20 and x21 shown in Figure 1.2. Since the purpose of this test was to provide information for selecting unit weights for the triaxial shear test specimens, only the material passing the ½ inch sieve was utilized in the compaction test. The test results of the compaction tests are presented in Appendix B and are shown in Table 4.4.

Table 4.4: Laboratory Results of Compaction Test

Boring ID[1] / Sample Depth (ft)	Material Type	Test Type	Maximum Dry Density (pcf)	Optimum Water Content (%)
x20 and x21, Surface	Overburden, (GC)	Uncorrected	140.7	8.5
		Corrected for Oversize	142.2	8.1

Notes: 1. Approximate location of borings and stations shown in Figure 1.2.
2. pcf = pounds per cubic foot.

4.2.3 Consolidated Undrained Triaxial Shear Tests (2014)

Consolidated undrained triaxial tests with pore pressure measurements (CU/pp) were performed on samples of overburden fill collected in 2014 to provide shear strength properties (ASTM D4767). Similar to the compaction test, only material passing the ½ inch sieve was used to prepare test specimens. The three triaxial shear test specimens each had an approximate dry density of 121 pounds per cubic foot (pcf) and a moisture content of approximately six percent. This density is approximately 85 percent of the maximum dry density of the soil obtained in the compaction test, and approximates the density of the overburden fill when placed with little or no compaction. The results of the tests (Appendix B) indicate that the effective friction angle of the backfill is approximately 39 degrees with zero cohesion.

4.2.4 Torsional Ring Shear Tests (2016)

Two torsional ring shear tests (ASTM D6467) were performed on samples collected in 2016 to provide residual strengths of the residual clays obtained from the likely slide plane of the North OFA failure. The tests were run on relatively undisturbed samples with three points obtained from one sample and one point obtained from another sample. The test results are summarized in Table 4.5. Residual strengths of clays reflected large shear displacements; therefore, this value is useful in assessing both back analysis and remediation design of landslides. Since Table 4.5 lists residual friction angles representing a pre-sheared surface, the cohesion is assumed to be zero and the residual strength varies with applied normal stress. Torsional ring shear test results are presented in Appendix B.

Table 4.5: Laboratory Results of Torsional Ring Shear Tests

Boring ID[1] / Sample Depth (ft)	Material Type[2]	Normal Stress (psf)	Residual Friction Angle (degrees)[3]
GB-3, 62.5-63.0	Residual Knoxville (F), (Fat Clay, CH)	3,000	11
		6,000	9
		12,000	8
GB-2, 47.8-48.0	Residual Knoxville (F), (Fat Clay, CH)	4,000	9

Notes: 1. Approximate location of borings and stations shown in Figure 1.2.
2. (F) = Fine Grained, (C) = Coarse Grained.
3. Assumes cohesion = 0.

4.2.5 Direct Shear Tests (2016)

A three-point direct shear test (ASTM D 3080) was performed on two relatively undisturbed samples from 2016, one from coarse grained residual Knoxville and the other on fine grained residual Knoxville at normal stresses of 3,000, 6,000, and 12,000 psf. The direct shear tests results present the effective shear strength parameters developed from the peak stresses acting on each sample at failure. Test results are presented in Appendix B and summarized Table 4.6.

Table 4.6: Laboratory Results of Direct Shear Tests

Boring ID[1] / Sample Depth (ft)	Material Type[2]	Effective Friction Angle, ϕ' (degrees)	Effective Cohesion (psf)
GB-1, 10.0-10.5	Residual Knoxville (F), (Sandy Lean Clay, CL)	32	50
GB-3, 64.0-64.5	Residual Knoxville (C)	40	200

Notes: 1. Approximate location of borings and stations shown in Figure 1.2.
2. (F) = Fine Grained, (C) = Coarse Grained.

It should be noted that the purpose of the direct shear tests was to estimate shear strength parameters for the native residual soils derived from the Knoxville Formation. The values of effective friction angle and cohesion are greater from the results of direct shear test than those values presented from the results of the torsional ring shear tests. The purpose of the torsional ring shear tests (Section 4.2.4) was to estimate the shear strength of the fat clays assumed to make up the basal rupture of the North OFA landslide. The fine grained Residual Knoxville (F) sample that the direct shear test was performed on had a higher sand content than the fat clays utilized in the torsional ring shear tests, and the coarse grained Residual Knoxville (C) sample contained larger, less weathered fragments of Knoxville. Both samples from the direct shear tests are considered to be representative of residual native soil and/or highly weathered rock derived from the Knoxville Formation.

5.0 GEOTECHNICAL CHARACTERIZATION

5.1 Bedrock Units

The high west and north quarry walls are composed entirely of diabase with varying degrees of weathering. Weathered diabase is typically uniformly brown while fresh to slightly weathered diabase is greenish gray with occasional brown iron-stained discontinuities. Photographs of the west and north quarry walls (Figures 2.1 and 2.2) indicate rock weathering to a depth of about 100 feet below original ground surface.

The weathered diabase rock is composed of blocks of rock with a lower intact rock strength intersected by joints with lower shear strength characteristics than the fresh to slightly weathered diabase. Therefore, the diabase was divided into two geotechnical units, Weathered Diabase and Slightly Weathered to Fresh Diabase. In this report, the Slightly Weathered to Fresh Diabase, which makes up the bulk of the rock mass in the west slope of Clayton Quarry, is referred to as Diabase.

The quarry rock mass on the east side of the quarry was divided into three geotechnical units: Knoxville Formation (siltstone, sandstone, and claystone), Knoxville/Diabase Contact material (Transition Zone), and Diabase.

The following sections discuss the characteristics and rock mass properties of the following rock types:

- Diabase (Slightly Weathered to Fresh)
- Weathered Diabase
- Knoxville/Diabase Contact material (Transition Zone)
- Knoxville Formation (Siltstone)

5.1.1 Uniaxial Compressive Strength

Based on the UCS estimated from point load tests (Table 4.2), the Diabase consists of Weak (R2) to Extremely Strong (R6, UCS > 35,000 psi) rock, but it typically ranges from Strong (R4, 7,500 < UCS < 15,000 psi) to Very Strong (R5, 15,000 < UCS < 35,000) based on observations of field rock strength tests and the average UCS estimated from point load tests.

Based on Golder's observations in the quarry, the Weathered Diabase consists of Weak (R2, 725 < UCS < 3,500 psi) to Medium Strong (R3, 3,500 < UCS < 7,000 psi) rock; however, it is typically Medium Strong as indicated by the point load tests in Table 4.2.

Point load tests performed on samples of the Knoxville/Diabase Contact (Table 4.2) indicated that the contact material consists of Weak (R2) to Strong (R4) rock, but it is typically identified at Medium Strong (R3) rock.

The point load tests performed on core and hand specimens of Knoxville Formation may overestimate the intact rock strength of this unit since suitable samples for point load testing can be difficult to obtain in altered and weathered rock units; therefore, Golder assigned the UCS of the Knoxville Formation based on the weighted average of the field estimate of the UCS of intact rock made during core logging (approximately 3000 psi) and shown in the log for the corehole (B-1) in Appendix A.

Base on the available data, Golder assigned characteristic UCS values to the various rock types for use in our engineering analyses as shown in Table 5.1.

Table 5.1: Characteristic UCS by Rock Type

Rock Type	Average Uniaxial Compressive Strength (psi)
Diabase (Slightly Weathered to Fresh)	18300
Weathered Diabase	5300
Knoxville/Diabase Contact	7400
Knoxville Formation (Siltstone)	3000

5.1.2 Rock Mass Quality (GSI)

Rock mass quality is an indication of the condition of the rock that accounts for the intact strength of the rock; and the persistence, spacing, and condition of the natural fractures in the rock mass. It is used to estimate rock mass shear strength properties used in slope stability analyses. For this project, Golder estimated the rock mass quality by estimating the Geologic Strength Index (GSI) according to the guidelines provided by Hoek et al. (1992) and shown in Figure 5.1.

Both the Diabase and Weathered Diabase consist of a Very Blocky to Blocky rock mass. The individual rock blocks are interlocked and formed by three or more intersecting discontinuities that are pervasive throughout the rock mass. In the Diabase, the rock mass is typically fresh to slightly weathered with rough discontinuities, so the discontinuity surface condition is classified as Very Good to Good. The Weathered Diabase tends to be moderately to highly weathered and altered, corresponding to Fair to Poor discontinuity surface conditions.

The Knoxville/Diabase Contact material consists of a highly fractured rock mass, with angular individual rock blocks formed by sheared contacts and numerous randomly oriented joints. Based on Figure 5.1, it would be classified as a Blocky/Disturbed/Seamy rock mass with Poor to Very Poor conditions for discontinuities.

Since there are no fresh outcrops of the Knoxville Formation in the Clayton Quarry, Golder estimated the rock mass quality based on the RMR_{76} for the corehole (B-1). The weighted average of the RMR_{76} assigned to each core run is 30, based on the log for B-1 provided in Appendix A. Hoek, et al. (1993), indicates that GSI = RMR_{76} when RMR_{76} > 18. Since the value of RMR_{76} might be influenced by core intervals with high RMR, and there was only a short (50 foot) interval of core in the Knoxville Formation, Golder conservatively estimated that the GSI = RMR_{76} = 20 for estimating rock mass shear strength properties.

Golder assigned values of GSI to the rock mass as shown in Table 5.2 for use in our analyses.

Table 5.2: Geologic Strength Index (GSI) by Rock Type

Rock Type	Structure	Discontinuity Surface Conditions	Geologic Strength Index (GSI)
Diabase (Slightly Weathered to Fresh)	Very Blocky	Very Good to Good	55
Weathered Diabase	Very Blocky	Fair to Poor	35
Knoxville/Diabase Contact	Blocky/Disturbed/Seamy	Poor to Very Poor	20
Knoxville Formation (Siltstone)	Blocky/Disturbed/Seamy	Poor to Very Poor	20

5.1.3 Rock Structure

Geologic structures pertinent to quarry wall slope stability studies are divided into major and minor structures (rock fabric).

Major structures consist of persistent individual geologic structures such as contacts between rock types, faults, and other structures that extend over many benches or the entire quarry wall. Typically, these structures can be mapped and shown as individual structures on large scale geologic maps or quarry geology maps. For slope stability studies, the effect of each major structure is assessed individually by considering its location and orientation in the pit slope and evaluating if the major structures, individually or in combination, intersect the pit slopes in a manner that may result in slope instability.

Rock fabric consists of those small-scale geologic structures such as joints, bedding planes, and small scale faults that form discontinuities that pervade the rock mass and are so numerous and with such limited persistence that they cannot be shown on maps as individual structures. Their effect on slope stability is assessed by considering their average orientation, persistence (trace length of the structure in rock exposures), and spacing, and assuming that similarly oriented structures will be found throughout the defined structural domains.

5.1.3.1 Major Structures

The geologic maps of the area (Dibblee, 1980; Dibblee, 1986; and Williams, 1984), and our observations do not indicate the presence of major structures in the west, north, and south quarry walls. The sheeted dikes that comprise the Diabase are shown by Williams (1984) to have similar orientations over a wide area of Mount Zion. This indicates that it is unlikely that major faults with significant displacement divide the Diabase sheeted dike complex into discrete structural blocks. This corresponds to our reconnaissance observations as Golder did not observe major faults intersecting the south, west, or north quarry walls.

Williams' (1984) geologic map shows an east dipping fault on the east side of the quarry that separates the Knoxville Formation and the Diabase. This fault was observed during Golder's site visit and mapped at Stations x3, x18, x13, and x17, and it dips to the east at approximately 61 degrees.

5.1.3.2 Rock Fabric

During our site visit in 2014, Golder observed and collected rock discontinuity data on the east quarry slope from benches excavated in the Diabase and Knoxville/Diabase contact. A description of the rock fabric of the Knoxville Formation was based on the discontinuity descriptions contained in the core log provided in Appendix A. The descriptions of rock fabric are provided in Table 5.3.

Table 5.3: Description of Rock Fabric by Rock Type

Rock Type	Discontinuity Set	Description
Diabase	Primary	Type: Dike Contacts Orientation: Dip is 40 to 60 degrees to northwest Persistence: High to Very High (10 to > 60 feet) Spacing: Wide to Very Wide (6 inches to < 6 feet) Surface Condition: Planar to Undulating, tight, rough, no to non-softening clay and silt infilling
	Secondary	Type: Joints/Shears Orientation: Random Persistence: Low to Medium (< 3 to 10 feet) Spacing: Close to Wide (few inches to 3 feet) Surface Condition: smooth to rough, undulating to planar
Knoxville/Diabase Contact	Primary	Type: Joints and Shears Orientation: Random Persistence: Very Low to Low (< 3 feet to 10 feet) Spacing: Very Close (< 6 inches) Surface Condition: very irregular to undulating, smooth to slickensided surfaces with non-softening infillings. Note: Contact material consists of a sheared irregular mass of moderately strong angular rock blocks.
	Secondary	None
Knoxville Formation	Primary	Type: Bedding Planes Orientation: Dip is vertical to 40 degrees east

		Persistence: High (> 30 feet) to Continuous Spacing: Very Close (< 6 inches) Surface Condition: Planar, Smooth
	Secondary	Type: Joints Orientation: Orthogonal to Bedding Planes Persistence: Very Low (< 3 feet) Spacing: Close (< 6 inches) Surface Condition: Planar, Smooth

5.1.3.3 Structural Domains

Structural domains are areas characterized by a recognizable structural fabric (similar orientation) that clearly differentiates it from its neighbors (Read and Stacey, 2009). For the Clayton Quarry, the geologic maps (Dibblee, 1980 and 2006, and Williams, 1984) indicate the dikes have similar orientations on both sides of Mount Zion. The geologic maps and the results of discontinuity measurements of the west quarry wall (Figure 5.2) indicate that the Clayton Quarry is characterized by two structural domains. The dominant structural domain is made up of structural orientations and characteristics of discontinuities exposed in the quarry slopes composed of Diabase that are similar throughout the quarry. They are also likely similar behind the quarry walls in the Diabase given the consistency of the dike orientations over long distances.

The Knoxville formation forms a secondary structural domain. The bedding planes in the Knoxville are either near vertical or dip into the quarry slope and are likewise not in an orientation upon which failures may occur. Steeper dips are observed where the Knoxville is in contact with the Diabase.

5.2 Native Soils

Overburden fill areas (existing and proposed) consist of overburden material being placed upon native residual soils derived from the Knoxville Formation. Borings drilled in the proposed area of the South OFA encountered this residual Knoxville from 15 to 31.5 feet bgs in B-2 and 5 to 31.5 feet in B-3. Soils encountered in B-2 consisted of mostly silty clay with medium plasticity fines, fine to coarse sand, and fine angular gravel. Soils encountered in B-3 consisted of fat to lean clays that were observed to be yellowish-brown, moist, and varying from hard to very stiff.

In the North OFA area, the upper portion of boring GB-1 was interpreted as landslide debris (from 2 to 23 feet bgs), and was comprised of fat to lean clays from 2 to 15 feet bgs overlying clayey sands and gravels with medium plasticity fines, fine angular gravel, and fine to medium sand from 15 to 23 feet bgs. The fat and lean clays were observed in a moist condition with firm to stiff consistency and were brown to dark brown and dark gray to black. The clayey sands and gravels were moist, brown, dark brown, and red brown with fine to coarse sands, fine to medium subangular to angular gravels, and dense to very dense relative densities. Highly weathered Knoxville Formation was encountered in GB-1 from 23 feet bgs to the boring termination depth of 36.5 feet bgs, and is described as extremely to very weak and highly fractured rock

with medium strong iron oxidation. The material is similar to a clayey sand with mostly fine to coarse sands, little to some fine angular gravel, and low plasticity fines.

Residual Knoxville within GB-2 consisted of fat clay with varying amounts of sand from 47.5 to 54 feet bgs overlying clayey sand with gravel to clayey gravel from 54 feet to the boring termination depth of 79.5 feet bgs. The fat clays were described as moist and dark brown with a very stiff consistency and varying amounts of fine to medium sand. Trace fine subangular to angular gravels were observed within the residual clay from 48.5 to 54 feet bgs. The clayey sands and gravels were described as moist, brown, dark brown, and dark gray with dense to very dense relative densities, fine to medium sands, fine to medium angular to subangular gravels, and low to medium plasticity fines. A layer of residual fat clay with sand was observed from 64 to 67 feet bgs. This interval was interpreted as the likely basal rupture surface of the landslide.

Residual Knoxville encountered within GB-3 generally comprised clayey gravels and clayey sands from 55 feet to the boring termination depth of 74.5 feet bgs with a layer of fat clay observed from 62 to 63 feet bgs. The clayey sands and gravels were described as moist, brown to dark brown and gray brown with medium dense to very dense relative densities, fine to coarse sands, fine to medium subangular to angular gravel, and medium plasticity fines. The fat clay layer was moist and gray to dark gray with trace amounts of fine sand and a very stiff consistency. This interval was interpreted as the likely basal rupture surface of the landslide.

Evidence from the borings GB-2 and GB-3 suggest that the basal rupture of the landslide in the North OFA slopes at approximately 11% (6.5 degrees) to the east.

5.3 Overburden Fill

Characteristics of the overburden fill described in this section are based on boring logs from boreholes GB-1, GB-2, and GB-3 located in the North OFA area. In general, overburden fill material consists of moist clayey sands and gravels. The overburden fill was described as gray, light brown, and reddish brown with fine to medium sands, fine to coarse, subrounded to angular gravels, and low to medium plasticity fines with a medium dense to dense relative density. The amount of fines is estimated to range from about 25 to 35 percent. Overburden was encountered within borings GB-2 and GB-3 to depths of 47.5 and 55 feet bgs, respectively, and was observed to be only 2 feet thick in GB-1 (likely fill from recent grading). Moist to wet overburden fill was encountered within GB-2 from approximately 43.5 to 47.5 feet bgs.

5.4 Groundwater Conditions

Regional groundwater conditions for the Clayton Quarry site are described in Section 2.3.3. Based on the information provided by Cemex, and the for the purposes of the slope stability analyses presented in this report, it was assumed the gradient and position of the future water table in the pit walls (post reclamation) would be defined by maximum pit lake elevation at 735 feet (EMKO 2017).

As shown in the exploration logs in Appendix A, soils logged within GB-2 (including overburden fill and residual Knoxville soils) were described as moist to wet from 43.5 to 54 feet bgs. In Golder's opinion, this corresponds to perched groundwater encountered in piezometers installed in the North OFA area. The piezometers were installed generally in the mid portion of the slide in the vicinity of GB-2, with water levels observed from about 30 to 47 feet below the 2015 ground surface elevations.

5.5 Slope and Bench Conditions

5.5.1 Overall Slope

The stability of the overall slope (quarry slope crest to toe) in rock masses can be controlled by the persistence and orientation of large-scale geologic structures (e.g., geologic contacts and faults), and also persistent bedding planes in sedimentary rocks. Structurally-controlled failures are evaluated by performing a kinematic analysis that takes into consideration the orientations of the slope and controlling structures. Overall slope stability is also controlled by the shear strength of the rock mass. While shear through the rock mass is unlikely in strong, brittle rocks such as the Diabase, slopes composed of highly fractured rock like the Knoxville are more liable to become unstable due to shear through the rock mass. Once the kinematics of a rock mass are understood, the level of stability of a rock slope can be quantified by performing a limiting equilibrium slope stability analyses focused on the strength of either the controlling structure or the rock mass itself, or both.

5.5.2 Benches

Benches are left in quarry slopes as a rockfall control measure. Catch benches (Figure 2.5) will be left in the slope to retain rockfall and small bench-scale failures. Leaving benches in the slope does not improve or decrease overall global slope stability.

The steepness of bench faces excavated in rock is controlled by both the mining method and the persistence and orientation of geologic structures that might form plane shear and wedge type bench-scale failures. In strong, brittle rock such as the Diabase, near vertical bench faces have been formed in the quarry by pre-splitting, a controlled blasting method. Where dike contacts dip out of the bench face, bench-scale plane shear failures may form, and a few of these have formed in the existing east wall of the quarry. The size of these plane shear failures is limited by the persistence and shape of the dike contacts, typically less than 30 feet in length. Where they have occurred, they have been removed during mining and bench scaling operations.

There are currently few benches in the Knoxville/Diabase Contact material in the existing quarry, but as indicated in Table 5.3, discontinuity orientations vulnerable to bench-scale plane shear and/or wedge failures do not appear to be present. Bedding planes in the Knoxville Formation dip either near vertical or steeply to the east – orientations favorable for bench slope stability in the east wall of the quarry.

The steepness of bench faces in the highly fractured Knoxville Formation and the Knoxville/Diabase Contact is likely to depend on mining method, and may vary locally depending on the degree of fracturing of the rock mass. The bench faces in the Knoxville Formation may be formed, or modified, by mechanical excavation such as ripping and trimming with a dozer or digging with an excavator.

5.6 Controls on Slope Stability

The Diabase is classified as a strong, brittle rock mass containing three or more discontinuities. Due to the high shear strength of the rock mass, even high, steep slopes are likely to be stable. The shear strength of the Weathered Diabase, while lower than the Diabase, still forms a sufficiently strong rock mass that deep-seated failures in the weathered portions of the slopes are not considered likely.

Instability of the overall slope would most likely result from major structures intersecting the face in orientations that form large structurally-controlled plane shear and wedge failures. Similarly, the shear strength of the rock mass of the near vertical benches is too great to result in unstable bench slopes as this would require shear through intact rock. In strong rock, bench instability occurs where unfavorably oriented discontinuities are exposed during mining. While our qualitative evaluation and experience suggests deep-seated instability of the high south, north and west slopes of the quarry is unlikely, Golder presents the results of limit equilibrium stability analyses to better quantify their level of stability in a Section 6.2 of this report.

Groundwater does not appear to be a control on overall slope stability as the Diabase is not a significant producer of water. Water encountered in the rock mass likely comes from surface runoff entering fractures in the rock. However, the steep slopes promote runoff and the recharge area is small, so infiltration of surface water into fractures in the rock mass is not likely to be a source of significant groundwater in quarry slopes. Water that does seep into fractures in the rock mass appears to drain readily where exposed in the slopes; therefore, the Diabase rock mass can be assumed to be “dry” for the purposes of the slope stability analyses except where a pit lake will form against the slope.

Performance of bench slopes is indicated by their ability to catch rockfall or raveling from benches at higher elevations. Bench performance can be evaluated based on the width of the bench remaining in the slope, and over time the ability of the bench to maintain adequate width to retain rockfall so it does not fall into the working areas of the quarry. Bench scale rockfall and raveling has occurred over time in the Weathered Diabase and the bench performance appears to be worse (less effective for catchment of rockfall) than in the Diabase, probably due to the reduced shear strength of weathered discontinuities and raveling of highly weathered rock. In addition, the blocky rock mass in the less weathered portion of the slope have a higher degree of interlocking blocks than the weathered rock mass at the crest of the slope. While unstable rock wedges most likely fell out of the slope during quarry operations, there are undoubtedly marginally stable

rock wedges and plane shears remaining that may fail under seismic loading, during or after a heavy precipitation event, or just due to the passage of time as natural weathering processes continue. However, as discussed in Section 5.6.2, these marginally stable wedges are expected to be contained on slope benches or a rock containment ditch and soil berm that could be provided at toe of the quarry slopes if deemed necessary in the future. Typical mining practice includes leaving wider catch benches as the pit slope is developed if upper benches become full and are inadequate to retain rockfall.

5.6.1 Seismic Slope Stability of Rock Slopes

Clayton quarry is located in a seismically active area of California. Keefer (1984) summarized the geologic environments likely to produce earthquake-induced landslides and his findings were included in California Geological Survey, Special Publication 117 (2008). Keefer's study was based on analysis of 40 earthquakes and found that different types of landslides occur with different frequencies.

Keefer (1984) noted that rockfalls (falls of boulders of disrupted masses of rock) and rock slides (masses of rock fragments that slide on discontinuities dipping out of the rock) are relatively common. Large deep-seated rock slumps and block slides and rock avalanches are less common. The geologic environments in which rock slumps, block slides and avalanches are most likely to occur are different than those exposed in the west wall of Clayton Quarry. These failures typically require either conspicuous weak discontinuities dipping out of the slope (rock block slides) or intensely fractured rocks (rock avalanches and slumps).

The west quarry wall is primarily composed of a blocky rock mass with varying degrees of weathering. Unstable rock wedges may be present and may fail under seismic loading. While portions of the east quarry slope will be composed of highly fractured rock, the quarry slope is not particularly steep or high and so does not correspond to the conditions Keefer indicates are likely to produce large-scale, earthquake-induced landslides. As part of our engineering analyses, Golder performed limiting equilibrium analyses using the pseudo-static method to assess the level of stability under seismic loading conditions.

As there are likely marginally stable rock wedges and boulders remaining on near vertical quarry bench faces, there is the potential that rockfalls and slides could occur should a large seismic event take place on a nearby fault. The size of these rock wedges would be limited to the size of rock blocks, or the length of discontinuities that dip out of the bench faces. Golder's observations indicate that block sizes are typically a few feet or less, and the length of joints are typically less than ten feet and often less than just a few feet. This limits the size of potentially unstable rockfalls and wedges to those that can be caught on a bench or in rockfall catchment ditches and berms that can be constructed near the toe of the rock slopes.

5.6.2 Rockfall

Rockfall source areas predominantly consist of the upper weathered portion of the quarry slopes and the bench faces (upper one to two benches). The overall west quarry wall was formed by leaving 30-foot wide

catch benches every 60 vertical feet to form a 0.5H:1V (approximately 63 degrees) overall slope. Based on field observations, these catch benches appear to be effective for control of rockfall during quarry operations. They are also slightly wider than the minimum catch bench width predicted to be effective by the most commonly used criteria (the modified Ritchie criteria) for selecting minimum catch bench width. The modified Ritchie criteria (Ryan and Pryor, 2000) indicates that the minimum catch bench width should be wider than (0.2 x Bench Height) + 15 feet, or 27 feet for 60 foot high benches. Catch benches are left in rock slopes as a temporary rockfall control measure for the protection of personnel and equipment during quarry operations, and may become ineffective as rockfall control measures over time as they become filled with debris. However, inclusion of a pit lake in the quarry reclamation plan will provide an effective exclusion zone for rockfall.

6.0 ENGINEERING ANALYSIS OF PIT SLOPES

Golder's engineering analyses performed on the pit slopes at Clayton Quarry were split into two studies: analyses of the western pit slopes, and analyses of the eastern pit slopes. In our opinion, these are the most critical slopes from a geologic perspective. Southern pit slopes at Clayton Quarry consist of similar geology to those of the eastern pit slopes. However, due to the bench geometry, depth of mining, and exposure of the weathered Knoxville Formation, eastern pit slopes were considered more critical for stability analysis. Similarly, northern pit slopes consist of similar geology to those of the western diabase pit slopes, but western pit slopes have the greatest slope height exposed due to mining.

The level of stability of the bedrock slopes composed of Weathered Diabase and Diabase in the western pit slopes was quantified by performing stability analyses. The analyses completed include:

- Kinematic analyses to evaluate the potential for development of bench and large scale plane shear and wedge failures in the quarry walls that will be exposed after reclamation.
- Limit-equilibrium analyses to evaluate the level of slope stability (factor-of-safety) under both static and seismic loading and the potential for deep-seated failures to occur due to shear through the rock mass.

Several iterations and types of engineering analyses were performed to evaluate the stability of the Diabase and Knoxville rocks forming the eastern pit slopes of the quarry. The analyses completed include:

- Kinematic analyses to evaluate the potential for overall slope instability to develop related to discontinuities (i.e., geologic structures) intersecting the east quarry slope.
- Limit-equilibrium analyses to evaluate a variety of cases for the overall stability of the eastern slopes.

Supplemental analyses were then performed to address specific issues, including:

- The long-term stability of the proposed Knoxville Formation final reclamation slopes

- The stability of the Knoxville Formation and the contact zone between the Knoxville and Diabase where submerged by the proposed pit lake

The following sections discuss each analyses performed for the western and eastern pit slopes.

6.1 Kinematic Analyses of Overall Slopes and Benches

6.1.1 Kinematic Analyses of Overall Western Slope and Benches

The stability of slopes in competent rock can be controlled by structures, or combinations of structures that define kinematically admissible failure modes. A failure formed by discontinuities in the rock mass results when the shear strength of the discontinuities is sufficiently low to allow sliding of an intact rock block along one or more discontinuities, typically in planar, wedge, or a combination of these modes. Each of these modes is described as follows:

- Planar failure can occur where individual discontinuities dip towards the slope face and daylight such that the overlying rock block can displace.
- Wedge failures can occur where two planar structures intersect to form a rock wedge and the line of intersection between the two structures dips toward and daylights in the bench face.
- Toppling failures can occur where there are persistent, closely spaced discontinuities that dip at a high angle into the slope so as to form slabs and blocks of rock that can overturn or topple from the slope. Toppling may occur from steep bench faces, but typically does not form a failure mechanism for an overall slope.

The first step in the kinematic analyses of rock slopes is to assess if discontinuities intersect the slope to form kinematically admissible rock blocks. A kinematically admissible rock block is free to move or slide along discontinuities in the direction of the applied loads such as gravity and seismic forces. If no kinematically admissible failure modes are identified based on evaluation of discontinuity orientations relative to the orientation of the slope face, then rock blocks are not free to displace and the slope is assumed to be stable with respect to the sliding of rock blocks.

If stereonet-based analyses show the potential for planar or wedge failure modes, limit equilibrium methods can be used to calculate a factor-of-safety (FOS) to express the level of stability of the slope. No simple limiting equilibrium analyses methods are available for calculating the FOS for potential toppling failures, and the available methods are most useful for identifying the conditions required for toppling and estimating the effectiveness of rock stabilization measures.

6.1.1.1 Large Scale Structurally Controlled Failures

Regional geologic mapping in conjunction with our site specific mapping does not indicate the presence of large scale faults or other geologic structures that might intersect the quarry slopes to form large structural plane shear or wedge failures. During the site visit, Golder did not observe large scale structures, such as faults or geologic contacts, intersecting the high, east and south facing quarry slopes that might create

plane shear and wedge failures. Therefore, Golder anticipates that the overall slope will be stable relative to this failure mode.

6.1.1.2 Bench Scale Stability (West, North, and South Walls)

The sheeted dike contacts are the only systematic set of discontinuities that have the potential to form bench scale failures over wide areas of the quarry. These contacts dip towards the northwest and therefore are not in an orientation to form plane shear failures in bench faces in the north, west and south quarry walls.

Joint orientations on a stereonet projection (Figure 5.2) indicate the existence of isolated joints that dip at moderate to steep angles (30 to 60 degrees) in all directions. Isolated faults tend to be steeply dipping (greater than 60 degrees) where they are not oriented similarly to the dikes and dike contacts. While these joints and faults may form unstable wedges, plane shears, and topples where they intersect bench faces, they are unlikely to form bench-scale failures over significant or concentrated areas of the quarry walls because they do not have similar orientations over wide areas. Rather they combine to form wedges and plane shears at random locations across the entire pit slopes.

It is not practical, nor can the data be readily obtained, to perform bench scale stability analyses for these potentially unstable rock wedges in the bench faces over the entire quarry wall. Based on the joint characteristic data Golder collected during the site visit, the persistence of these joints is commonly less than about 3 to 20 feet. Therefore, the wedges and plane shears they create are likely to be small and most of the failed material will be caught on the remaining intact benches. These small, infrequent falls of rock from bench faces are most appropriately evaluated as rockfall hazards that are dispersed throughout the portion of the high, steep rock slopes that remains after reclamation. Mitigation measures can then be designed to reduce the rockfall hazard. Mitigation measure include construction of berms, or rockfall barriers, or installation of wire mesh on the slope face.

6.1.2 Kinematic Analyses of Overall Eastern Slope and Benches

Similar to the slopes of the west wall of the quarry, failures in the east wall of quarry will typically follow three modes: planar, wedge, and toppling.

The sheeted dike complex present in the Diabase dips out of the east wall to the west. These dike contacts have the potential to cause bench scale failures at the bottom of the pit; however, they are not anticipated to impact overall global slope stability. The size of these plane shear failures is limited by the persistence and shape of the dike contacts, typically less than 30 feet in length. Few of these have formed in the existing east wall of the quarry; and where they have occurred, they have been removed during mining and bench scaling operations.

The only major structure on the east side of the quarry with sufficient persistence to impact overall quarry slope stability is the contact between the Diabase and the Knoxville Formation. This contact dips to the east into the overall slope of the quarry at about 60 degrees, and thus does not form a kinematically admissible failure. The contact has been mapped in detail and confirmed (see Section 3.1.2). Although the contact is not in an orientation that would allow sliding to occur, small scale toppling failures may occur along the contact daylight, but are not expected to form a failure mechanism for an overall slope. Similarly the existing geologic data appears to indicate that the bedding planes in the Knoxville Formation are either near vertical or dip into the quarry slope and are likewise not in an orientation upon which sliding can occur.

6.2 Limit Equilibrium Analyses of Quarry Pit Slopes

The weight of the soil and rock in pit slopes creates shear stresses within those slopes. Pore pressures in the slope (if present) reduce the available effective shear strength of the rock mass. If the shear stresses are greater than the available effective shear strength over large zones within the slope, the pit slope will become unstable. Such failure mechanisms are evaluated by performing limiting equilibrium analyses along surfaces that pass through the rock mass and mobilize the rock mass shear strength.

6.2.1 Methodology

For this study, the level of stability of the high bedrock slopes was quantified by performing limiting equilibrium slope stability analyses using Spencer's Method of Slices (Spencer, 1967) as implemented in the computer program *SLIDE* 7.022 (Rocscience, 2017). Spencer's method is an "accurate" method that satisfies both horizontal and vertical force and moment equilibrium. It provides calculated factors-of-safety (FOS) that are comparable to values calculated by other "accurate" methods. Algorithms programmed within *SLIDE* generate trial slope surfaces and identify the surface with the lowest FOS (critical surface). This minimum FOS of all of the trial surfaces provides an indication of the level of stability of the slope. For static loading, the minimum acceptable factor-of-safety is typically between 1.20 and 1.30 for slopes with a low consequence of failure (Duncan and Wright, 2004; Read and Stacey, 2009). Golder considers a FOS $\geq$ 1.30 to be appropriate for application to the Clayton Quarry.

Golder selected two sections for the analysis of the quarry pit: Section C-C' represents the critical section for the highest pit slopes in the western wall; and Section B-B' represents the critical section for the highest and steepest pit slopes in the eastern wall of the quarry. Both sections are shown on Figure 1.2.

For the western pit slopes comprised of Diabase, Golder limited the search for the most critical shear surfaces to represent deep seated failures, that is, shear surfaces passing through the rock mass that are typically at least 20 to 30 feet behind the slope surface. Shallower failure surfaces would typically only form along rock discontinuities and the stability of such shallow failure surfaces was evaluated by kinematic analyses discussed in Sections 6.1.1 and 6.1.2.

For the eastern pit slopes, a variety of geology will exist in the exposed face of the pit. Therefore, Golder searched for the most critical shear surfaces under four failure conditions: (1) failure surfaces that pass through the entire overall slope configuration (crest to pit bottom); (2) failure surfaces that pass from the uppermost bench in the Knoxville and daylight in the Diabase; (3) failure surfaces that pass from the uppermost bench in the Knoxville and daylight in the Knoxville/Diabase Contact zone; and (4) failure surfaces entirely contained in Knoxville. Golder limited our search to failures that would pass below individual benches, as bench failures would most likely consist of sliding of rock blocks as discussed in Section 5.6 and would be either be removed during mining as part of normal operations or retained on catch benches left in the slope.

Our current understanding is that the Reclamation Plan recognizes that a pit lake will form many decades following reclamation at a maximum elevation at 735 feet controlled by the elevation of an outlet to the north side of the quarry. To evaluate the effect that the pit lake has with respect to the stability of the quarry walls, Golder performed additional analyses that included a pit lake at elevation 735 feet and saturated pit slopes.

6.2.2 Rock Mass Properties

Rock mass properties required for limiting equilibrium slope stability analyses consist of the rock mass shear strength and the unit weight of the rock. The typical specific gravity of the Diabase is 2.81 based on Cemex's laboratory testing performed at the quarry (verbal communication R. Nielson, 2014). This specific gravity corresponds to a unit weight of approximately 175 pcf.

The practical limitations for shear strength testing of the rock mass in the laboratory (samples are too small to be representative) requires that empirical methods be used to estimate rock mass shear strength for strong, fractured rock such as the Diabase. For this study, Golder estimated the rock mass shear strength based on an empirical method initially developed by Hoek and Brown (1980) and subsequently modified based on experience (Hoek and Brown, 1988; Hoek et. al., 2002). This is the most widely used method of estimating rock mass shear strength for pit slope stability and is the standard of practice in the industry.

The Hoek-Brown failure criteria defines the strength of a rock mass as a function of the parameters: m_b, s, and a. These are in turn defined by the following properties:

- Uniaxial Compressive Strength (UCS) of the intact rock (Table 5.1)
- Geologic Strength Index (GSI) of the rock mass (Table 5.2)
- A material constant, m_i, of the intact rock
- A disturbance factor, D, that accounts for loosening of the rock mass due to blast damage or stress relief

The material constant, m_i, can be determined from triaxial tests on intact rock; however, where these are not available, an approximate value of m_i, can be selected from published values based on rock type. Hoek

and Karzulovic (2000) indicate that the value of m_i for diabase can range from 10 to 20; Golder used an average m_i of 15 for our analyses. For the Knoxville Formation, Golder assumed an average value of m_i = 7 for sedimentary rocks consisting of sandstone, siltstone and claystone. Golder also used a m_i of 7 for the Knoxville/Diabase Contact as it appears to consist of mostly fine-grained material likely derived from the Knoxville Formation.

The value of the disturbance factor, D, was selected based on guidelines developed by Hoek (2012). D can range from 0 to 1.0 with lower values indicating lesser degrees of disturbance due to stress relief and blast damage. A disturbance factor, D, of 0 was selected for use in our analysis for the portion of the rock mass located deep in the slope. This is an appropriate value to use for D when little stress relaxation occurs and benches are formed by controlled blasting. For the Weathered Diabase at the crest of the west quarry slope, Golder estimated that D is equal to 0.7, corresponding to a condition in which some loosening of the rock mass has occurred due to stress relief. Hoek (2012) indicates stress relief and blast damage typically only occurs to a depth into the slope equal to at most one or two bench heights. Golder did not assume a disturbed zone for the Diabase in our analyses because the purpose of those analyses was to estimate the stability of the overall slope for shear surfaces located deep in the slope far away from any rock mass in bench faces that may be blast damaged or loosened due to stress relief.

A summary of the values of UCS, RMR_{76}, m_i, and D used in the Hoek-Brown Failure Criterion formulas to obtain the Hoek-Brown rock mass shear strength parameters, m_b, s, and a, used in our analyses is provided in Table 6.1.

Table 6.1: Rock Mass Properties for Quarry Pit Slope Stability Analyses

Geotechnical Unit	Unit Weight (pcf)	Hoek-Brown Failure Criterion						
		UCS (psi)	GSI	mi	D	mb	s	a
Diabase	175	18300	55	15	0	3.007	0.006738	0.5040
Weathered Diabase (undisturbed)	175	5300	35	15	0	1.4720	0.00073	0.5159
Weathered Diabase (disturbed)	175	5300	35	15	0.7	0.42173	0.00008	0.5159
Knoxville/Diabase Contact	150	7400	20	7	0	0.40203	0.000138	0.5437
Knoxville Formation	140	3000	20	7	0	0.40203	0.000138	0.5437

6.2.3 Seismic Loading

For this study, Golder evaluated the effect of seismic loading on the rock slopes by performing a pseudo-static analysis. A pseudo-static analysis is a type of limit-equilibrium analysis used to assess the level of stability of a slope subjected to ground accelerations likely to be experienced at the site during an

earthquake. Golder selected a k value of 0.21 g for pseudo-static slope stability analysis of the quarry pit slopes. Development of the seismic coefficient (k) used in this analysis is described in Section 2.4 and consistent with the recommendations for performing pseudo-static analyses developed by Blake, et. al. (2002). A pseudo-static FOS greater than or equal to 1.00 assuming k = 0.21g indicates the performance of the slope will be acceptable under seismic loading.

6.2.4 Results of Analysis

For each case discussed in Section 6.2.1, at the end of mining and after reclamation, the results of the slope stability analyses are summarized in the following table:

Table 6.2: Results of Quarry Pit Slopes Stability Analyses

Figure	Quarry Wall	Section	Case	Stage of Operation	Factor-of-Safety (FOS)	
					Static k = 0g	Seismic k = 0.21g
6.1	West	C-C’	Overall Slope	End of quarry operations, pit floor at el. 110 ft	2.40	1.84
6.2			Overall Slope	Reclaimed pit with pit lake to el. 735 ft	2.45	1.75
6.3	East	B-B’	Overall Slope	End of quarry operations, pit floor at el. 110 ft	2.17	1.65
6.4			Overall Slope	Reclaimed pit with pit lake to el. 735 ft	2.44	1.52
6.5			Toe of Surface in Diabase	End of quarry operations, pit floor at el. 110 ft	2.05	1.51
6.6			Toe of Surface in Diabase	Reclaimed pit with pit lake to el. 735 ft	2.25	1.46
6.7			Toe of Surface in Contact Zone	End of quarry operations, pit floor at el. 110 ft	1.79	1.28
6.8			Toe of Surface in Contact Zone	Reclaimed pit with pit lake to el. 735 ft	1.85	1.09
6.9			Toe of Surface in Knoxville	End of quarry operations, pit floor at el. 110 ft	2.26	1.57
6.10			Toe of Surface in Knoxville	Reclaimed pit with pit lake to el. 735 ft	2.23	1.54

The critical shear surfaces for each of the analyses listed in Table 6.2 are provided in Figures 6.1 through 6.10. The critical shear surface is not the shear surface over the full height of the slope due to the high strength Diabase unit in the toe of the slope

The lowest factor-of-safety of 1.09 (seismic) was obtained from the shear surface shown in Figure 6.12 that passes through the Knoxville/Diabase Contact with the pit lake at elevation 735 feet.

The minimum acceptable factors-of-safety are:

- Static Loading Only (k=0): FOS $\geq$ 1.30
- Seismic Loading (k=0.21): FOS $\geq$ 1.00.

The results of these analyses indicate acceptable factors-of-safety are achieved for both static and seismic loading for the overall slope and therefore the proposed slopes meet the requirements of SMARA (Section 1.0).

6.3 Supplemental Analyses of Knoxville Slopes (East Wall of Quarry)

To further evaluate the long-term stability of proposed slopes in Knoxville formation materials, Golder performed supplemental engineering analyses considering a variety of conservative conditions. For our evaluations, Golder reviewed the site conditions upon which our original design slope recommendations were based. Golder then used these observations to: (1) check if the estimates of the shear strength properties for the Knoxville Formation were reasonable, (2) perform sensitivity analyses of shear strengths, (3) simulate the effect of weathering of the Knoxville by reducing the strength properties and performing additional slope stability analyses with the reduced strength values, and (4) consider long-term conditions associated with filling of the pit lake over time (i.e., submergence of Knoxville earth materials and potential wave erosion).

6.3.1 Natural Slopes versus Cut Slopes

While observations of natural slopes that occur in the Knoxville Formation are as flat as 2H:1V, these flatter slopes are produced by geomorphic processes that occur over long periods of geologic time. Significant deep-seated landslides in the Knoxville are most likely to occur along weak bedding planes in the formation. Geologic maps of the area, and Golder's observations of the cut slopes in in the Quarry, indicate that the dip of bedding ranges from moderate dips to the east to near vertical. Therefore conditions conducive to deep-seated failures do not exist at the Quarry.

Deep-seated failure of the Quarry slopes cut in the Knoxville would require shear displacements through alternating weaker and stronger beds that form the rock mass. The Knoxville contains relatively strong siltstone and sandstone layers that preclude such failures even though there are weaker interbedded intervals. Such slopes have an analogue near the north end of the Quarry (Figure 6.11) where there is presently a 60 foot high slope that has been excavated into the Knoxville. The slopes of this cut slope range from 33 to 39 degrees (approximately 1.5H:1V to 1.25H:1V).

Weathering of the Knoxville material since the slope was cut does not appear to have resulted in deep weathering and loss of strength in the slope. Rather the Knoxville bedrock slakes to a depth of a few inches to perhaps a foot deep and forms talus that covers the lower portion of the slope. In Golder's opinion, this slope represents the best analogue for the proposed east quarry slope that will be excavated in the Knoxville Formation, and provides the best guidance for estimating the likely behavior of the material in the future. In summary, Golder's observations and analyses of this slope (see further below), indicates that slopes in the Knoxville can stand for considerable periods of time at slopes steeper than 2H:1V.

6.3.2 Analyses of Shear Strength Sensitivity

Unlike soils, the strength of a rock mass is difficult to estimate as the strength is scale dependent, and it is difficult to obtain intact samples of materials on which to perform laboratory tests. In the absence of laboratory testing, the stability of cuts in rock, where shear surfaces pass through numerous layers of thinly bedded intact rock and not along discontinuities, is typically assessed through the use of empirical shear strength criteria — the Hoek-Brown criteria being the most widely accepted. The suitability of these criteria for slope design are assessed where possible by back analyses of stable and unstable slopes in similar rock masses. At the Clayton Quarry, the estimated shear strength of the Knoxville rocks Golder used in the analyses is consistent with the stable slopes containing Knoxville material observed immediately north of the quarry (Figure 6.11).

To test if Golder's estimates of shear strength of the Knoxville are consistent with the observations of stable slopes along the north end of the quarry, Golder performed a slope stability analysis of this slope. Using the shear strength properties summarized below (Table 6.3), Golder calculated a factor-of-safety equal to approximately 2.71 for static loading; consistent with the observation of the stable 60 foot high slope. Under seismic loading, the factor-of-safety for this slope is approximately 1.94 (Figure 6.12).

Table 6.3: Material Properties for Shear Strength Sensitivity Analysis of Knoxville and Diabase

Geotechnical Unit	Unit Weight (pcf)	Hoek-Brown Failure Criterion						
		UCS (psi)	GSI	mi	D	mb	s	a
Diabase	175	18300	55	15	0	3.007	0.006738	0.5040
Knoxville/Diabase Contact	150	7400	20	7	0	0.40203	0.000138	0.5437
Knoxville Formation (Best Estimate)	140	3000	20	7	0	0.40203	0.000138	0.5437
Knoxville Formation (Reduced Shear Strength)	140	1200	20	7	0	0.40203	0.000138	0.5437

The estimate of the Unconfined Compressive Strength (UCS = 3000 psi) used to estimate the Hoek-Brown rock mass shear strength properties in Table 6.3 was based on a weighted average of the estimated UCS of the materials encountered in corehole B-1 (Appendix A). This weighted average included core intervals that included both rock materials and weaker more soil-like materials. Corehole B-1 was advanced through an overburden stockpile to intersect about 55 feet of the Knoxville Formation immediately below what was once the original ground surface. This material would have been weathered in-place and therefore B-1 intersected material that is already weathered and additional weathering may not substantially reduce the UCS further.

In Golder's opinion, the strength estimates made on the core from corehole B-1 provides the best estimate of the strength of the intact, weathered Knoxville Formation that will be left in the east quarry wall at the end of mining, and the UCS (3,000 psi) assigned to our original analyses was a conservative estimate of the strength of the Knoxville Formation.

Furthermore, using Golder's best estimates of rock mass shear strength, it would be possible to cut slopes in the Knoxville Formation that are actually steeper than those recommended in this report. This is demonstrated in results of stability analyses shown in Figure 6.13 and presented in Table 6.4 below. For these analyses, Golder estimated the steepest bench face and inter-ramp slope angles in the Knoxville of 86.5 and 61 degrees, respectively. Therefore Golder's proposed slopes are relatively conservative and should perform adequately.

Table 6.4: Results for Steepest Slopes in Knoxville Formation Using Best Estimate of Shear Strength

Figure	Quarry Wall	Section	Bench Face Angle (˚)	Inter-ramp Angle (˚)	Bench Height (ft)	Bench Width (ft)	Factor-of-Safety (FOS)	
							Static k = 0g	Seismic k = 0.21g
6.13	East	B-B'	86.5	61	60	30	1.09	-
			72	50	60	30	-	1.03

As a further demonstration that the slopes proposed in the Knoxville Formation will remain stable, Golder performed additional analyses using reduced UCS for the Knoxville Formation. For these analyses the UCS was reduced to 1200 psi. This strength is typical for poorly indurated shale and claystone, but not the more indurated siltstone/sandstone that forms a good portion of the Knoxville formation encountered in corehole B-1. A UCS of 1200 psi is about 40% Golder's best estimate of the average value of the UCS (3000 psi) based on the field logging and the point load tests and is considered very conservative. The results of these analyses are shown in Table 6.5 below.

Table 6.5: Results of Slope Stability Analyses with Reduced Shear Strength in Knoxville Formation

Figure	Quarry Wall	Section	Case	Condition	Factor-of-Safety (FOS)	
					Static k = 0g	Seismic k = 0.21g
6.14	East Wall	B-B'	Overall Slope	End of quarry operations, pit floor at el. 110 ft	1.70	1.19
6.15			Overall Slope	Reclaimed pit with pit lake to el. 735 ft	1.67	1.16
6.16			Single Bench Failure	End of quarry operations, pit floor at el. 110 ft	1.78	1.30
6.17			Single Bench Failure	Reclaimed pit with pit lake to el. 735 ft	2.07	1.25

The results of these analyses all indicate bench and overall slopes in the Knoxville Formation with acceptable factors-of-safety, even when reduced values of the average UCS of the rock units is assumed.

6.3.3 Stability of Submerged Knoxville and Knoxville/Diabase Contact Zone

Golder performed additional stability analyses to evaluate the potential effects of weathering in the submerged Knoxville Formation and Knoxville/Diabase Contact zone on the stability of the overall slope with the proposed design. This included a bench face angle (BFA) of 45 degrees, an inter-ramp angle (IRA) of 37 degrees, and a pit lake elevation at 735 feet.

A photograph of benches in the east quarry slope composed of material at the contact between the Knoxville Formation and the Diabase is shown in Figure 6.18. Golder's observation of this material is that the rock formation is composed of a highly fractured rock mass. The individual blocks and particles of rock are typically composed of a dark, aphanitic, medium strong to strong rock. The parent rock type cannot typically be determined visually in the field but is likely derived from both the Diabase and Knoxville Formation. The contact material does not appear to contain abundant clay and silt particles that might slake upon immersion in water. While slickensides were observed on some of the surfaces of some particles, these slickensides are interpreted as the result of tectonic emplacement of the Diabase, and are not the result of shearing in soil-like materials related to near surface slope failure processes.

As part of our field studies, Golder performed jar slake tests (Caltrans, 2010) on particles of rock obtained from Knoxville formation near the contact zone. This is a simple test to evaluate slaking potential that consists of observing the behavior of material following immersion in water. Two samples were tested, and both were given a jar slake index value of 6, the highest value possible indicating no change in condition of the sample. Based on this test, Golder concluded that the material from the contact zone was likely non-

slaking. The rock forming benches shown in Figure 6.18 also do not appear to have degraded from slaking in air; however, bench slopes and crests appear to ravel in the highly fractured rock mass due to the highly fractured and blocky nature of the material. This raveling is a natural, and shallow process that does not increase or indicate the potential for a deep-seated failure. And, this process can be controlled through proper drainage control and re-vegetation.

To further analyze the issue, Golder performed additional stability analyses to evaluate the potential effects of reduced bench face angles due to sloughing and shallow failure of the bench faces in the submerged Knoxville and Knoxville/Diabase Contact zone. Golder evaluated the stability of the slope assuming that the bench faces in the Knoxville/Diabase Contact zone would ravel or slough back to about 60 degrees. Golder performed this analyses using both the best estimate shear strength properties in the Knoxville Formation, and also using reduced shear strengths. The results of these analyses are summarized in Table 6.6 and shown in Figures 6.19 through 6.22.

Table 6.6: Results of Slope Stability Analyses of Submerged Knoxville and Contact Zone

Figure	Quarry Wall	Strength	Case	Condition	Factor-of-Safety (FOS)	
					Static k = 0g	Seismic k = 0.21g
6.19	East	Best Estimate of Shear Strengths	Toe of Surface in Knoxville	Reclaimed pit with pit lake to el. 735 ft	2.37	1.62
6.20			Toe of Surface in Contact Zone	Reclaimed pit with pit lake to el. 735 ft	2.49	1.68
6.21		Reduced Shear Strength in Knoxville Formation	Toe of Surface in Knoxville	Reclaimed pit with pit lake to el. 735 ft	1.65	1.11
6.22			Toe of Surface in Contact Zone	Reclaimed pit with pit lake to el. 735 ft	1.57	1.00

In conclusion, it is Golder's opinion that potential shallow failures in the Knoxville/Diabase Contact material will not result in significant slope instability at the crest of the pit. First, based on Golder's site observations and slake tests, this material does not appear to slake upon immersion in water. Second, even if the benches recede from near vertical to a shallower slope (about 60 degrees) from small scale failures, raveling or erosion; Golder's slope stability analyses predict the slope will retain adequate factors-of-safety with respect to global stability. This remains the case even when reduced shear strengths are used in the Knoxville Formation to account for weathering of that material. Lastly, raveling and subaerial erosion is a natural and shallow process that does not increase or indicate the potential for a deep-seated failure and can be managed during reclamation through proper drainage control and re-vegetation.

6.3.4 Potential Wave Erosion of East Wall

The revised Reclamation Plan designates a planned end use of open space for the quarry. As part of this plan, it is anticipated that the quarry pit will slowly fill with stormwater to form a quarry lake with a controlled outflow with a lake elevation of 735 feet msl (EMKO 2017).

Although the pit lake is relatively small, and wave heights will likely also be small (< 2 feet), the shore of the pit lake may require riprap protection to protect against wave erosion. It is recommended that riprap be designed based on an evaluation of historical wind data to estimate the design wave height at the shore and appropriate design guidelines (e.g., USACE 2006; Racin et al 2000). Note that the pit lake will not form for many decades (EMKO 2017) and therefore the need for, and design of, any riprap can be developed following completion of mining.

7.0 STABILITY ANALYSIS OF SOUTH OVERBURDEN FILL SLOPES

Stability analyses were performed to develop appropriate recommendations for permanent overburden fills that will be constructed on the east-facing slopes located southeast of the quarry (Figures 1.2 and 1.3).

7.1 Methodology

For evaluating the stability of overburden fill, Golder estimated the soil shear strength based on the Mohr-Coulomb strength criterion. This is the most widely used method of estimating soil shear strength for slope stability and is the standard of practice in the industry. The Mohr-Coulomb strength criterion is used to estimate the state of stress at failure on a potential sliding mass by relating a soil's angle of internal friction (friction angle, ϕ) to its cohesion (c). The cohesiveness of a soil indicates its ability for soil particles to adhere to each other when unconfined. Clay are cohesive soils which maintain their shape without confinement and have non-zero cohesion, whereas sands are described as cohesionless soils (c=0). The effective friction angle (ϕ') and effective cohesion (c') are used to estimate effective stresses acting on a potential sliding mass at failure. Effective stress is defined as the total stress acting on the slide plane minus the effects of pore water pressure.

Laboratory testing indicates that the overburden fill consists of majority coarse grain soils classified as lean (low plasticity) clayey sands and gravels (SC and GC). In estimating effective Mohr-Coulomb strength parameters (listed in Section 7.2), Golder assumed that the overburden fill was a cohesionless soil (c'=0 psi).

For the evaluation of the South OFA, Golder performed an infinite slope analyses to assist in selecting an appropriate slope for design of the overburden fill. In an infinite slope analysis, the potential sliding mass is assumed to be a long, thin slab of material sliding on top of a continuous shear surface that is parallel to

the sloping ground surface. This will be the critical shear surface (surface with the lowest factor-of-safety (FOS)) for long straight continuous slopes composed of a cohesionless Mohr-Coulomb material.

The pseudo-static FOS for an infinite slope in a dry, Mohr-Coulomb material is calculated as follows (Duncan and Wright, 2004):

$$FOS = \frac{c' + (\gamma z \cos^2(\beta) - k\gamma z \cos(\beta)\sin(\beta))\tan(\phi')}{\gamma z \sin(\beta)\cos(\beta) + k\gamma z \cos^2(\beta)}$$

Where:

- c' = effective cohesion
- z = depth of failure surface
- γ =the saturated unit weight of the soil
- β = the slope of ground surface
- ø' = effective friction angle of the soil
- k = seismic coefficient (k=0g for static analyses)

For this study, Golder evaluated the effect of seismic loading on the overburden fill slopes by performing a pseudo-static analysis. A pseudo-static analysis is a type of limit-equilibrium analysis used to assess the level of stability of a slope subjected to ground accelerations likely to be experienced at the site during an earthquake. Golder selected a k value of 0.18 g for pseudo-static slope stability analysis of the overburden fill area. Development of the seismic coefficient (k) used in this analysis is described in Section 2.4 and consistent with the recommendations for performing pseudo-static analyses developed by Blake, et. al. (2002). A pseudo-static FOS greater than or equal to 1.00 assuming k = 0.18g indicates the performance of the overburden fill slope will be acceptable under seismic loading.

7.2 Material Properties

Table 7.1 summarizes the estimated strength parameters for the overburden fill and the soil-like foundation materials below the fill. Note that the Mohr-Coulomb properties are approximately equivalent to the Hoek-Brown properties for the Knoxville Formation shown in Table 6.1.

Table 7.1: Material Properties for South OFA Overburden Fill and Foundation

South OFA Overburden Fill Area		Strength Parameters	
		Mohr-Coulomb	
Geotechnical Unit	**Unit Weight (pcf)**	**Effective Friction Angle (ϕ') (˚)**	**Effective Cohesion (c') (psi)**
Overburden Fill	135	34	0
Overburden Fill/Knoxville Contact	125	25	0

Knoxville Formation (highly weathered)	125	25	3.5
Knoxville Formation (moderately weathered)	140	25	20.8

7.3 Results

The results of infinite slope analyses for use in design of overburden fills at the South OFA are typically conservative because they assume a very thin layer of soil slides along an infinitely long slope. The actual overburden fill will have some finite dimension, and the thickness of the shear surface of interest is likely to be greater than just a few feet deep. Although slope stability analyses that include a search for a critical shear surface will yield somewhat higher factors-of-safety than the infinite slope analyses performed, the infinite slope analyses provide an indication of the maximum slope of the fill where calculated FOS values begin to fall below the design FOS (FOS $\geq$ 1.00 for seismic loading and FOS $\geq$ 1.30 for static loading). In this way, the slope angles from the infinite slope analyses can provide constraints on the maximum achievable slope angles for overburden fill that will satisfy SMARA requirements for static and seismic stability.

The results of the stability analyses indicate adequate factors-of-safety for a 2H:1V slope (approximately 26.6 degrees) under static loading; however, this slope would not have an adequate factor-of-safety under seismic loading (Table 7.2). The pseudo-static analyses indicate the slope would have to be flatter than 2.3H:1V (approximately 23.5 degrees) to achieve a FOS $\geq$ 1.00 under seismic loading; therefore Golder recommends that future overburden fill slopes be designed at an overall maximum slope of 2.5H:1V (approximately 21.8 degrees).

Table 7.2: Results of Infinite Slope Analyses for Overburden Fills

Slope Angle (degrees)	Factor-of-Safety (FOS)	
	Static k = 0g	Seismic k = 0.18g
21.8 (2.5H:1V)	1.69	1.08
23.5 (2.3H:1V)	1.55	1.01
26.6 (2.0H:1V)	1.35	0.90
33.7 (1.5H:1V)	1.01	0.70

The current proposed design for the South OFA is presented in Figure 1.2 and consists of slopes at 2.5H:1V or flatter. Based on Golder's infinite slope analyses, the proposed South OFA design is adequate to meet stability requirements. To support the infinite slope analyses, Section A-A' was evaluated to check the stability of the proposed South OFA under both static and pseudo-static loading for three cases: (1) overall stability of the overburden fill, (2) stability of the contact between the fill and the foundation, and (3) the

stability of the foundation beneath the overburden fill. Highly weathered Knoxville Formation was modeled to a depth of 50 feet below the contact of the overburden fill and the existing ground.

The results of these analyses (Table 7.3 below) indicate that the proposed South OFA design is adequate to meet the slope stability requirements imposed by SMARA. The SLIDE model outputs for these results are shown in Figures 7.1 through 7.3.

Table 7.3: Results of Proposed South OFA Slope Stability Analysis

Figure	OFA	Section	Case	Factor-of-Safety (FOS)	
				Static k = 0g	Seismic k = 0.18g
7.1	South	A-A'	Overall Slope Stability in Fill	1.72	1.10
7.2		A-A'	Fill-Foundation Contact Stability	1.56	1.01
7.2		A-A'	Foundation Stability	1.56	1.00

8.0 STABILITY ANALYSIS OF NORTH OVERBURDEN FILL AREA (OFA) SLOPE FAILURE

Golder performed a limit equilibrium stability analysis on a section through the North OFA that included a back analysis of the existing slide to assess residual strengths of the slide material and model the estimated failure plane geometry. Residual strengths obtained in the back analysis were compared to laboratory test results.

Material properties utilized data presented in previous studies conducted in the project area, and from data obtained during the field and laboratory testing programs conducted for this investigation. Material properties utilized in the analyses are summarized in Section 8.2.

8.1 Methodology

Golder used the two-dimensional limit-equilibrium stability model *SLIDE* 7.022 (Rocscience, 2017) for stability analysis based on Mohr-Coulomb material properties (described in Section 7.1). This program allows for potential sliding surfaces in a stability section, both circular and non-circular, to be either pre-selected or automatically generated. *SLIDE* 7.022 allows the use of multiple methods of analyses which vary depending on assumptions used for equilibrium in the model. Based on our experience, Golder selected Spencer's Method of Slices to analyze the failure surfaces, a method that satisfies both force and moment equilibrium for all the slices of each model. Minimum factors-of-safety (FOS) $\geq$ 1.50 and 1.00 were utilized for static and pseudo-static analysis, respectively, to meet SMARA requirements (Section 1.0). The minimum FOS for static slope stability was increased from FOS $\geq$ 1.30 to FOS $\geq$ 1.50 for the design of the

buttress at the North OFA to account for uncertainties in the subsurface conditions as well as differences that may occur between the buttress design and the constructed buttress.

Separate *SLIDE* analyses were performed on Section D-D' (Figure 1.2) to evaluate the slide plane as well as potential failure modes of the keyway and gravity buttress remedial design. The following failure modes were evaluated for the facilities:

- Block surfaces, non-circular (slide plane) – used to evaluate failure mechanisms that develop along preferential zones of weakness. These surfaces extend from the crest of the slope and pass along a designated failure plane and exit at the toe of the slope. This failure mode was used to assess the weak residual clay zone that was identified as the likely slide plane.
- Overall slope surfaces, circular type – used to evaluate failure mechanisms that develop through the full height of the slopes and represent a global (or overall) slope failure. These surfaces extend from the crest of the slope and exit near the toe of the slope. This failure mode was used to evaluate stability of the buttress fill slopes at ultimate build-out.

8.2 Material Properties

The subsurface was broken down into four main material types as follows:

- Existing Overburden Fill – Existing uncontrolled overburden fill material currently on site
- Knoxville, Coarse Grained – Residual Knoxville Formation soil that classifies as a clayey sand with gravel.
- Knoxville, Fine Grained – Residual Knoxville Formation soil that classifies as fat to lean clays with varying sand content (slide plane material)
- Buttress Fill – Engineered fill properly moisture conditioned and compacted for construction of a gravity buttress. This material may be comprised of suitable overburden or imported fill meeting specified strength and particle size distribution requirements.

Based on the results of the laboratory testing and subsurface conditions observed during the field exploration program, the moist unit weights and Mohr-Coulomb strength properties utilized for stability analysis for each material type are presented in Table 8.1. In addition, a back analysis of the slide, and a sensitivity analysis of the potential slide material, were performed to obtain suitable strength parameters of the assumed slide plane material for use in analyzing design recommendations for remediation.

Table 8.1: Material Properties for North OFA Stability and Slide Area

Geotechnical Unit	Unit Weight (pcf)	Effective Friction Angle (ϕ') (˚)	Cohesion (c) (psi)
Existing Overburden Fill	130	32	0
Coarse Grained Residual Soil[1]	125	35	0
Fine Grained Residual Soil (Slide Plane)	125	9.25	0

Buttress (Engineered Fill)	135	34	0

Note: [1] Derived from Knoxville Formation

8.2.1 Existing Overburden Fill

Variations likely exist within the existing overburden at the North OFA based on various areas and depths of stripping; however, it is assumed based on Golder's understanding of materials at the Clayton Quarry, the existing overburden likely comprises primarily granular material (disaggregated Knoxville bedrock), similar to the clayey sands and gravels selected for laboratory testing (Table 4.3). The in-place moist density of the existing overburden fill was selected based on the laboratory density test results and was estimated to be on the order of 130 pcf. Triaxial test results indicate an effective shear strength of 39 degrees when compacted to 85% relative compaction. Conditions related to previous placement of overburden at the North OFA are unknown (i.e., equipment used, number of passes, etc); although the material was not documented as engineered fill. Considering this lack of information, and variations in the quality and type of fill already placed at the North OFA, a conservative effective friction angle of 32 degrees and zero cohesion was selected for analysis of the slope failure area.

8.2.2 Coarse Grained Residual Soil

The coarse grained residual soil derived from the Knoxville Formation is similar to clayey sands and gravels with very dense relative densities. Unit weights of selected samples ranged from 126 to 136 pcf; therefore, the in situ moist unit weight of the material was estimated at 125 pcf. Based on the results of the direct shear test, the strength parameters for this foundation material were selected as an effective friction angle of 35 degrees and zero cohesion.

8.2.3 Fine Grained Residual Soil (Slide Plane)

In our subsurface investigation, a zone of fat clay derived from shearing of residuals soils formed on the Knoxville Formation was identified as the likely basal rupture surface of the landslide. A back analysis of the existing slide was performed utilizing the results of Golder's field exploration in conjunction with the topographic survey provided by Cemex prior to the slope failure in 2016. Based on the results of the back analyses, the residual friction angle of this material at a FOS=1.00 was estimated at 9.25 degrees. Results of the torsional ring shear analysis ranged from 8 to 11 degrees which agreed well with the back analyses. Therefore, a residual shear strength of 9.25 degrees (no cohesion) was used in Golder's analysis. Results of the back analysis are presented in Figure 8.1.

8.2.4 Buttress (Overburden Fill)

A gravity buttress will be placed to stabilize the North OFA and slide area. The gravity buttress fill will be placed as engineered fill, properly moisture conditioned and compacted in accordance with the recommendations of design report (Golder 2016c). Toe and blanket drains beneath the buttress will be

installed prior to placement of Buttress Fill to allow for drainage of water that may infiltrate the fill material. Additional drainage channels will be installed around the perimeter of the buttress, including on the western slopes where the buttress meets the existing fill slope (Appendix D).

Existing overburden material consisting of clayey sands and gravels may be utilized as buttress fill if it meets the specified requirements. Assuming the material will comprise overburden material derived from stripping activities, the triaxial shear test and Modified Proctor compaction test results were utilized to develop parameters for buttress fill material. The overburden fill compacted to a moisture content of 8 percent (optimum moisture content) will have an approximate relative density of 136 pcf if the material is compacted to 90 percent of optimum. The triaxial test results indicate an effective shear strength of 39 degrees at 85 percent relative compaction. Assuming buttress fill will be placed as engineered fill in accordance with the recommendations of this report, Golder selected a moist unit weight of 135 pcf, an effective shear strength of 34 degrees, and zero cohesion for use in stability analysis. This lower friction angle was conservatively selected for design to allow for potential variations in the available material.

8.3 Seismic Loading

For this study, Golder evaluated the effect of seismic loading on the overburden fill slopes by performing a pseudo-static analysis. A pseudo-static analysis is a type of limit-equilibrium analysis used to assess the level of stability of a slope subjected to ground accelerations likely to be experienced at the site during an earthquake. Golder selected a k value of 0.18 g for pseudo-static slope stability analysis of the overburden fill area. Development of the seismic coefficient (k) used in this analysis is described in Section 2.4 and consistent with the recommendations for performing pseudo-static analyses developed by Blake, et. al. (2002). A pseudo-static FOS greater than or equal to 1.00 assuming k = 0.18g indicates the performance of the overburden fill slope will be acceptable under seismic loading.

8.4 Assumptions

The following assumptions were made for the limit-equilibrium slope stability analyses:

1. The ground water table is assumed to be significantly deep so that it does not affect the stability of the overburden facility; however, perched water was encountered in the existing overburden fill and was modeled within the overburden fill and overlying foundation materials.
2. The construction of subsurface toe drains and blanket drains along the length of the shear key will help to prevent buildup of pore pressures within the Buttress Fill. In addition, drainage benches and collection channels around the perimeter of the buttress will be constructed to drain run-off to a discharge point at the toe of the slope.
3. Buttress Fill will consist of Clayton Quarry overburden materials.
4. Where specified (i.e., keyway), residual clay soils will be removed in their entirety to expose coarse-grained Knoxville Formation and will be replaced with engineered Buttress Fill.

8.5 Results of Analysis

Based on Golder's analysis, improvement in the stability of the existing North OFA slope is attained by a combination of removing and replacing the slide material with materials that have higher strength properties (shear key), coupled with adding weight to the toe of the slide to counteract the driving forces from the upper portion of the slide (gravity buttress fill). Strengthening the material in the lower portion of the slide is achieved by removing the weak residual clays and replacing them with buttress fill. Section D-D' was altered and additional stability analyses were performed for each iteration of design alterations to find the dimensions of removal and replacement required to provide sufficient improvements to the slope. The amount of material just along Section D-D' that would need to be removed and replaced to achieve stability had a length greater than 1000 feet and a depth up to 90 feet. This indicated that the total volume of material that would need to be removed and replaced was not practical for construction. Less material could be removed and a buttress fill added to the toe area to achieve stability. Again, the cross section was altered and stability analyses were performed to determine the height and location of the buttress fill coupled with removal and replacement of the residual clays to sufficiently improved slope stability to meet FOS requirements for the site.

The ultimate buttress design to achieve stability is presented in Appendix D.

The calculated static FOS for static and pseudo-static loading conditions is summarized in Table 8.2. Results of slope stability analyses for both facilities are shown in Figures 8.2 through 8.3. The results show the critical failure surfaces (i.e., the surface with the lowest FOS value) identified for each loading condition.

Table 8.2: Results of North OFA Ultimate Buttress Design Slope Stability Analysis

Figure	OFA	Section	Failure Mode	Factor-of-Safety (FOS)	
				Static k = 0g	Seismic k = 0.18g
8.2	North	D-D'	Block Failure Along Slide Plane	1.91	1.01
8.3		D-D'	Buttress Fill Overall Slope	1.79	1.15

Calculated FOS's were found to be above the minimum criterion for stability indicating the proposed design will provide stability improvements for the OFA. Pseudo-static loading is considered to be the critical failure mode of the proposed improvements.

9.0 SEICHE GENERATED BY ROCKFALL

Golder performed a desktop analysis on the potential generation of a subaerial landslide generated wave (SLGW) due to a theoretical failure of the south pit-slope at Clayton Quarry; and the potential consequences of a SLGW on wave run-up and overtopping of a spillway weir on the opposite side of the pit lake. Appendix

C to this report provides the detailed empirical analyses performed to estimate the wave height, period and potential discharge related to overtopping of the lake outlet in the scenario that the reclaimed pit lake elevation is at 735 feet. A variety of mitigation options were evaluated. The methodology employed for the analysis of SLGW generation and consequences included the following:

- Review relevant science and engineering literature to determine appropriate analytical, empirical, and numerical approaches to estimating SLGW properties.
- Review characteristics of the sub-aerial pit-slope failure and topography of Clayton Quarry opposite the spillway weir to develop the basic dimensional parameters of a potential landslide scenario with wave generating potential.
- Use available empirical methods to estimate the characteristics of waves generated in the pit basin by the identified potential landslide scenario.
- Estimate wave run-up elevations and mean overtopping discharge rates at the spillway on the opposite side of the pit to the slope failure using empirical methods and calculation tools from the coastal engineering literature.
- Estimate the potential effects of a rock berm concept on mitigating mean overtopping discharges for the identified landslide scenario.

In summary, Golder concluded that overtopping of the lake outlet by a potential SLGW could be mitigated using an appropriate combination of design criteria. Based on a lake elevation of 735 feet a maximum wave height of 7 to 10 feet was estimated; to be conservative a maximum wave height of 10 feet was used for the overtopping assessment. Results of the assessment suggested that the run-up slope height for a wave height of 10 feet on 2H:1V slopes is approximately 13 feet. This wave run-up height was analyzed using a crest width of 35 feet, crest elevation of 750 feet, and a rubble mound of 5 feet on the crest with a rock revetment along the face of the run-up slope as wave armoring. The resulting discharge that may occur during an overtopping incident is approximately 0.1 gpm per linear foot. The total volume of overtopping for an actual SLGW would depend on the number of waves that overtop the spillway as well as the run-up exceedance of each wave. However, given the discharge is less than 0.1 gpm per foot distributed over the weir section of the spillway (40 feet wide), and the duration of the overtopping would be limited, it is unlikely that the volume of overtopping discharge will exceed 20 gallons over the duration of a SLGW event of this scale.

The proposed Reclamation Plan effectively incorporates the design criteria summarized above in order to mitigate the potential effects of a SLGW.

10.0 CONCLUSIONS

Golder's conclusions are based on:

- Golder's knowledge of geology at the site as defined in the literature and as observed from mapping in the field

- Golder's understanding of geologic environments which are conducive to the formation of large, deep-seated rock slope instability and bench instability under seismic and static loading
- Golder's understanding of rockfall mechanisms and mitigation measures and experience with similar high, steep slopes excavated in similar rock masses
- The results of the data collected, subsurface explorations, laboratory testing, and Golder's engineering analyses

Golder's geotechnical recommendations for pitslope design and design of overburden fills based on these conclusions were provided to Spinardi Associates and are incorporated into the Reclamation Plan.

10.1 West Quarry Slopes

Golder's conclusions from the site reconnaissance and engineering analyses performed on the west quarry pit slopes are as follows:

- Overall stability of the high quarry slopes (global stability from crest to toe):
  - The major structures (i.e., discontinuities) required to result in large structurally controlled instability of overall rock slopes are not present at the site.
  - The formation of a large deep-seated slope instability due to shear through either the Diabase or Weathered Diabase rock mass is not indicated by the geologic conditions or Golder's slope stability analyses for either seismic or static loading. The computed minimum factors-of-safety under static conditions and pseudo-static conditions meet the requirements of SMARA.
- Bench slopes:
  - Persistent structures in unfavorable orientations required to create bench-scale rock wedge failures over large portions of the south, west, and north quarry slopes are not present.
  - Rock wedge and plane shear failures and topples that could potentially form in the south, west, and north walls are limited in size by the length of discontinuities that divide the rock into rock blocks and are distributed throughout the slope.
  - Based on the above, the relatively small, bench scale, rock wedge failures that could occur in the south, north, and west walls due to either seismic loading, large precipitation events, or just the natural weathering process are most likely small and should be retained by remaining clean benches.
- Rockfall from slopes:
  - Likely rockfall source areas include the Weathered Diabase at the crest of the quarry slopes, catch benches filled with talus, and the bench faces themselves.
  - If rockfall is not caught on benches, considered unlikely based on our observations, rockfall hazard for end use can be mitigated by construction of berms and ditches at the toe of the slope. Assuming a pit lake is allowed to fill as part of the final reclamation issue, and access to the pit lake is controlled, rockfall is not considered a significant hazard.

10.2 East Quarry Slopes

- Major geologic structures (i.e., discontinuities) that could result in large structurally-controlled failures of east quarry slope are not present at the site based on the observed conditions.
- The formation of large deep-seated slope instability due to shear through the rock mass in the east slope of the quarry is not indicated by either the geologic conditions or Golder's slope stability analyses for either seismic or static loading. The computed minimum factors-of-safety under static conditions and pseudo-static conditions meet the requirements of SMARA.
- Structures that are likely to form bench-scale failures consist of the steeply-dipping dike contacts that dip out of the slope in a westerly direction.
- Rockfall from bench slopes and small bench-scale failures under static conditions or seismic load will likely either be mined out or retained on catch benches left in the overall pit slope during mining.
- Differences between the geotechnical characterization and geologic models described in this report and the actual geotechnical and geologic conditions encountered as the pit is mined should be anticipated. Geologic risks related to the slope stability of the east side of the pit include:
  - Unidentified faults, geologic contacts, or changes in the orientation of bedding planes in the Knoxville Formation or persistence and orientation of dike contacts in the Diabase.
  - Distribution of more highly fractured zones that could affect the ability to develop steep bench and stable bench faces and the ability to implement effective controlled blasting methods (pre-split and trim blasting).
  - Lack of adequate drainage or maintenance of drainage facilities such that erosion leads to localized instabilities.
- Although the final pit lake is relatively small, the eastern shore of the pit lake (where Knoxville is exposed) may require riprap protection to protect against wave erosion. The riprap protection should be designed based on historical wind data to estimate the design wave condition at the shore and appropriate guidelines (e.g., USACE 2006; Racin et al 2000).

10.3 South Overburden Fill Area (South OFA)

- Proposed overburden fill slopes of 2.5H:1V meet the requirements for static and seismic stability of SMARA (FOS $\geq$ 1.00). See e.g. 14 CCR section 3704.
- Foundation conditions in the proposed overburden fill area (native slopes east-southeast of the quarry) appear suitable for the proposed fills provided that design of the fills incorporate the recommendations included in the following section.

10.4 North Overburden Fill Area (North OFA)

- The North OFA failure occurred in March 2016 in response to heavy rainfall.
- The basal rupture surface of the landslide slopes at approximately 6.5 degrees to the east, and is comprised of fat clays, derived from shearing of highly weathered residual Knoxville soil materials, with a residual friction angle of approximately 9 degrees. Placement of overburden materials, along with perched groundwater and resulting pore pressures, increased the driving forces such that failure of the overburden occurred near the original ground surface.

- Stability analyses indicate that a shear key with adequate drainage (subsurface blanket drains and toe drains) and a gravity buttress will mitigate the landslide movement and restore static stability to FS $\geq$ 1.50. Pseudo-static stability controls the design basis for the repair with FS $\geq$ 1.00.
- Slide repair implementation is in process and will be completed ahead of mine reclamation, pursuant to County Grading Permit BLG16-011287.

10.5 Seiche Generated by Rockfall

- Golder concluded that overtopping of the lake outlet by a potential SLGW could be mitigated using an appropriate combination of design criteria which has been incorporated into the Reclamation Plan design.

11.0 USE OF THIS REPORT

The conclusions and recommendations contained in this report are based on data obtained by others as well as the site reconnaissance and subsurface explorations conducted by Golder. The methods used generally indicate geologic conditions at the time and locations explored and sampled. Golder's assessment of subsurface conditions based on the field exploration and samples obtained from widely spaced borings may not disclose geologic features either hidden from view or not sampled in the borings; and such undisclosed geologic features may result in slope instability under certain conditions. In addition, subsurface groundwater conditions can vary with time.

The contacts between geologic units indicated on the subsurface exploration logs and cross-sections represent the approximate boundaries between soil and/or bedrock units. Actual transitions between soil and rock units may be more gradual than indicated by the depths presented in the boring logs. In addition, the subsurface descriptions are based on the conditions encountered at the time of exploration. Soil, rock and subsurface water conditions outside of the exploration locations may vary from those encountered in the borings advanced during this field investigation. The nature and extent of variations between exploratory locations may not become evident until construction. If variations appear during construction, Golder should be asked to re-evaluate the recommendations of this geotechnical report to confirm or modify them.

The findings, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering practice that exists within the area at the time of the work. No other warranty, expressed or implied, is made.

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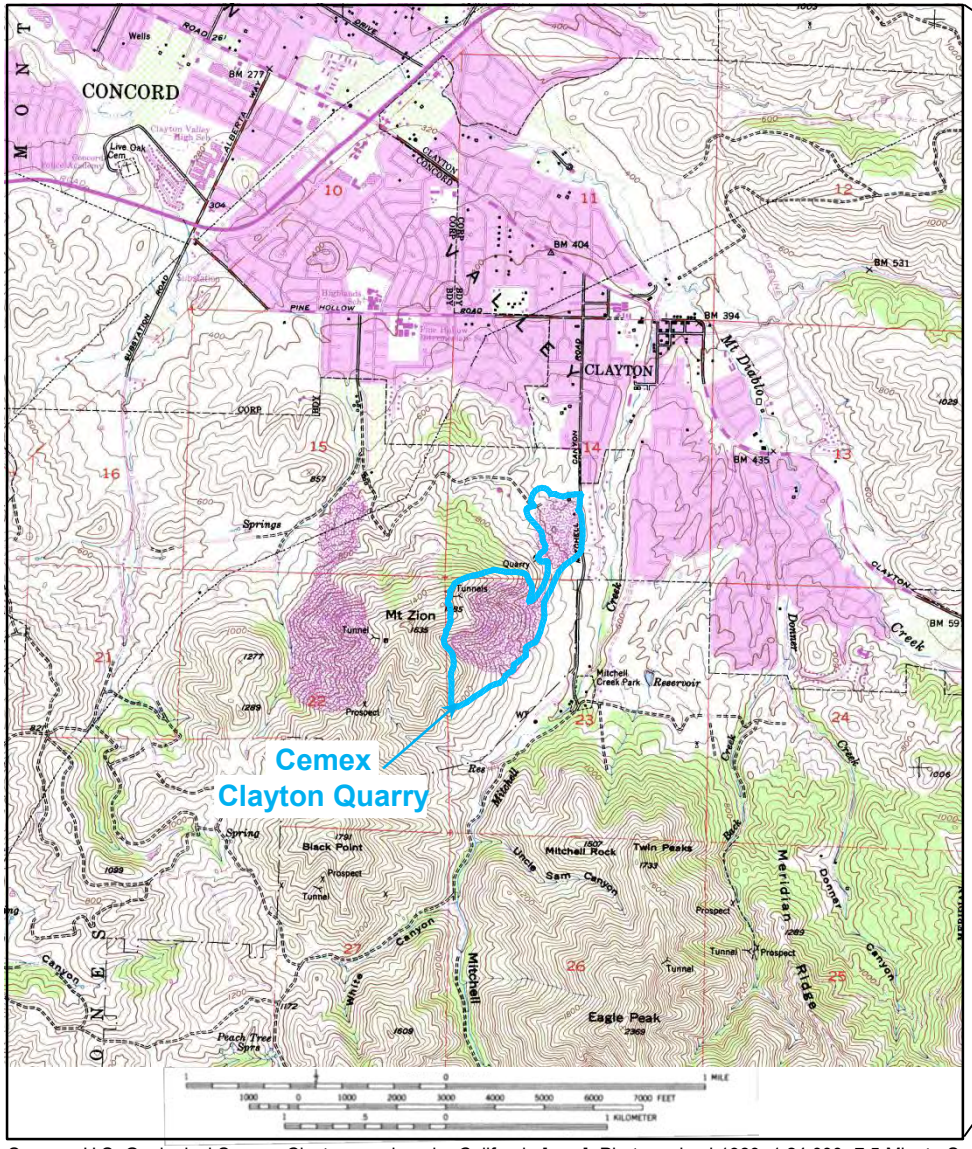
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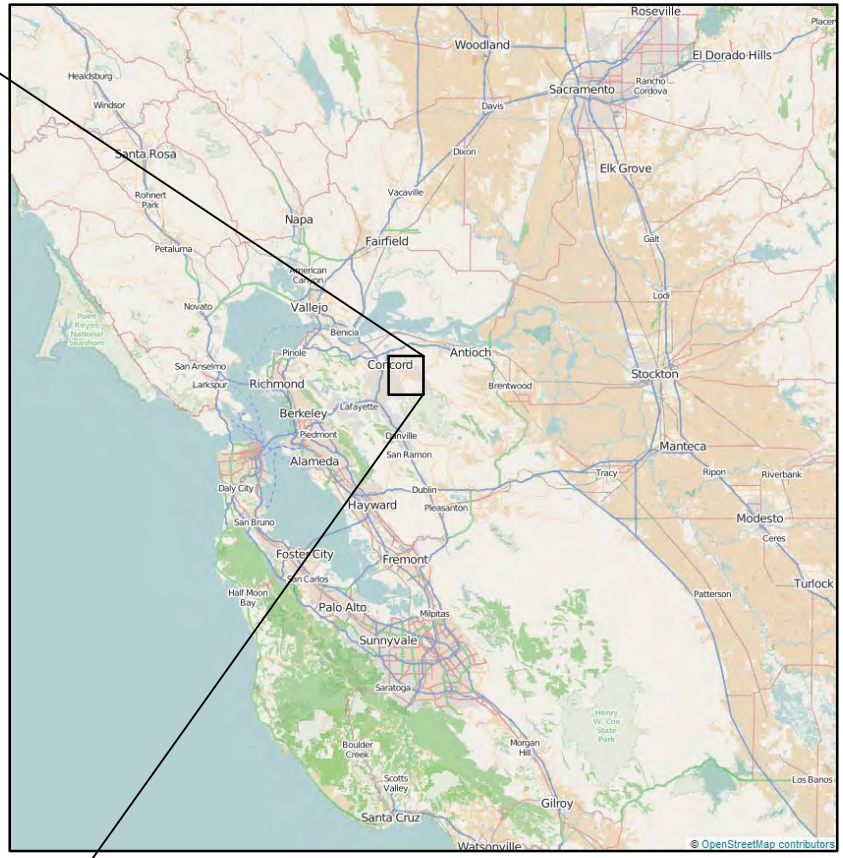
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FIGURES



Source: U.S. Geological Survey. Clayton quadrangle, California [map]. Photo revised 1980. 1:24,000. 7.5 Minute Series. Reston, Va: United States Department of the Interior, USGS, 1953.



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CLAYTON, CALIFORNIA

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DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

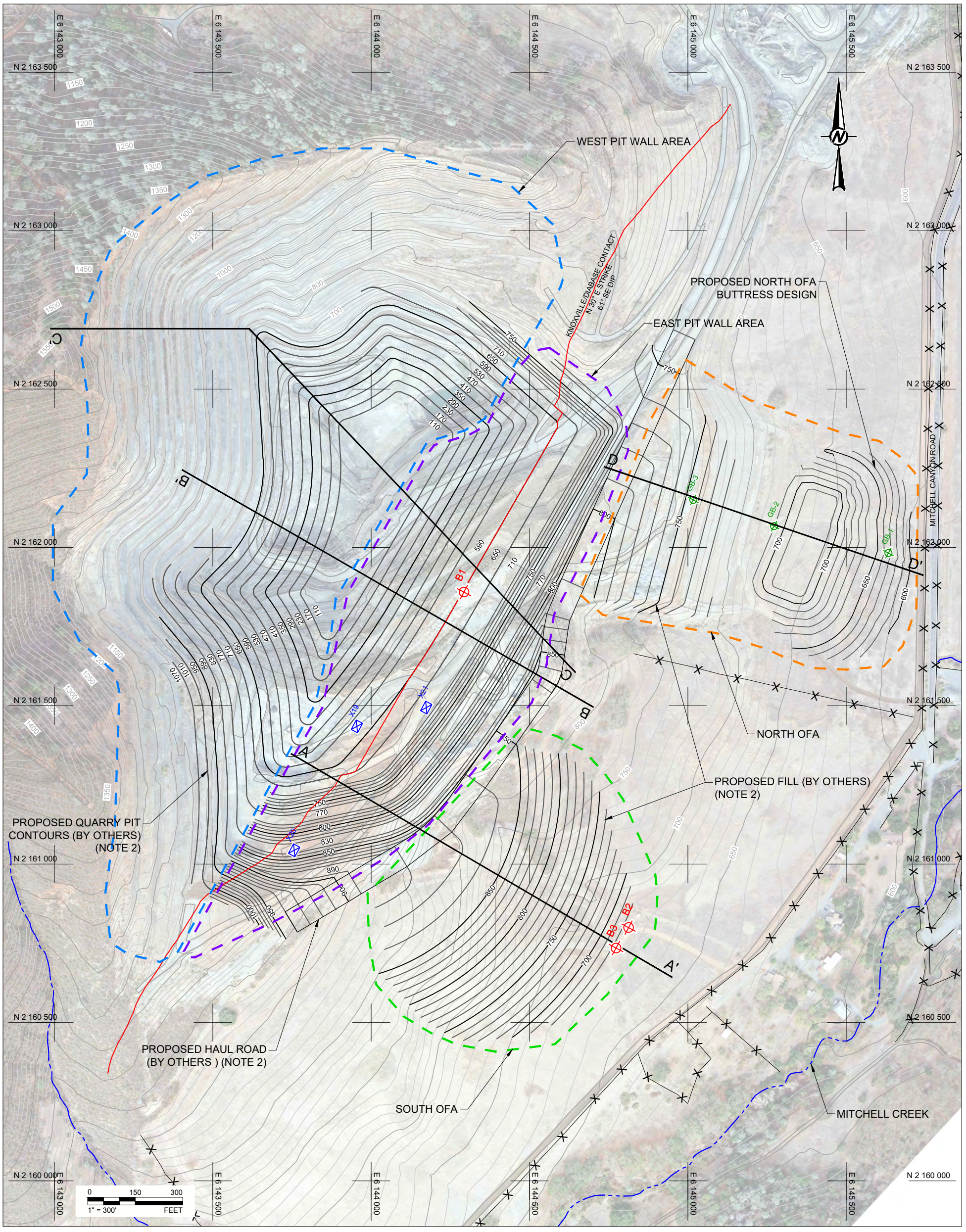
PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
SITE LOCATION

PROJECT NO. **1661332** REV. **0** FIGURE **1.1**

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LEGEND

- EXISTING GROUND TOPOGRAPHY (10 ft CONTOURS) (NOTE 1)
- PROPOSED QUARRY PIT AND OVERBURDEN FILL AREAS (10 ft CONTOURS) (NOTE 2)
- KNOXVILLE/DIABASE CONTACT (PROJECTED TO PROPOSED QUARRY PIT) (NOTE 3)
- EXISTING ROAD
- EXISTING FENCE
- NATURAL DRAINAGE
- WEST PIT WALL AREA
- EAST PIT WALL AREA
- NORTH OVERBURDEN FILL AREA
- SOUTH OVERBURDEN FILL AREA
- STABILITY SECTION LOCATION
- WASTE OVERBURDEN SURFACE LOCATION (MAPPED BY GOLDER IN 2014)
- BORING LOCATION (DRILLED BY GOLDER IN 2015)
- BORING LOCATION (DRILLED BY GOLDER IN 2016)

NOTE(S)

1. EXISTING GROUND TOPOGRAPHY AND AERIAL PHOTOGRAPHY PROVIDED BY AEROTECH MAPPING. DATE OF PHOTOGRAPH FLIGHT WAS NOVEMBER 5, 2015. HORIZONTAL DATUM: CALIFORNIA STATE PLANE COORDINATE SYSTEM (ZONE 3), NAD83. VERTICAL DATUM: NAVD88, GEOID 12B
2. PROPOSED QUARRY PIT, HAUL ROAD, AND SOUTH OFA CONTOURS DESIGNED BY SPINARDI ASSOCIATES AND PROVIDED ON FEBRUARY 22, 2017.
3. THE KNOXVILLE/DIABASE CONTACT LINE MAPPED BY GOLDER IN MARCH 2014. EXTENT OF THE WEATHERED CONTACT ZONE IS ASSUMED TO BE 100 ft ON EACH SIDE OF CONTACT LINE SHOWN.

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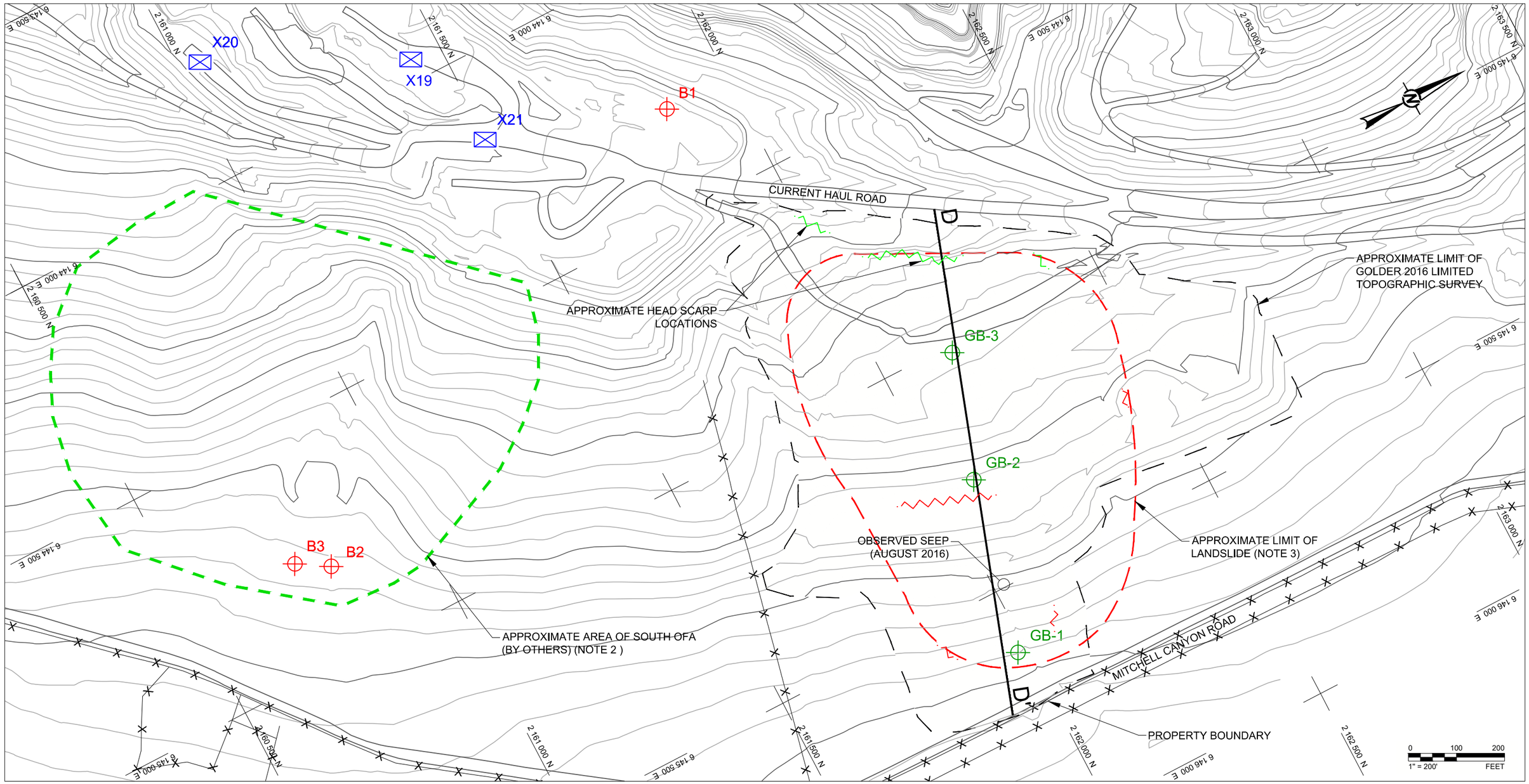
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GEOTECHNICAL EVALUATIONS FOR
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TITLE
OVERALL SITE LAYOUT

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LEGEND

- 850 — EXISTING GROUND TOPOGRAPHY (10 ft CONTOURS) (NOTE 1)
- PROPOSED SOUTH OFA (NOTE 2)
- APPROXIMATE LIMIT OF LANSLIDE (NOTE 3)
- APPROXIMATE LIMIT OF GOLDER 2016 SURVEY
- CRACKS IDENTIFIED DURING AUGUST 2016 SITE RECONNAISSANCE
- APPROXIMATE LOCATION OF HEADSCARP IDENTIFIED DURING AUGUST 2016 SITE RECONNAISSANCE
- EXISTING ROAD
- EXISTING FENCE
- E — E' STABILITY SECTION LOCATION
- X21 WASTE OVERBURDEN SURFACE LOCATION (GOLDER, 2015)
- B2 BORING LOCATION (GOLDER, 2016a)
- GB-3 BORING LOCATION (GOLDER, 2016b)

NOTE(S)

1. EXISTING GROUND TOPOGRAPHY SURVEYED BY AEROTECH MAPPING ON NOVEMBER 5, 2015. HORIZONTAL DATUM: CALIFORNIA STATE PLANE COORDINATE SYSTEM (ZONE 3), NAD83. VERTICAL DATUM: NAVD88, GEOID 12B
2. PROPOSED SOUTH OFA DESIGNED BY SPINARDI ASSOCIATES AND PROVIDED ON FEBRUARY 22, 2017. SEE FIGURE 1.2.
3. LIMITS OF LANDSLIDE ARE APPROXIMATE DUE TO ACTIVE RE-GRADING OF LANDSLIDE AREA.

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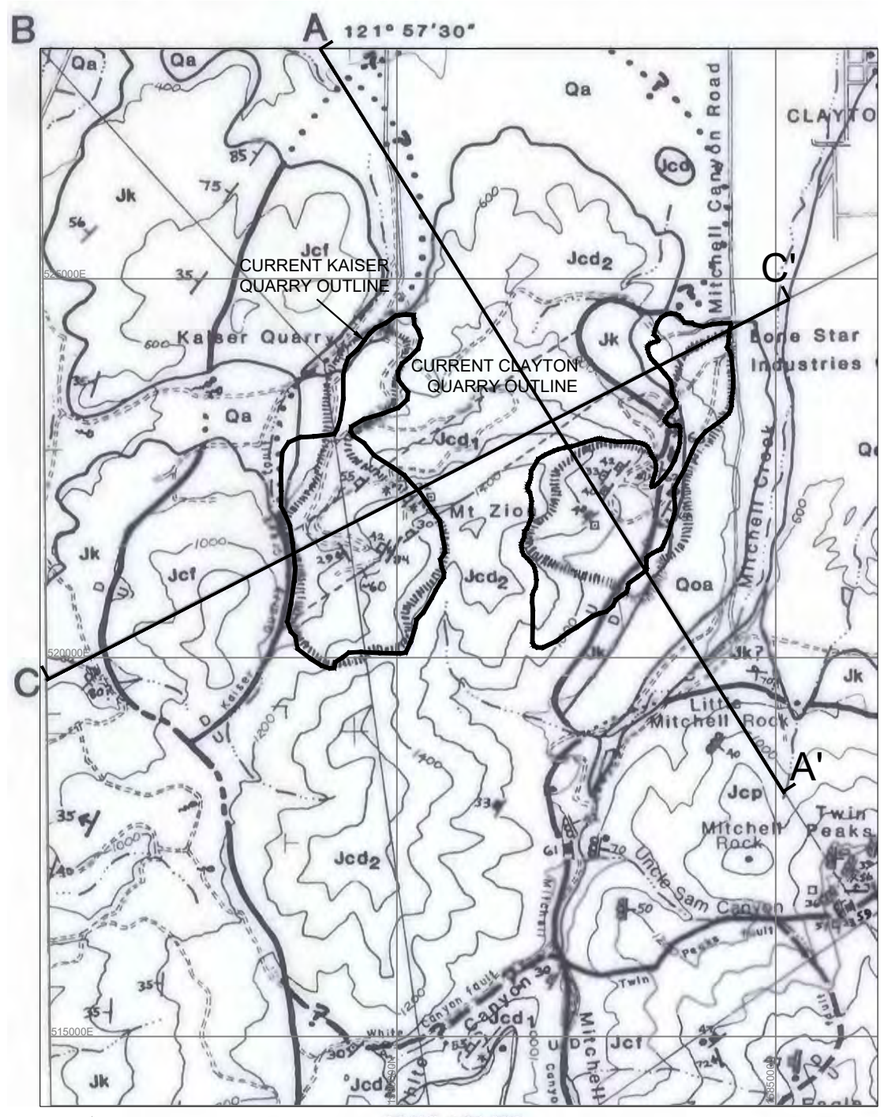
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TITLE
OVERBURDEN FILL AREA (OFA) LAYOUT

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1661332	0	1.3

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CONTOUR INTERVAL 200 FEET

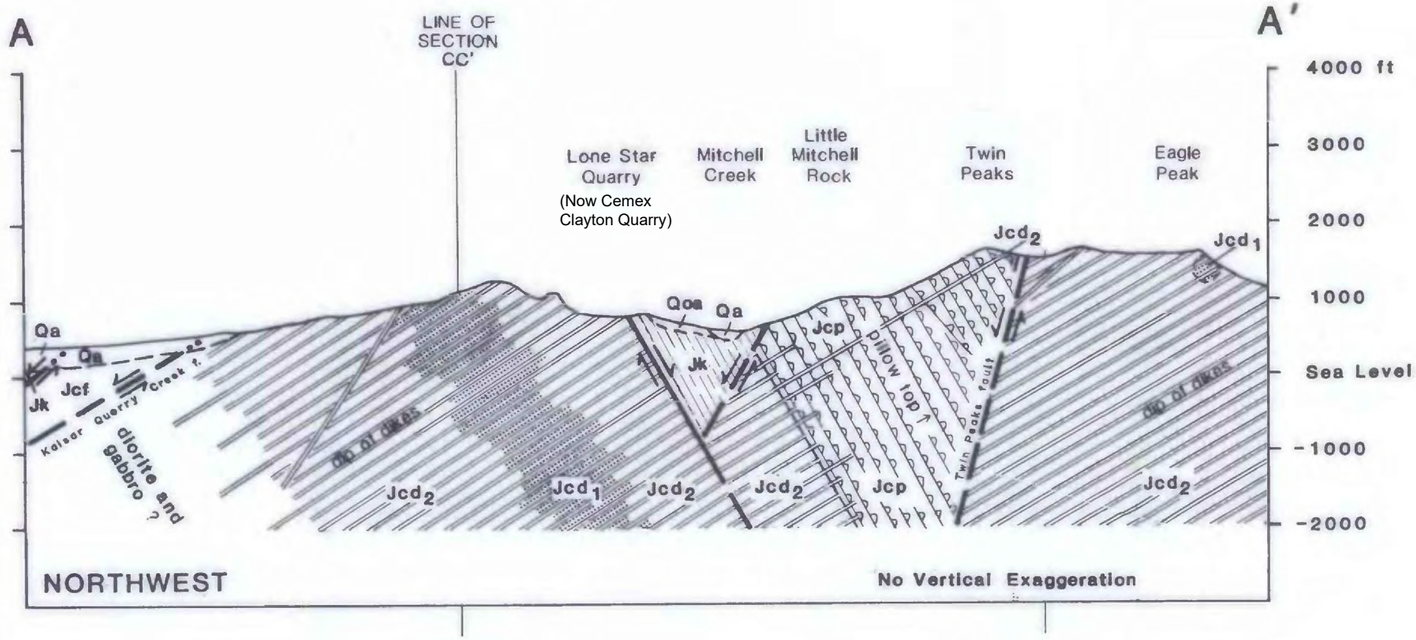
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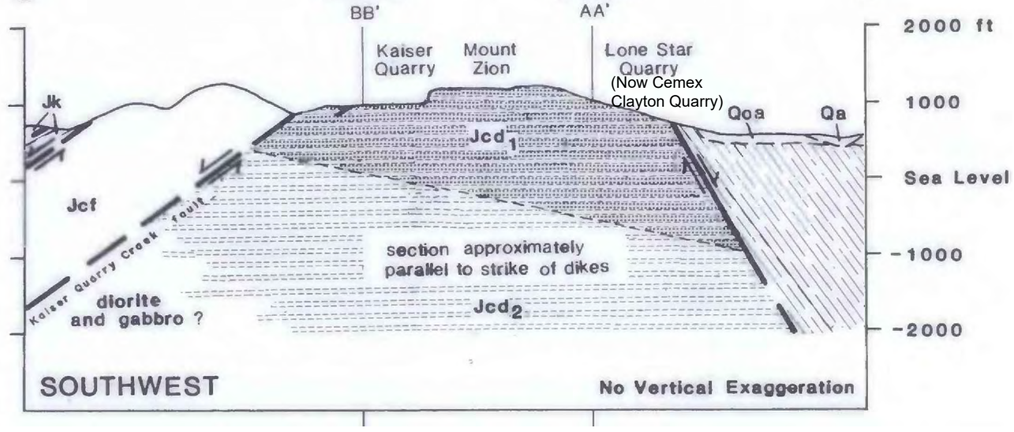
Contact
dashed where gradational or approximately located

Fault
U D
dashed where approximately located, dotted where concealed, queried where inferred, U = upthrown side, D = downthrown side, inclined, vertical

Strike and dip of sedimentary beds
inclined vertical overturned

Strike and dip of diabase dikes
screen intruded by fine-grained diabase
medium-grained diabase intruded by fine-grained diabase
one fine-grained diabase intruding another
fine-grained diabase intruding pillow basalt
medium-grained diabase intruding a green amygdaloidal flow





EXPLANATION

Qa Qls — Surficial deposits
Qa; alluvium
Qls; landslide debris

Unconformity

Qoa — Older alluvium

unconformity

Kps/Kp — Panoche Formation
Kps; sandstone, tan, arkosic, with large concretions; minor micaceous shale
Kp; micaceous clay shale, minor sandstone

KJfg | KJfs | KJfc | KJfsr — Franciscan Complex
KJfg; greenstone altered from basalt
KJfs; hard graywacke sandstone and micaceous shale argillite
KJfc; varicolored contorted chert and shale
KJfsr; sheared greenstone, sandstone, chert, and glaucophane schist in a sheared shale matrix

Jk — Knoxville Formation
Micaceous shale, ▲ Buchia elderensis identified by David L. Jones, 1980

Jcb | Jcp | Jcf | Jcd | Jch | Jcpy — Coast Range ophiolite
Jcb; volcanic breccia
Jcp; mainly tholeiitic, subophitic plagioclase-clinopyroxene pillow basalts with some basalt flows, average pillow 1.7 m by 1 m by 0.7 m
Jcf; mainly basalt flows with some pillow basalts, • some flows with amygdules 1-6 mm, ○ one keratophyre(?) flow with flattened amygdules
Jcd; sheeted diabase dike complex: (1) older diabase (calc-alkalic, subophitic plagioclase-clinopyroxene-hornblende diabase with an average grain size of 1 mm) that is cut by • late-stage leucocratic segregations mainly of plagioclase whose minor zircon gives an U-Pb age of 165 my by James N. Mattinson, 1982, all of which is intruded by diabase dikes (30% by volume), (2) diabase dikes, mainly tholeiitic, subophitic, uralitized plagioclase-clinopyroxene diabase with an average grain size of 0.3 mm
Jch; serpentinized harzburgite: 15% enstatite, 12% forsterite, 70% lizardite and clinochrysotile
Jcpy; serpentinized coarse-grained augite pyroxenite with minor silica carbonate rock

as | sp | sc — Ultramafic rocks
as; antigorite schist
sp; serpentinite with parts of Jcb, Jch, Jcpy, as
sc; silica carbonate rock replacing Jcf or Francis-can(?) volcanic rock heavily veined with quartz

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TITLE
SITE GEOLOGY

PROJECT NO. 1661332 | REV. 0 | FIGURE 2.1

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GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PHOTOGRAPH OF SOUTH AND WEST QUARRY WALLS TAKEN MARCH 2014

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TITLE
PHOTOGRAPH OF NORTH QUARRY WALL TAKEN MARCH 2014

PROJECT NO.	REV.	FIGURE
1661332	**0**	**2.3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



CLIENT
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT

Golder Associates

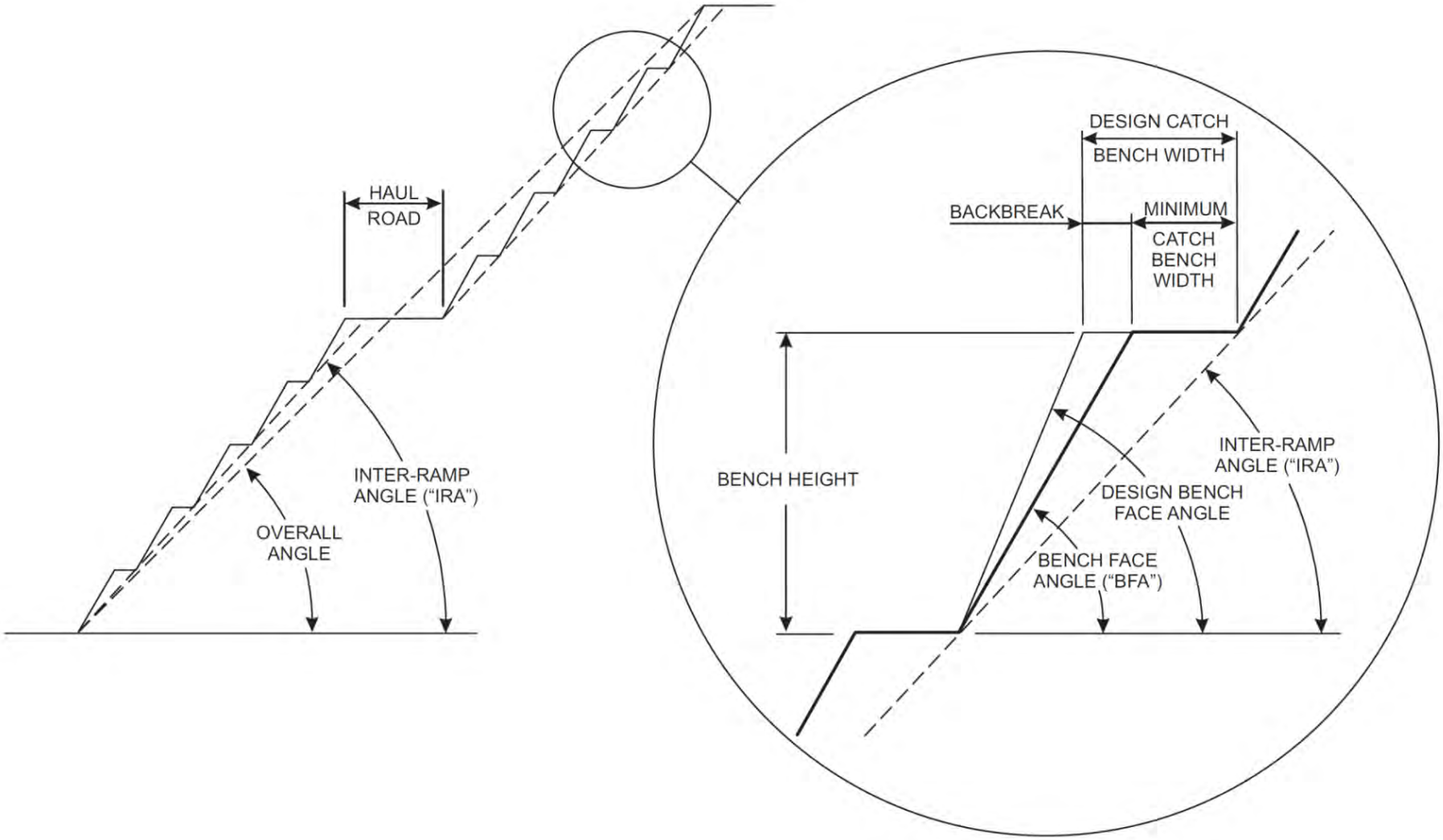
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PHOTOGRAPH OF EAST QUARRY WALL TAKEN MARCH 2014

PROJECT NO.	REV.	FIGURE
1661332	**0**	**2.4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



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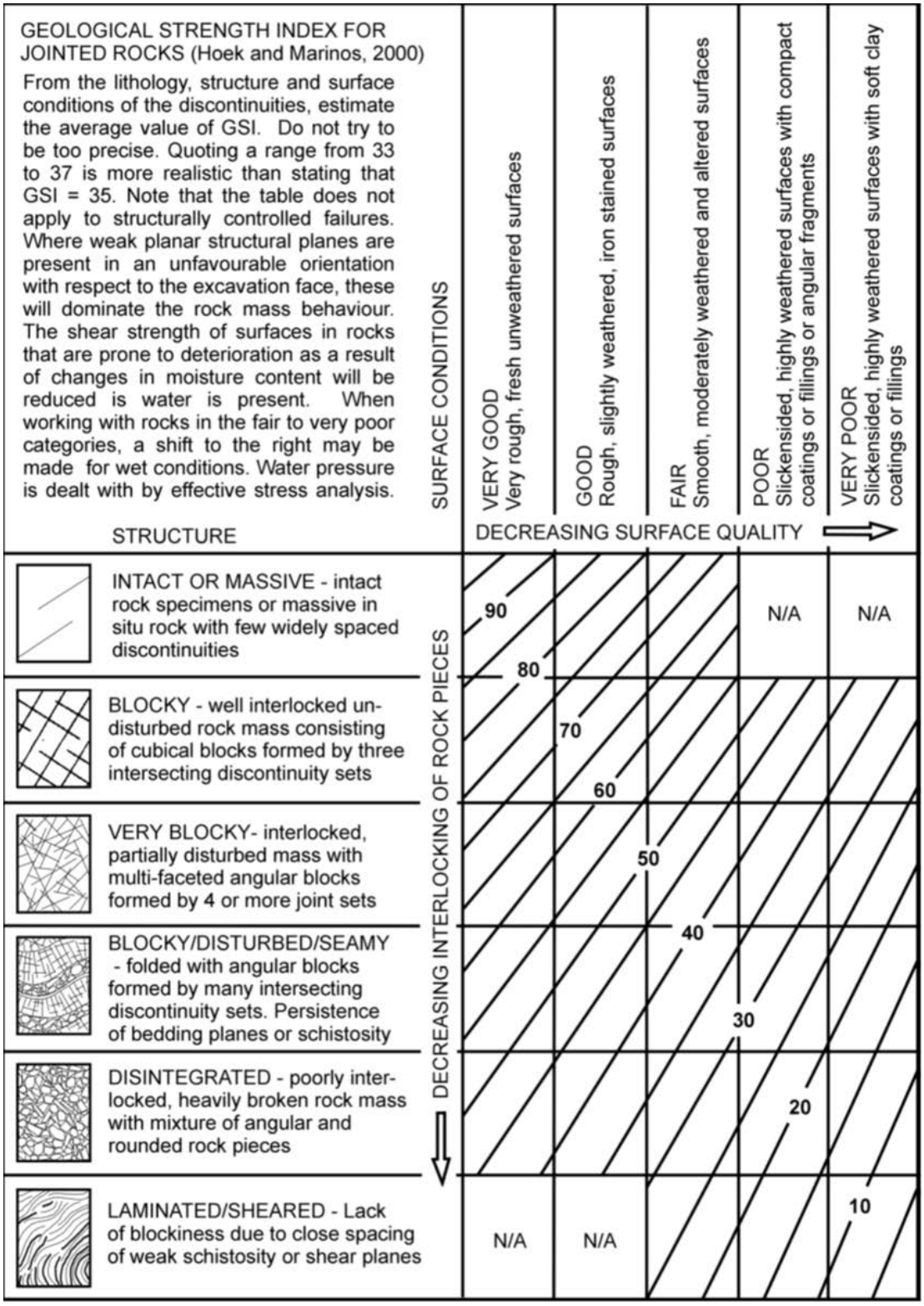
YYYY-MM-DD	2017-02-14
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
BENCH CONFIGURATION TERMINOLOGY

PROJECT NO.	REV.	FIGURE
1661332	**0**	**2.5**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



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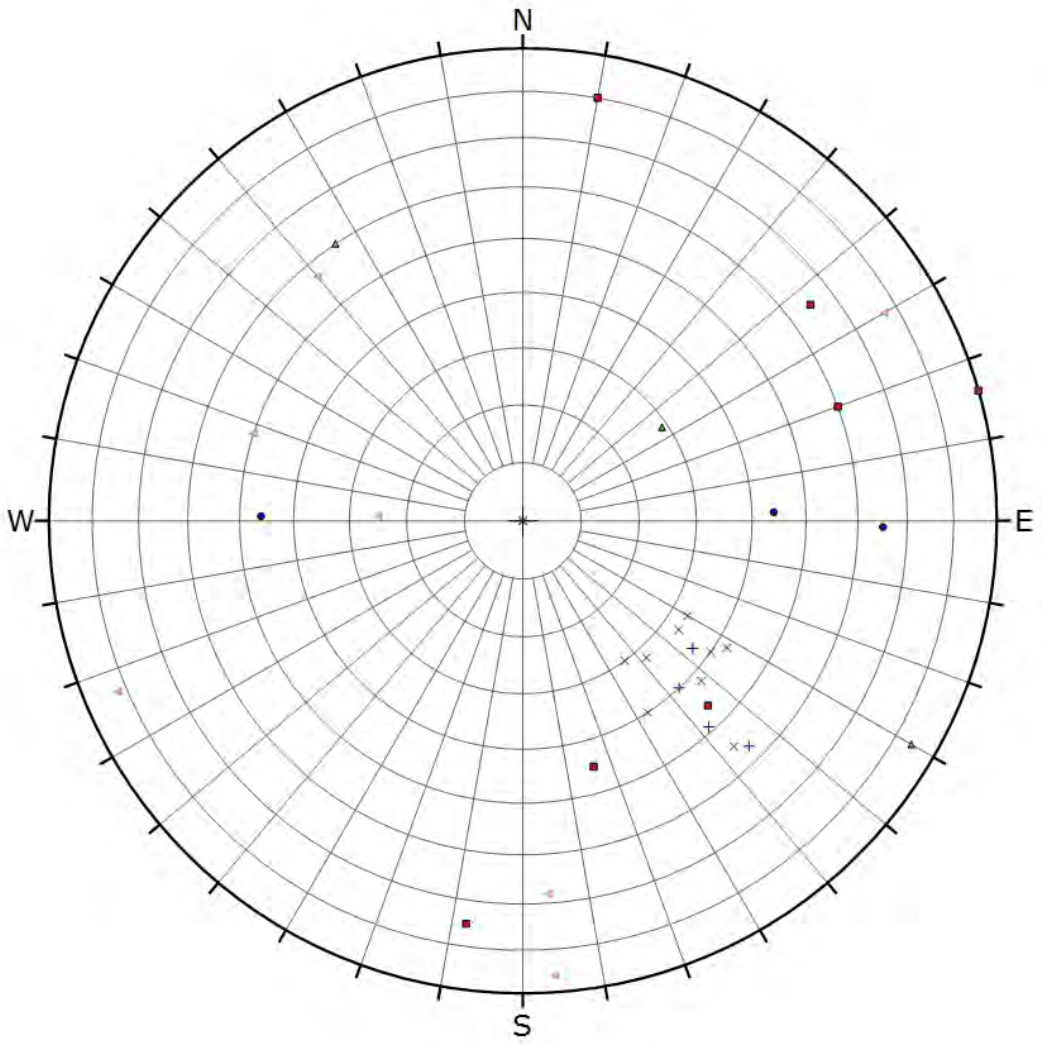
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
GEOLOGICAL STRENGTH INDEX (GSI)

PROJECT NO. **1661332**
REV. **0**
FIGURE **5.1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Symbol	TYPE	Quantity
+	DK	4
×	DK (USGS)	9
■	F	7
▲	F (USGS)	3
●	J	3
◀	JS	8

Plot Mode	Pole Vectors
Vector Count	34 (34 Entries)
Hemisphere	Lower
Projection	Equal Area

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YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

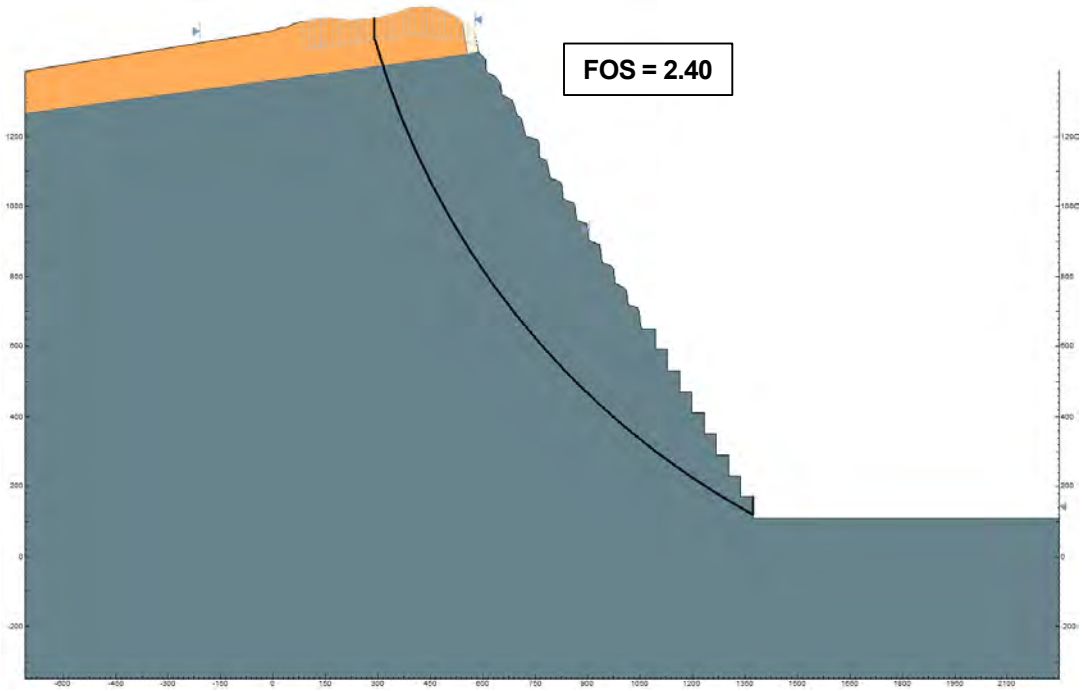
PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
WEST QUARRY WALL BEDROCK DISCONTINUITIES

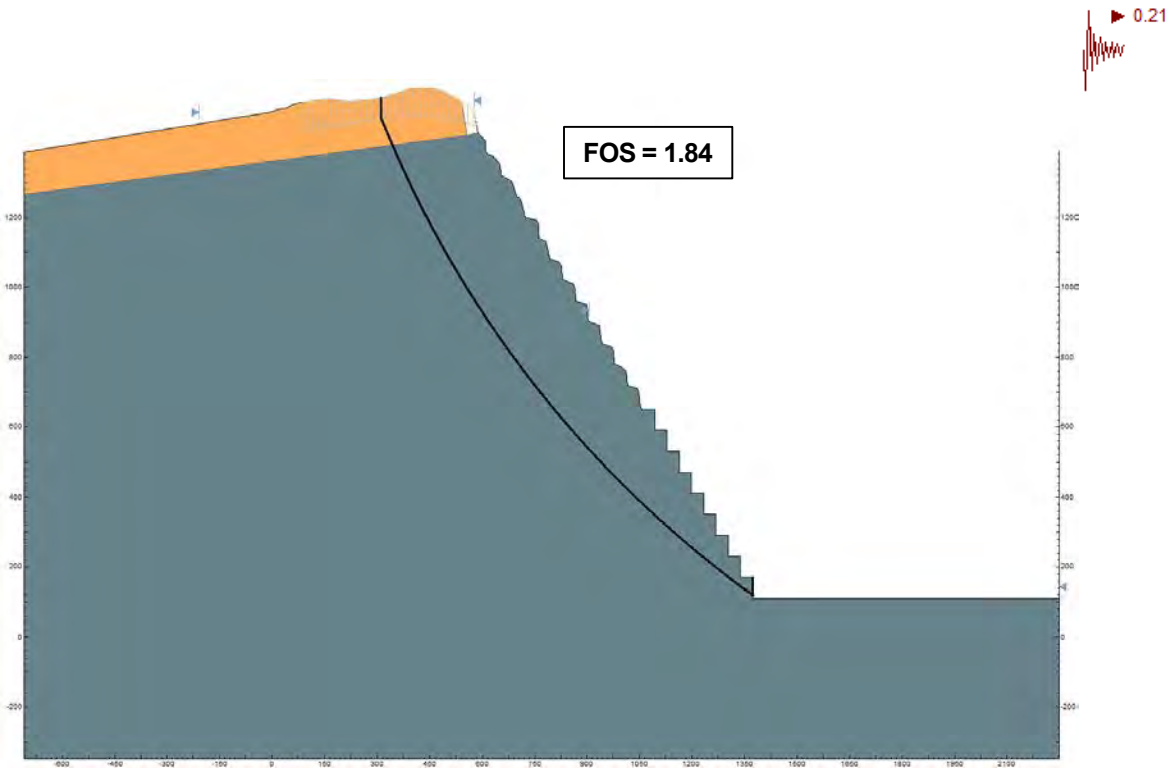
PROJECT NO. **1661332** | REV. **0** | FIGURE **5.2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B
1 in
0

Material Name	Color
Diabase	
Weathered Diabase	
Weathered Diabase (Disturbed)	



Section C-C' Static Analysis



Section C-C' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

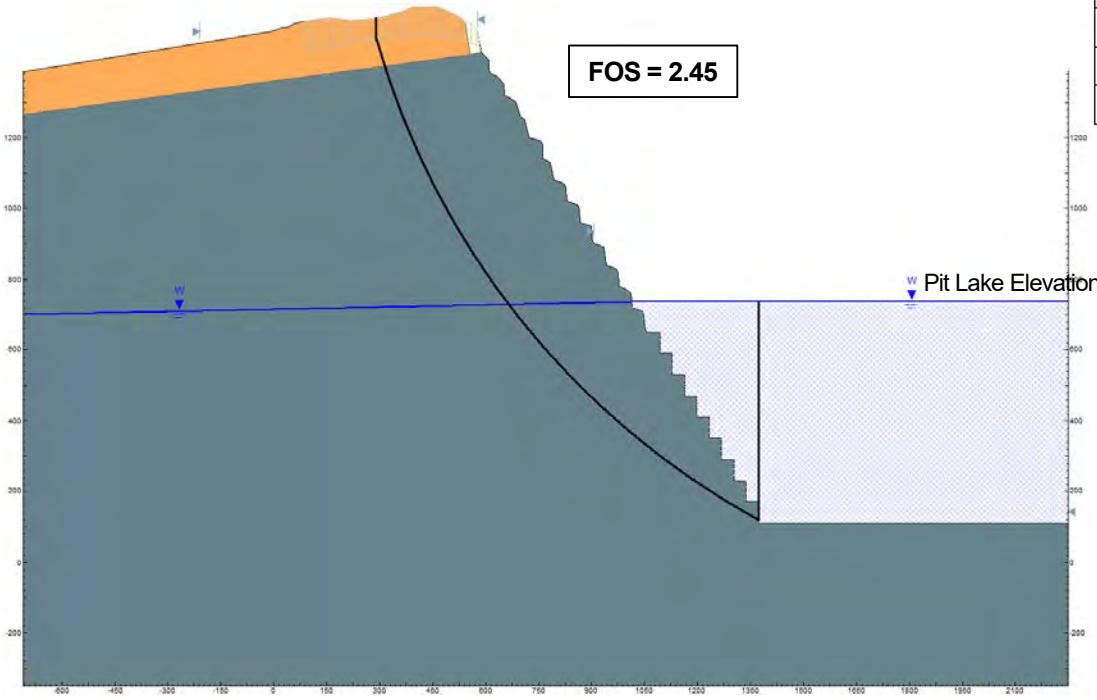
PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
WEST QUARRY WALL – OVERALL SLOPE STABILITY AT END OF QUARRY OPERATIONS

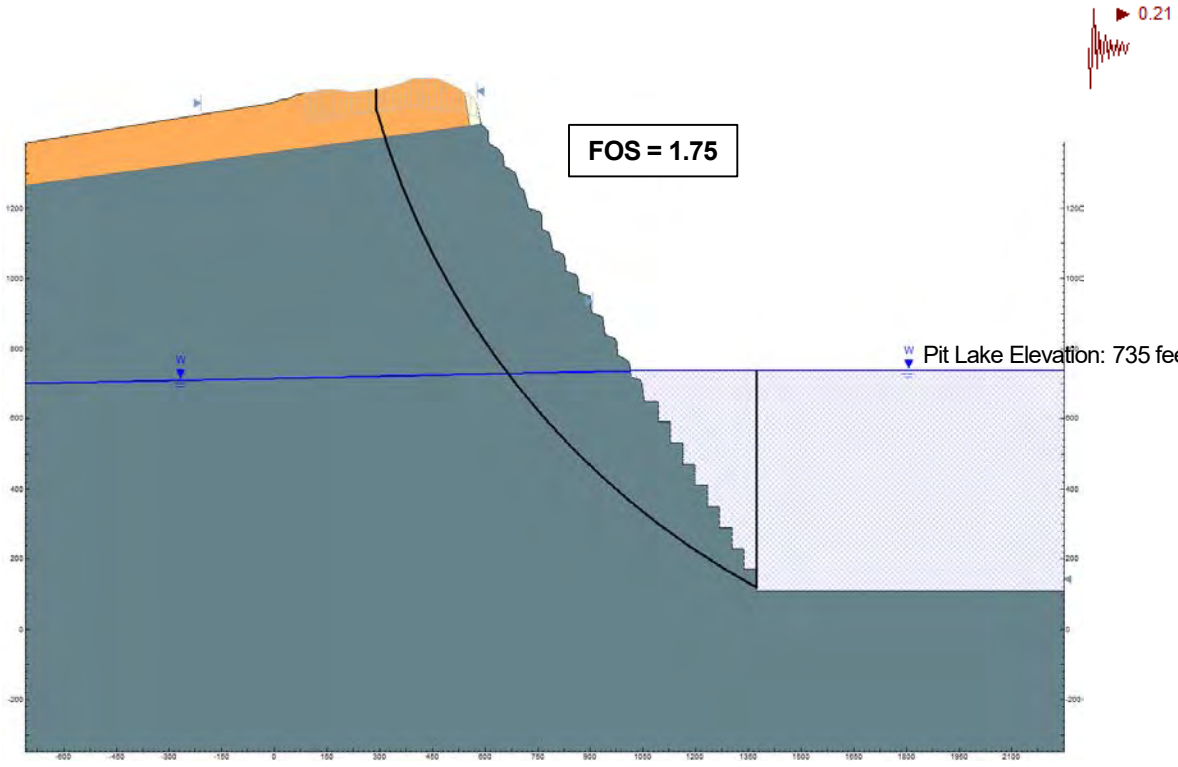
PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0

Material Name	Color
Diabase	
Weathered Diabase	
Weathered Diabase (Disturbed)	



Section C-C' Static Analysis



Section C-C' Pseudo-static Analysis (k = 0.21 g)

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CONSULTANT
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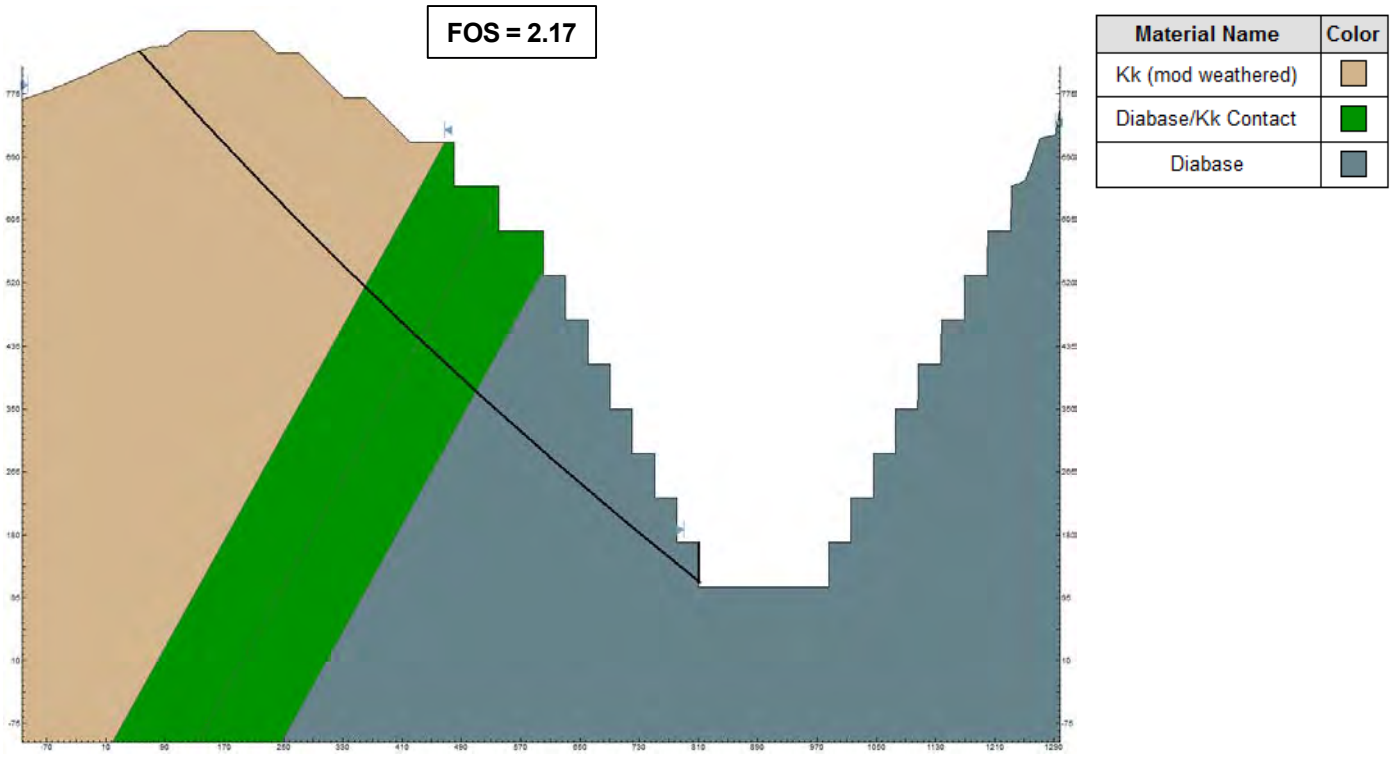
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

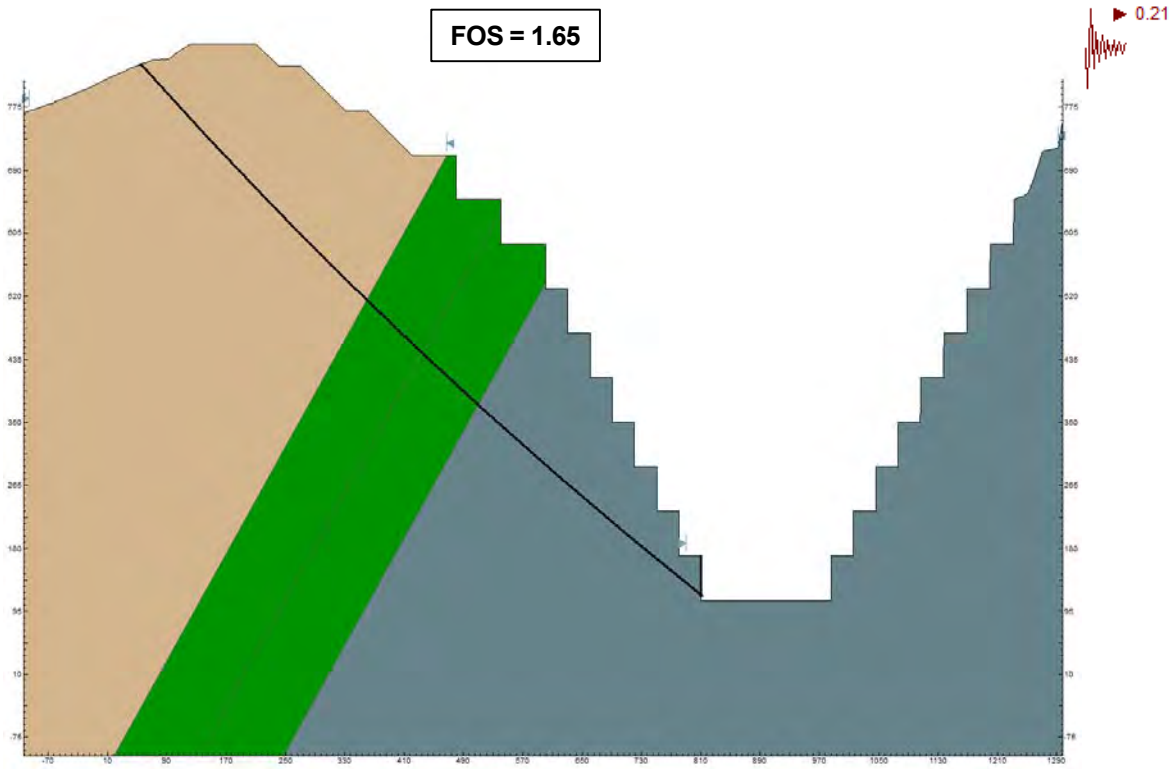
TITLE
WEST QUARRY WALL – OVERALL SLOPE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft

PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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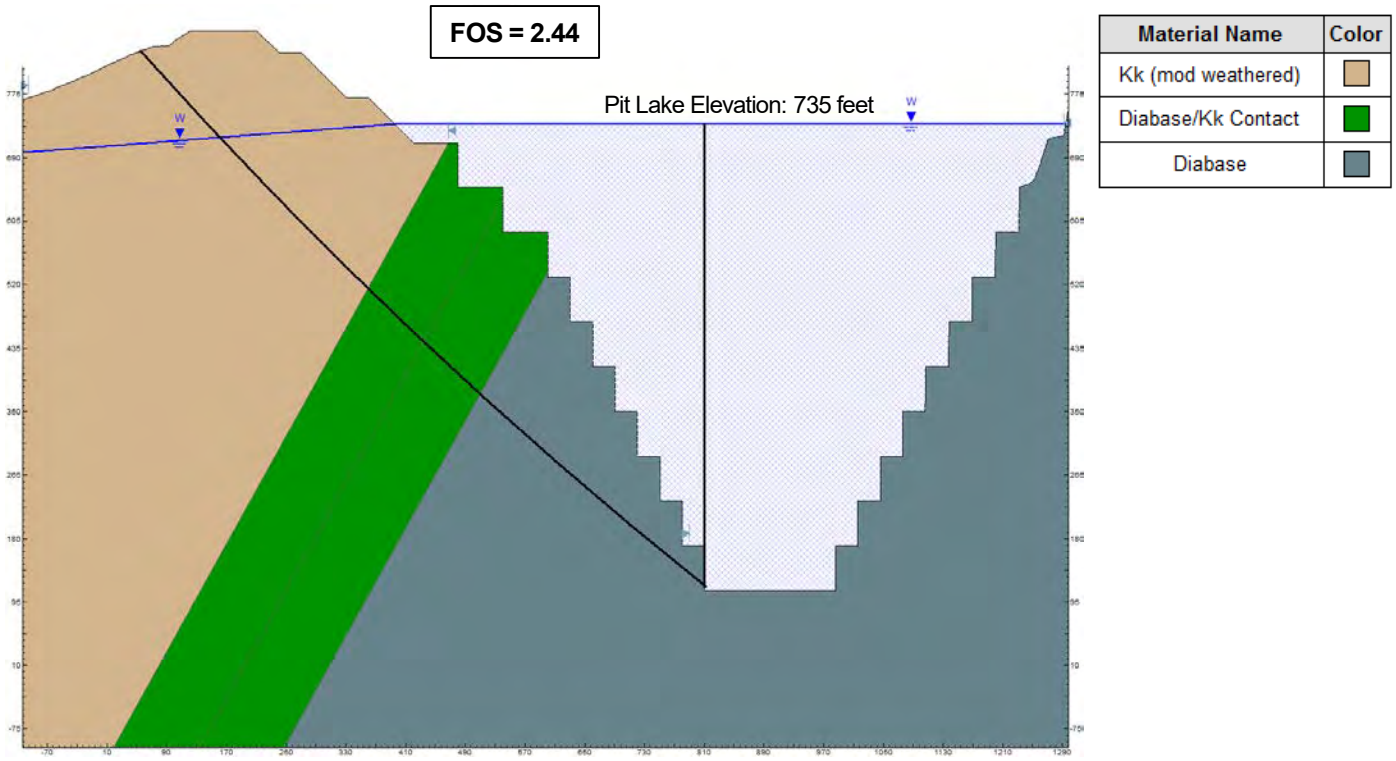
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

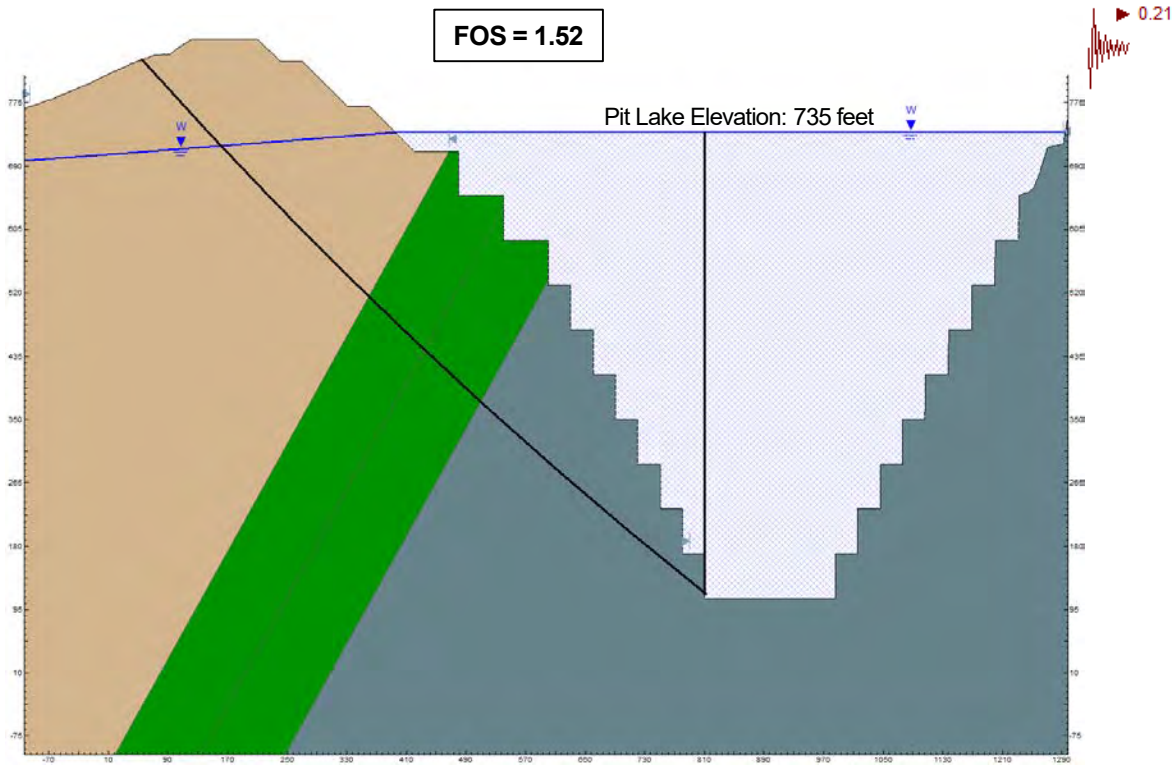
TITLE
EAST QUARRY WALL – OVERALL SLOPE STABILITY AT END OF QUARRY OPERATIONS

PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
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CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

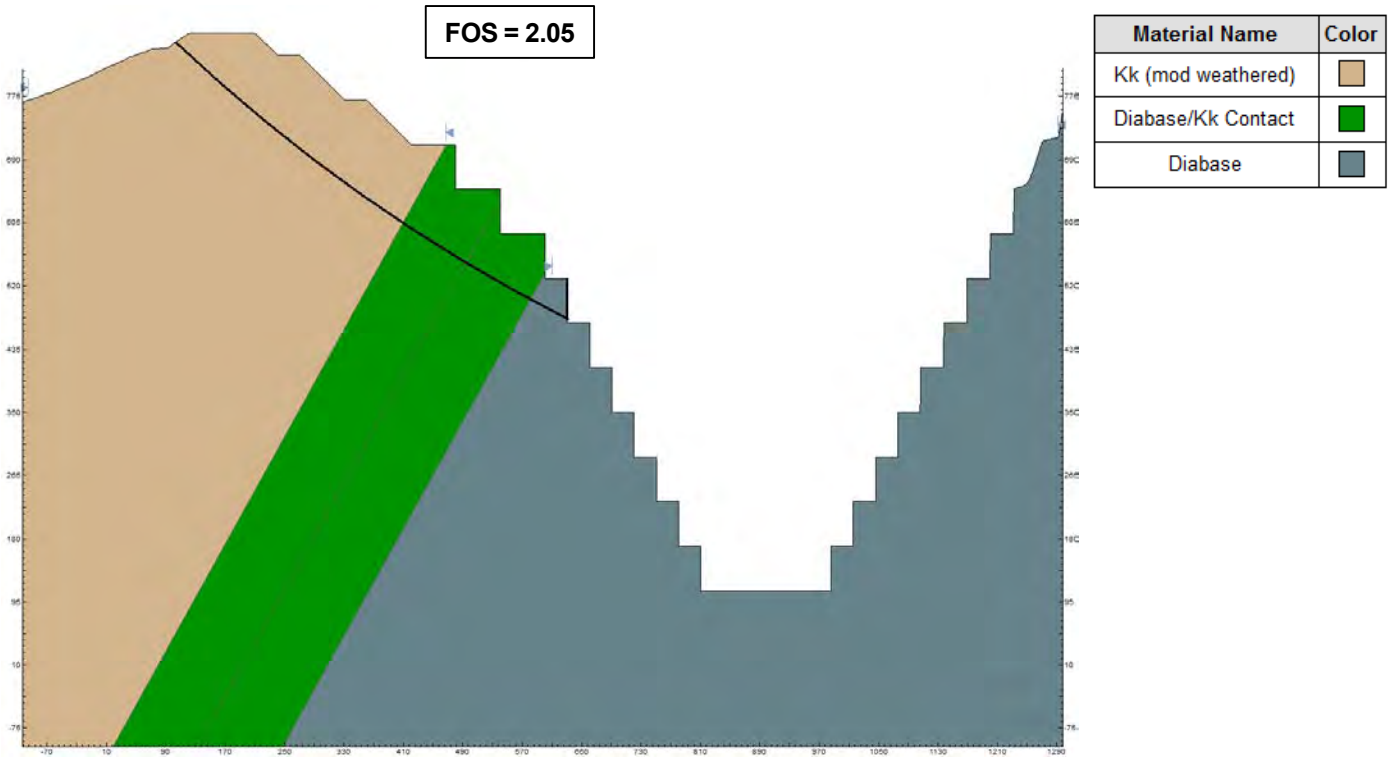
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

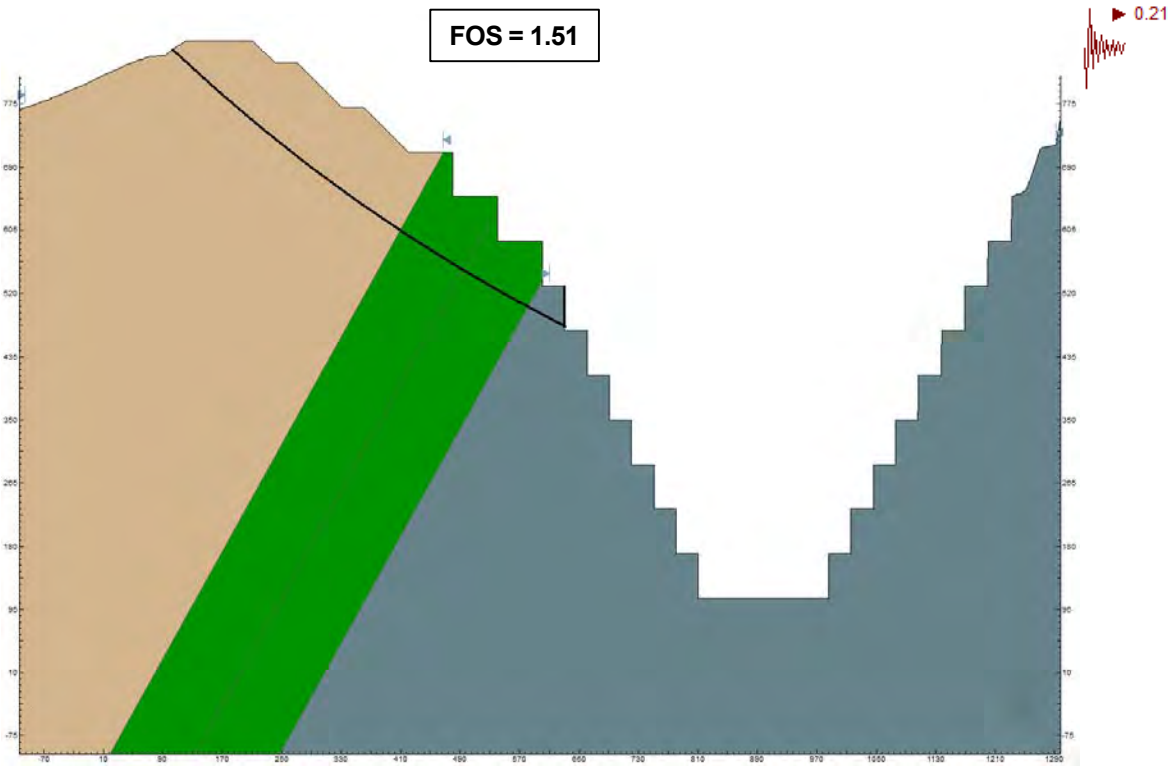
TITLE
EAST QUARRY WALL – OVERALL SLOPE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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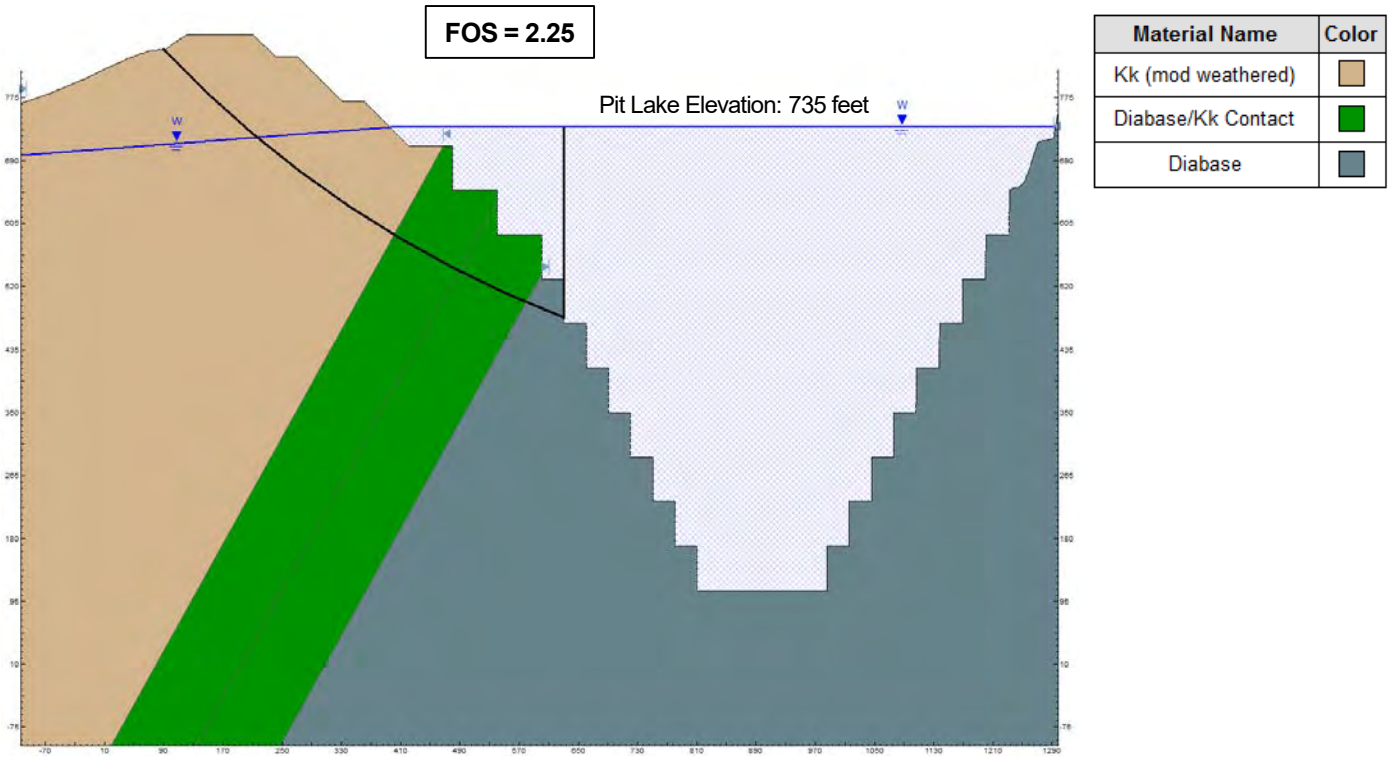
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

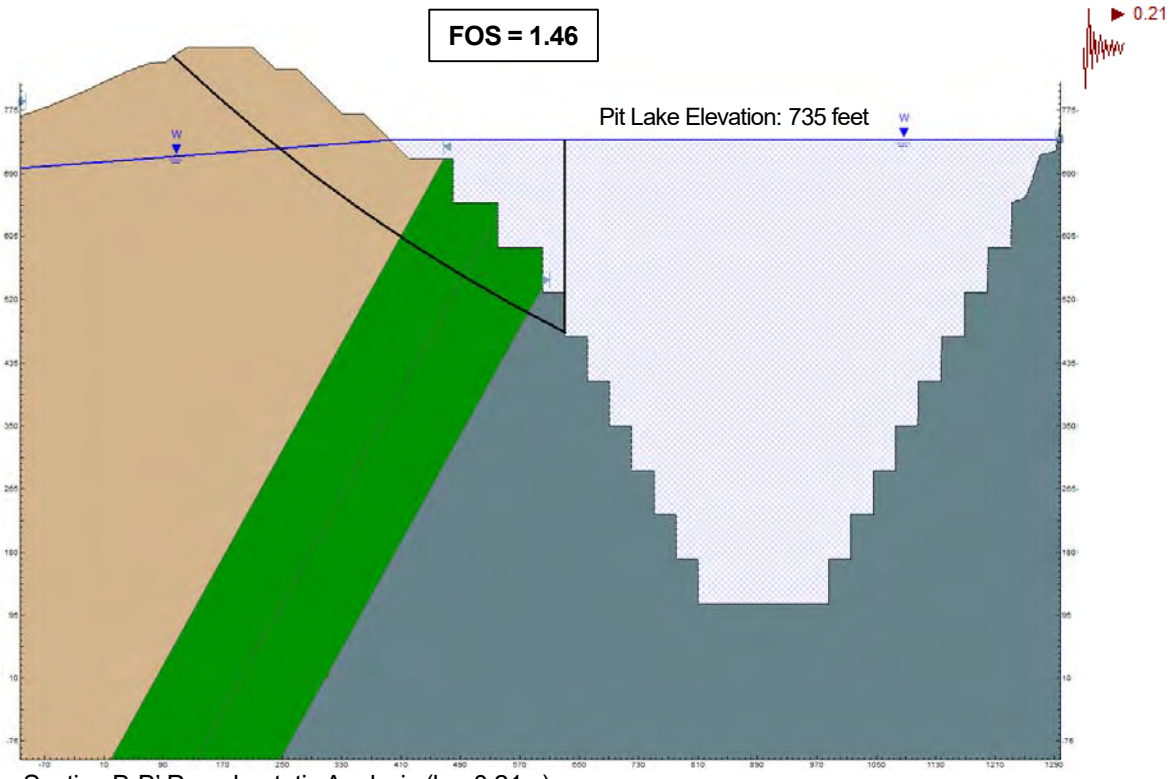
TITLE
EAST QUARRY WALL – KNOXVILLE TO DIABASE
STABILITY AT END OF QUARRY OPERATIONS

PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.5**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

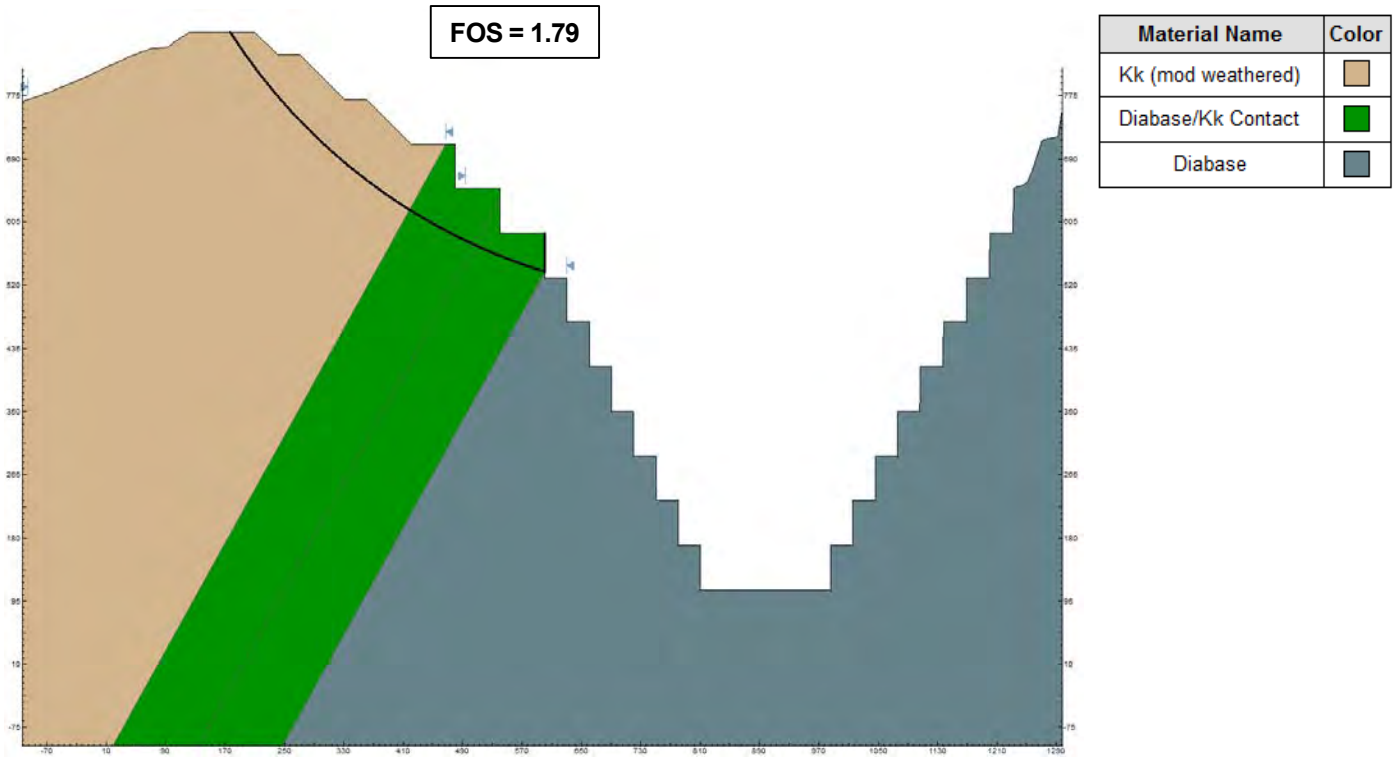
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

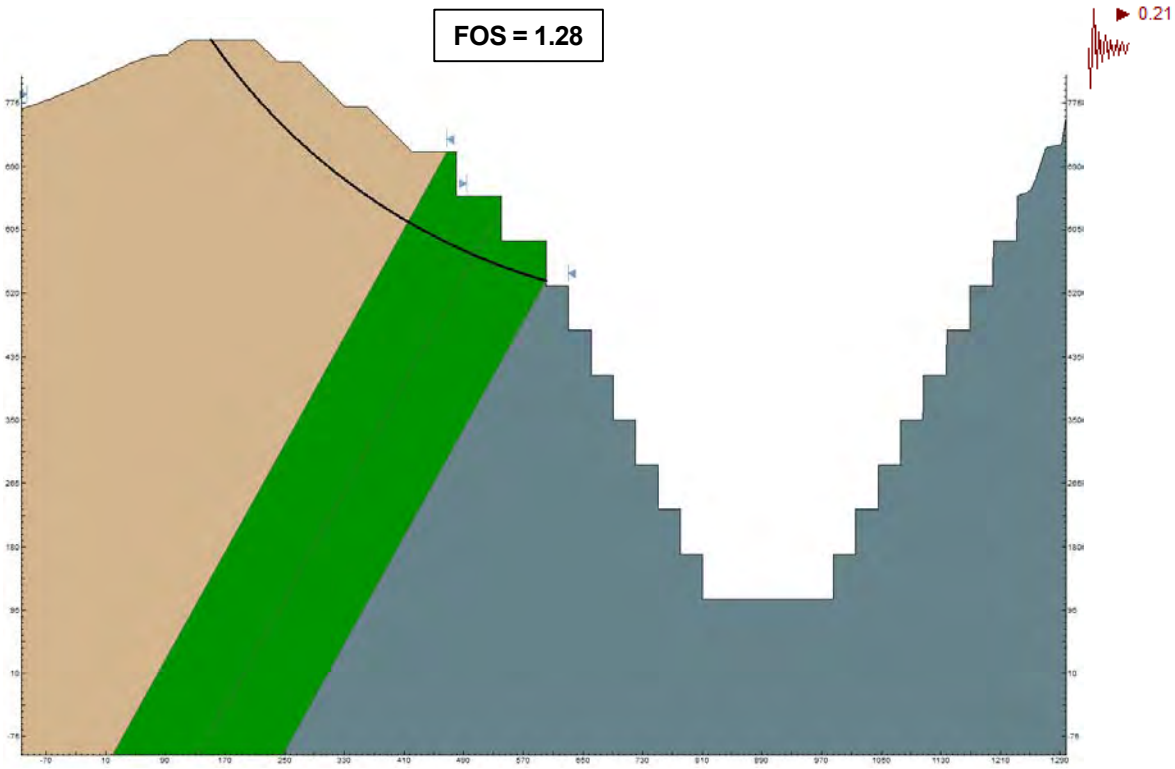
TITLE
EAST QUARRY WALL – KNOXVILLE TO DIABASE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.6**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

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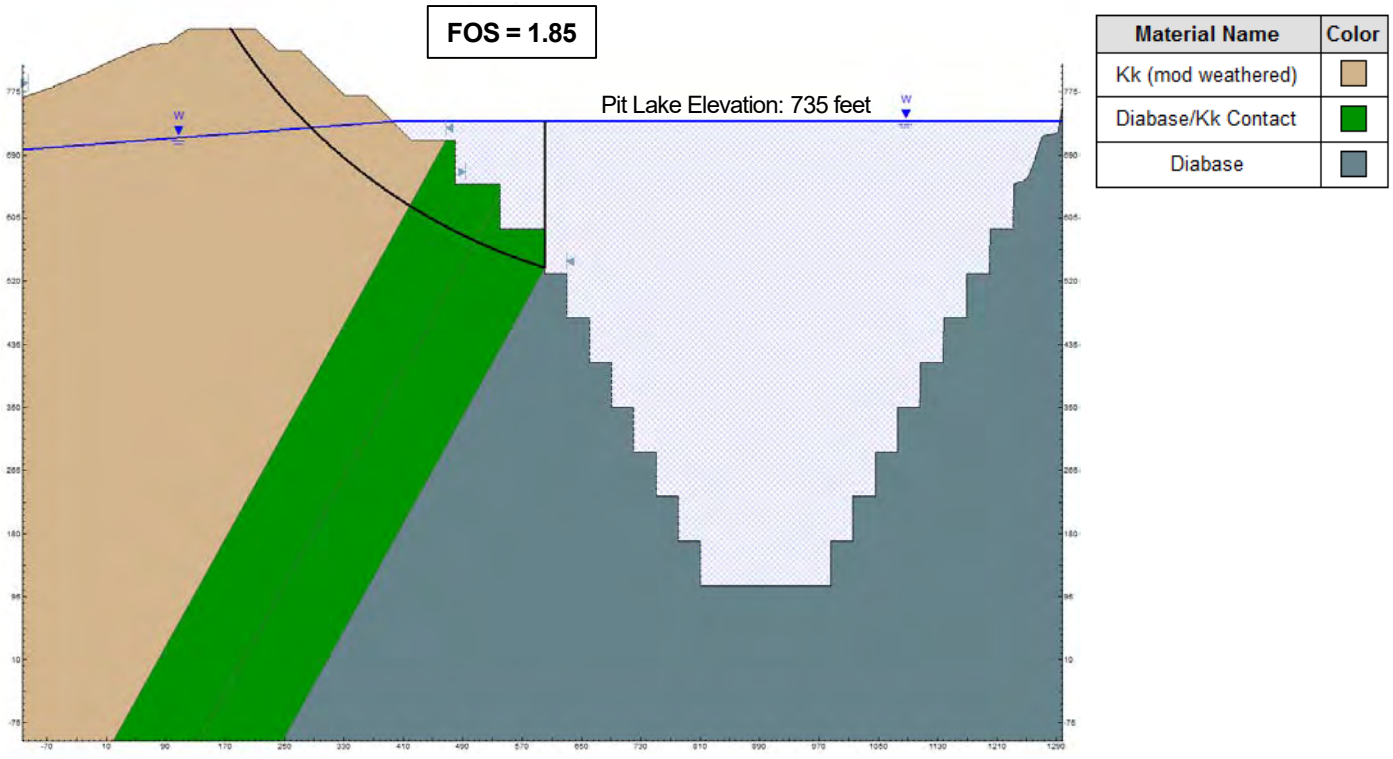
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PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

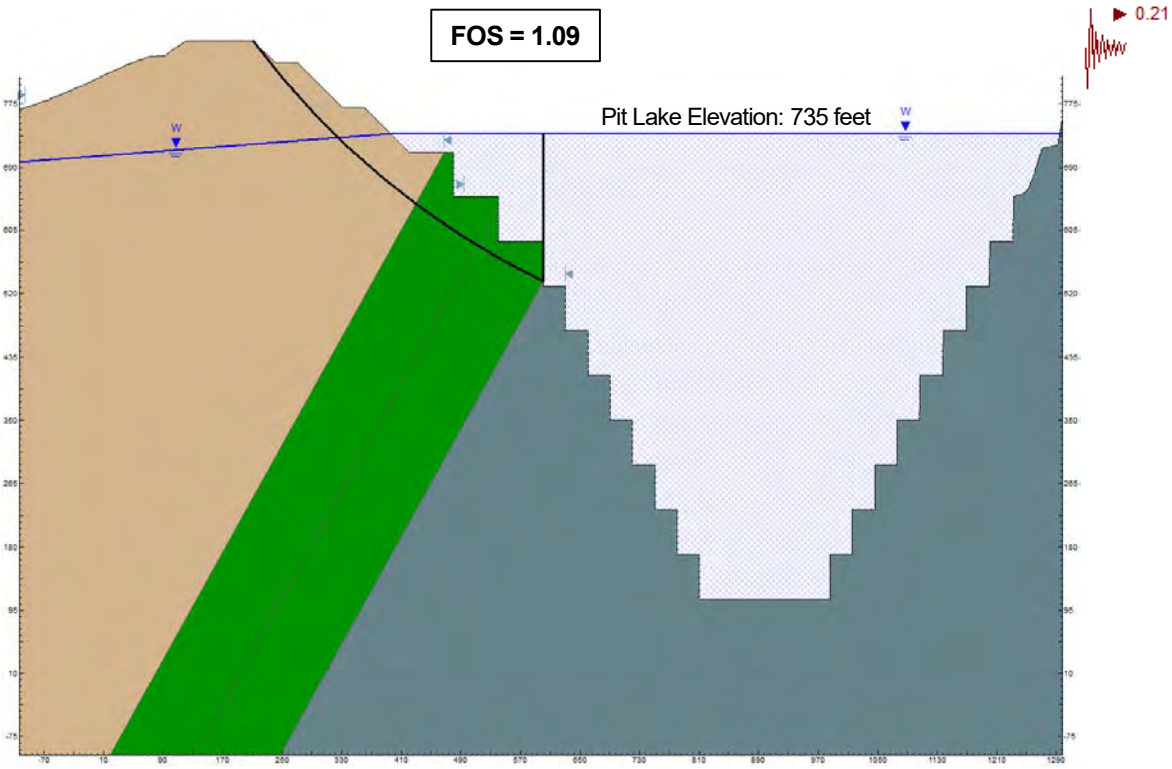
TITLE
EAST QUARRY WALL – KNOXVILLE TO CONTACT ZONE STABILITY AT END OF QUARRY OPERATIONS

PROJECT NO. **1661332** | REV. **0** | FIGURE **6.7**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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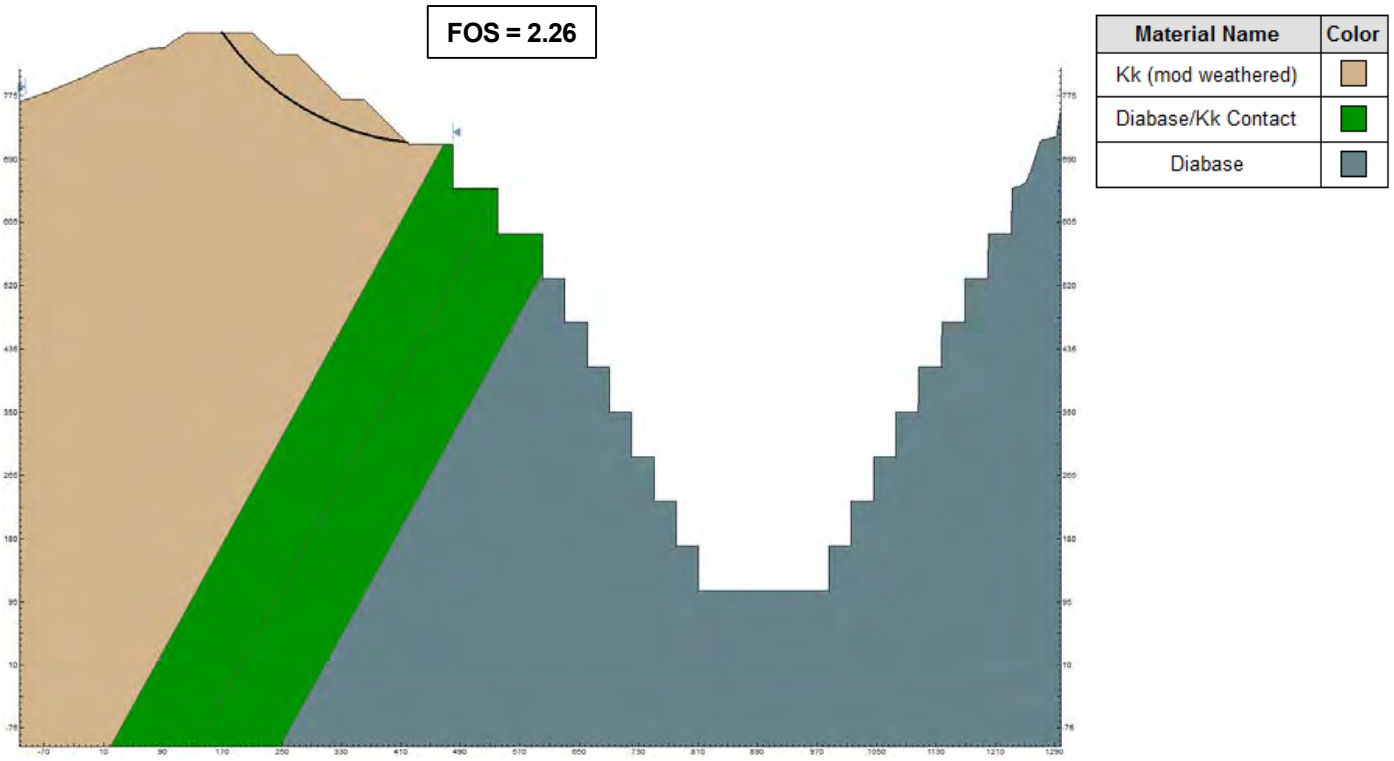
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PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

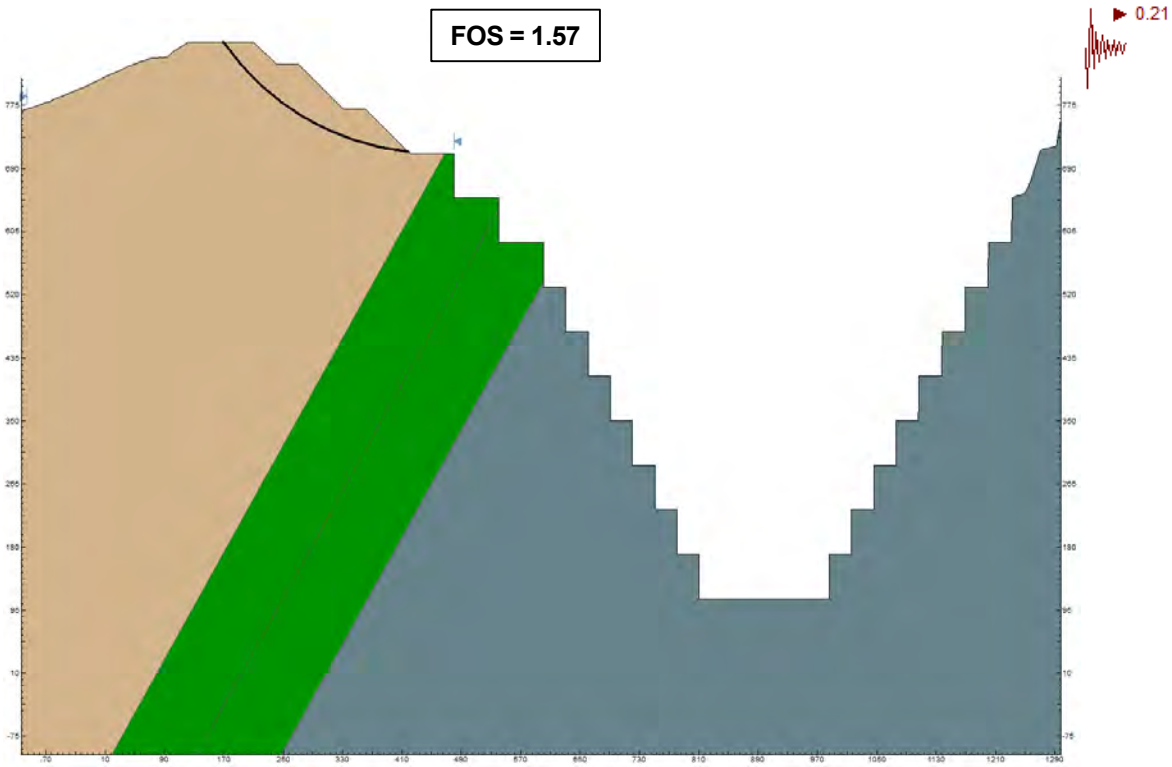
TITLE
EAST QUARRY WALL – KNOXVILLE TO CONTACT ZONE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.8**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

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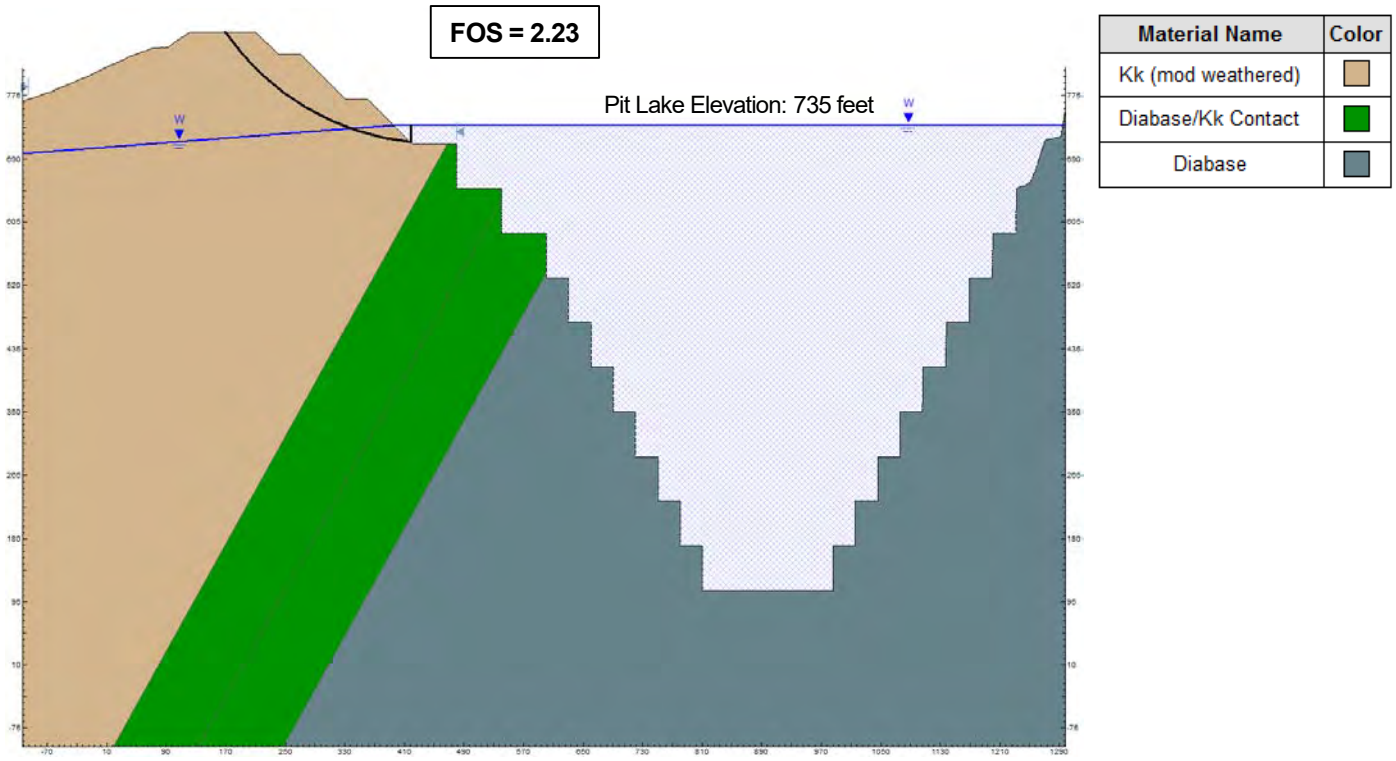
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

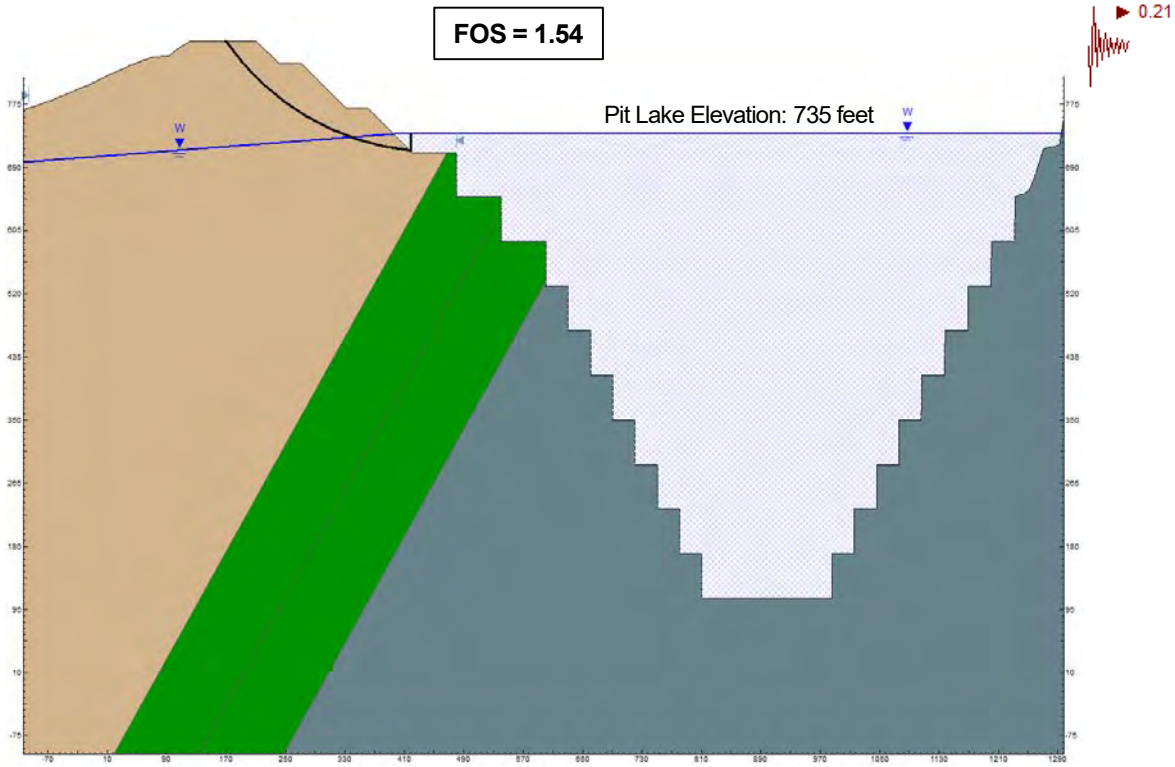
TITLE
EAST QUARRY WALL – KNOXVILLE STABILITY AT END OF QUARRY OPERATIONS

PROJECT NO. **1661332** | REV. **0** | FIGURE **6.9**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

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Golder Associates

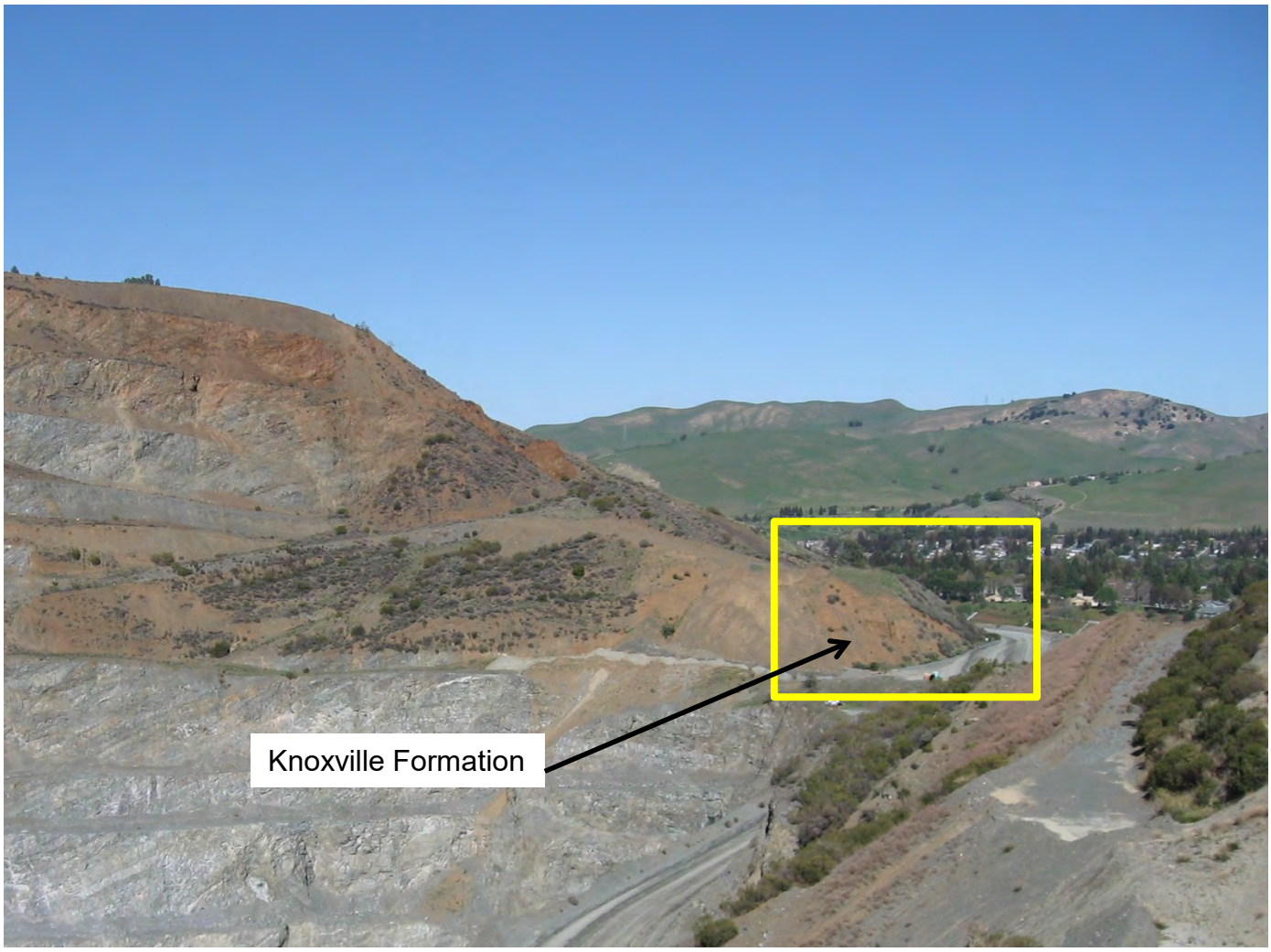
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
EAST QUARRY WALL – KNOXVILLE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.10**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



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DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

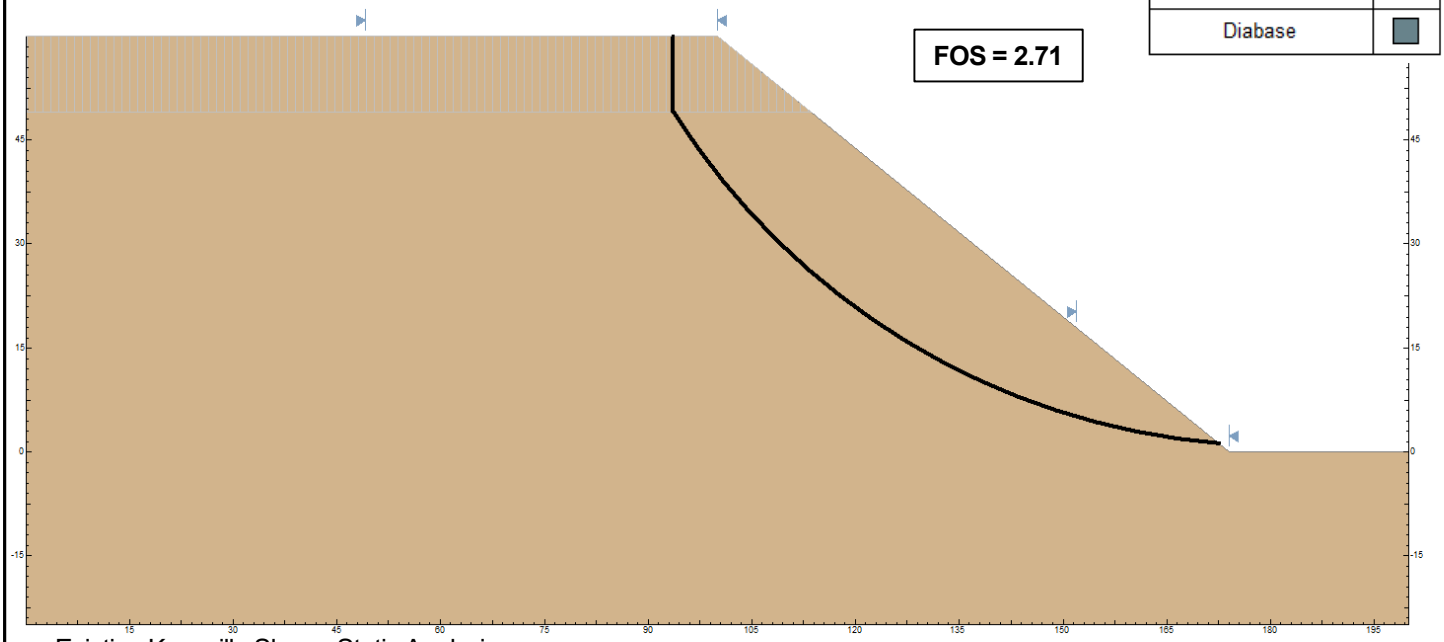
PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PHOTOGRAPH OF EXISTING KNOXVILLE SLOPES TAKEN MARCH 2014

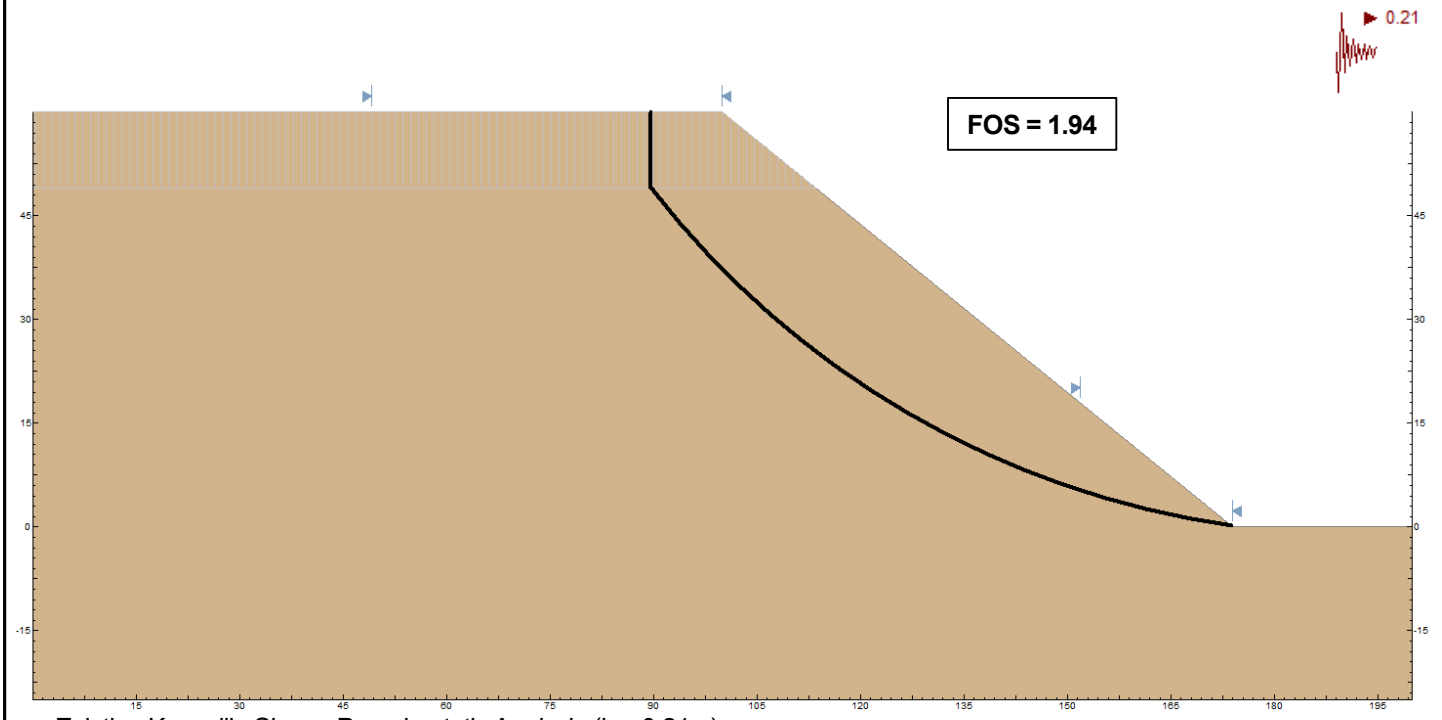
PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.11**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A

Material Name	Color
Kk (mod weathered)	
Diabase/Kk Contact	
Diabase	



Existing Knoxville Slopes Static Analysis



Existing Knoxville Slopes Pseudo-static Analysis (k = 0.21 g)

CLIENT
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CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

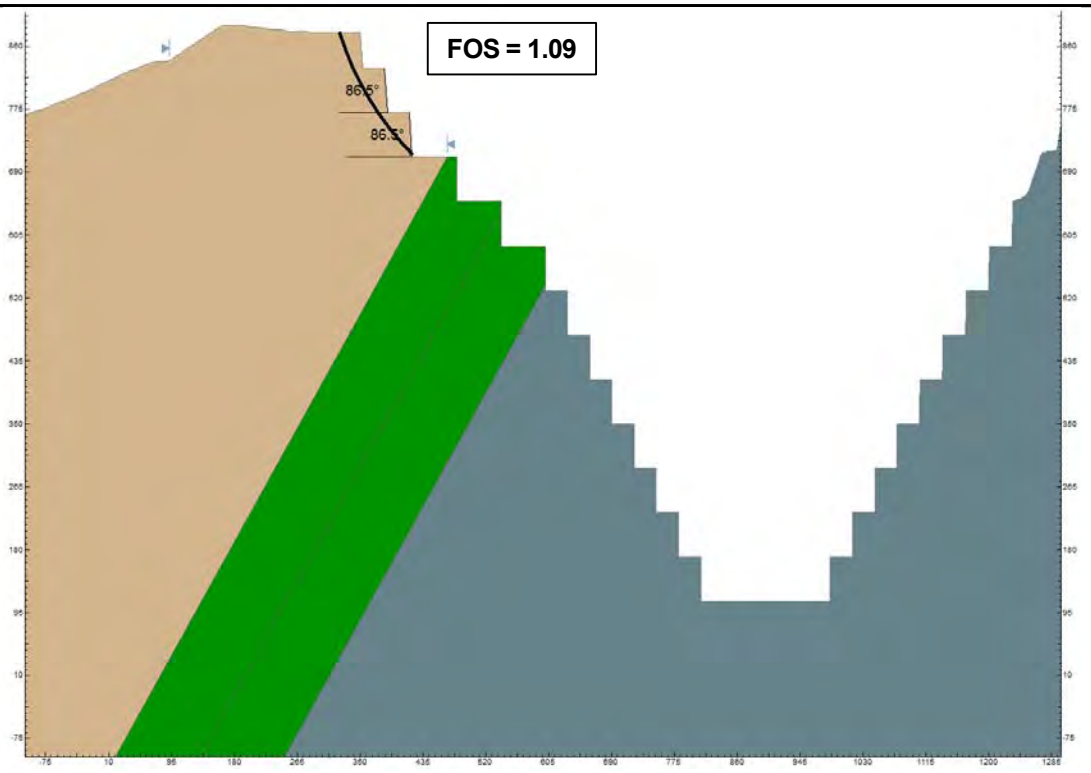
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
EXISTING KNOXVILLE SLOPES – OVERALL SLOPE STABILITY

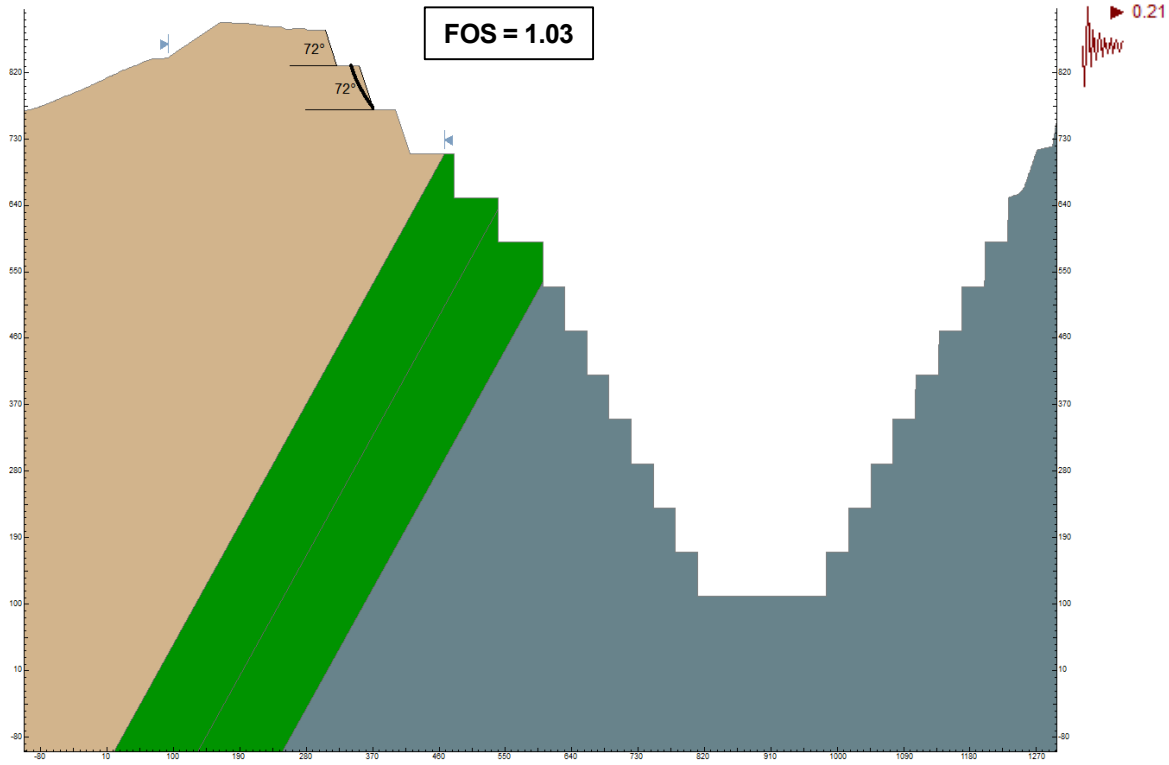
PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.12**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Material Name	Color
Kk (mod weathered) (Best Estimate)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

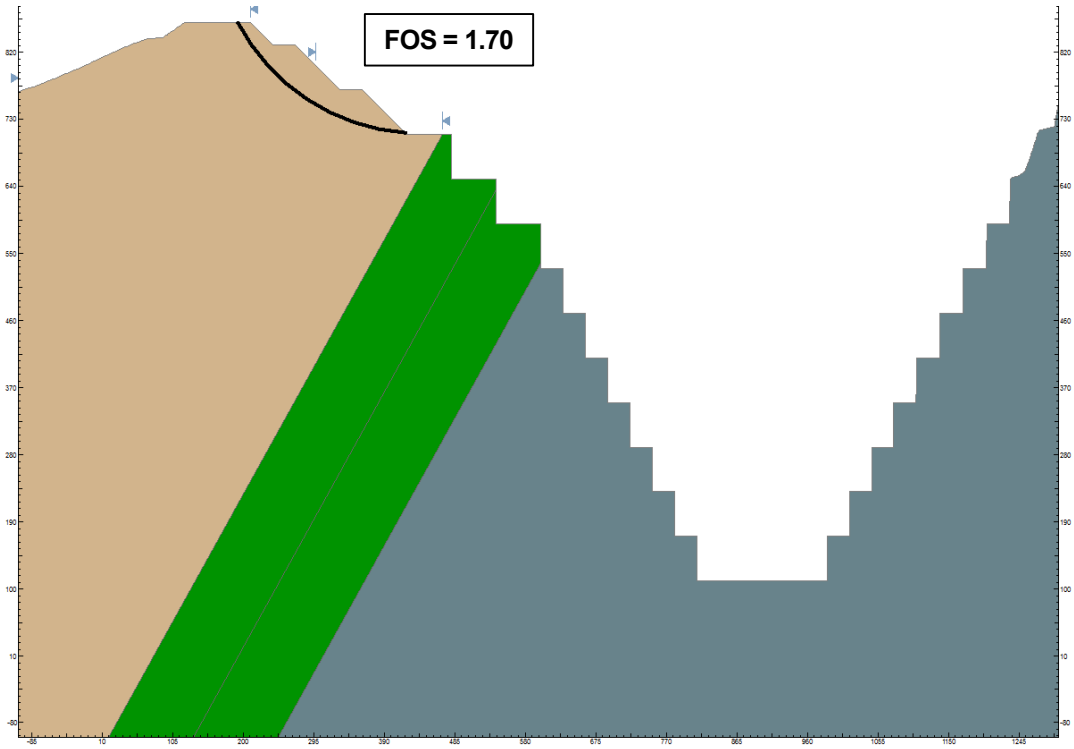
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PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
STEEPEST SLOPES IN KNOXVILLE – OVERALL SLOPE STABILITY – BEST ESTIMATE OF SHEAR STRENGTH

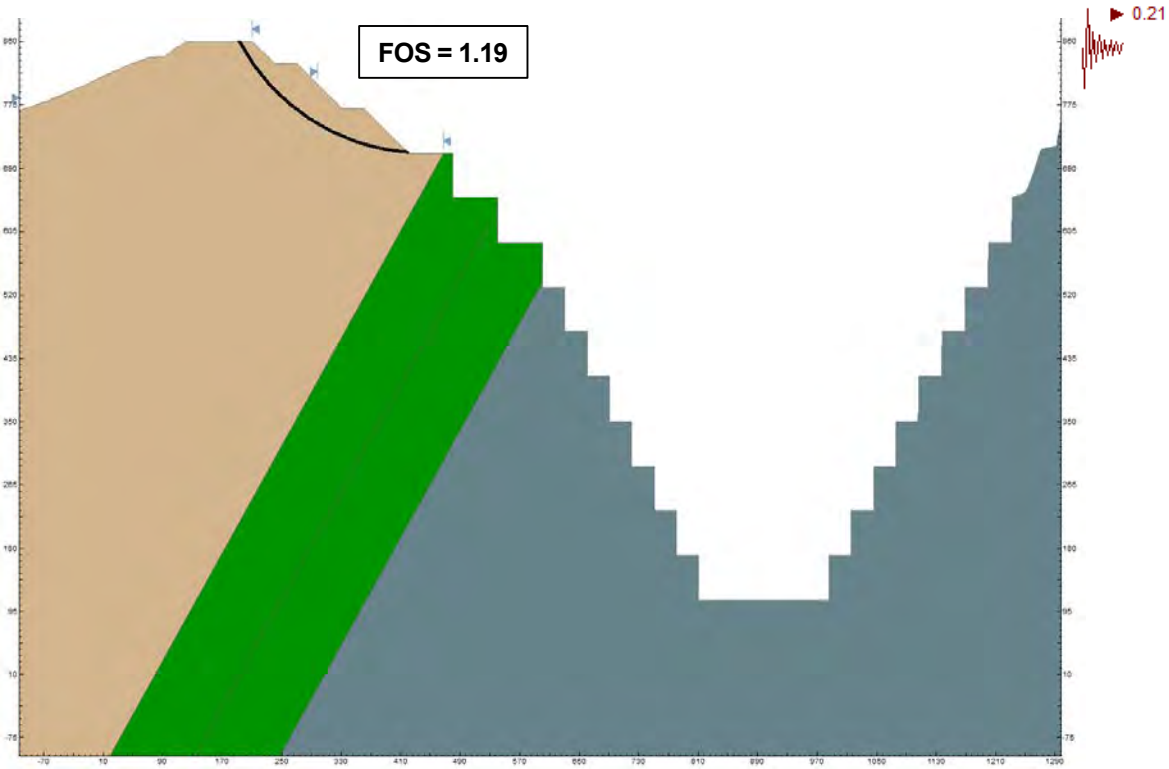
PROJECT NO. **1661332** | REV. **0** | FIGURE **6.13**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Material Name	Color
Kk (mod weathered) (Reduced Shear Strength)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

CLIENT
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

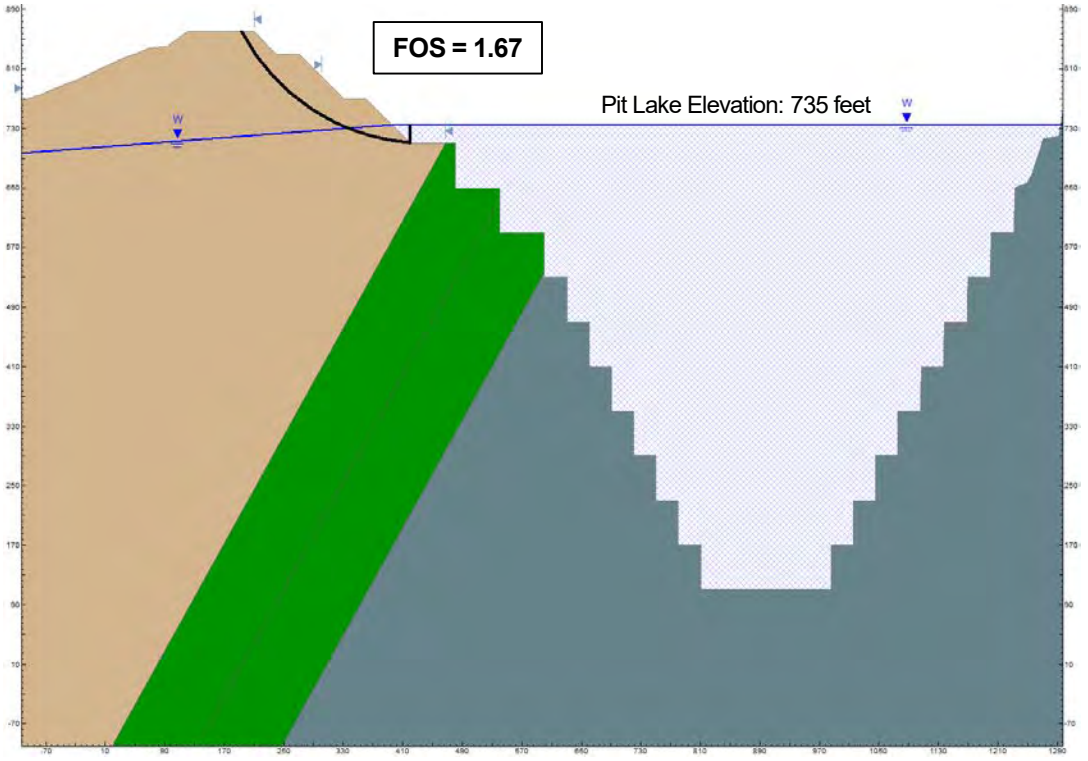
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PROPOSED SLOPES IN KNOXVILLE – OVERALL SLOPE STABILITY AT END OF QUARRY OPERATIONS – REDUCED SHEAR STRENGTH

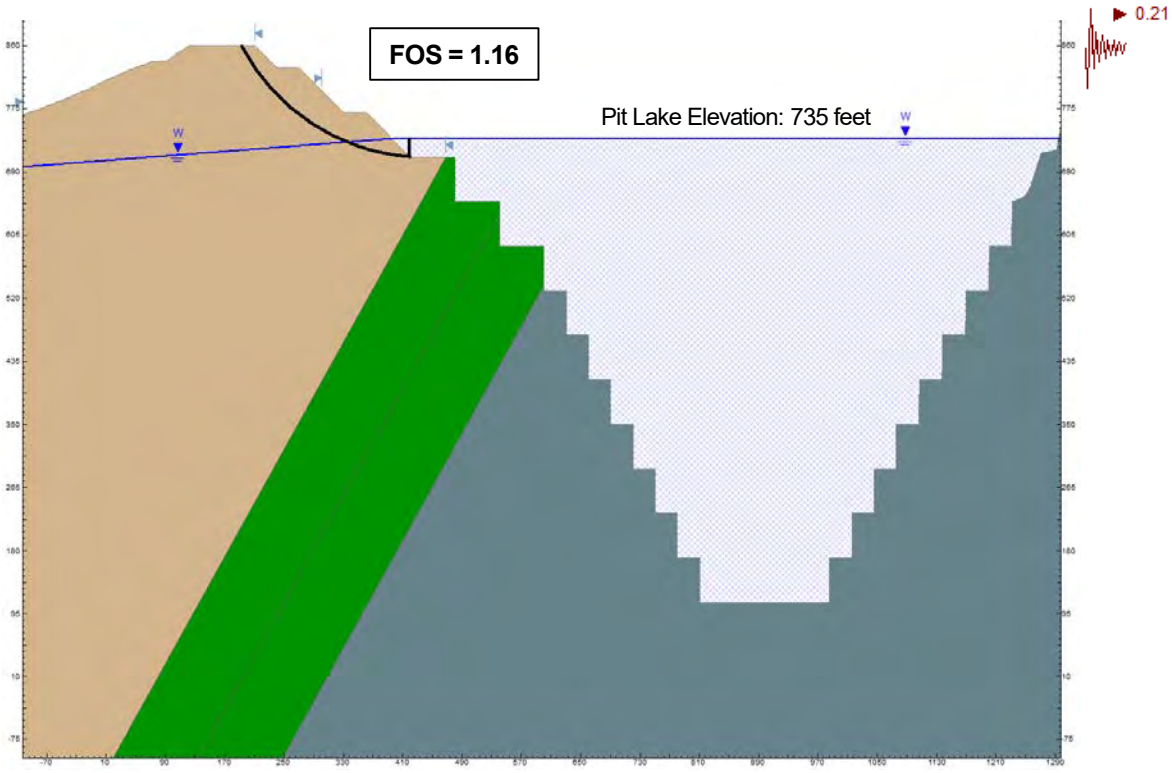
PROJECT NO. **1661332**
REV. **0**
FIGURE **6.14**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1in



Material Name	Color
Kk (mod weathered) (Reduced Shear Strength)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

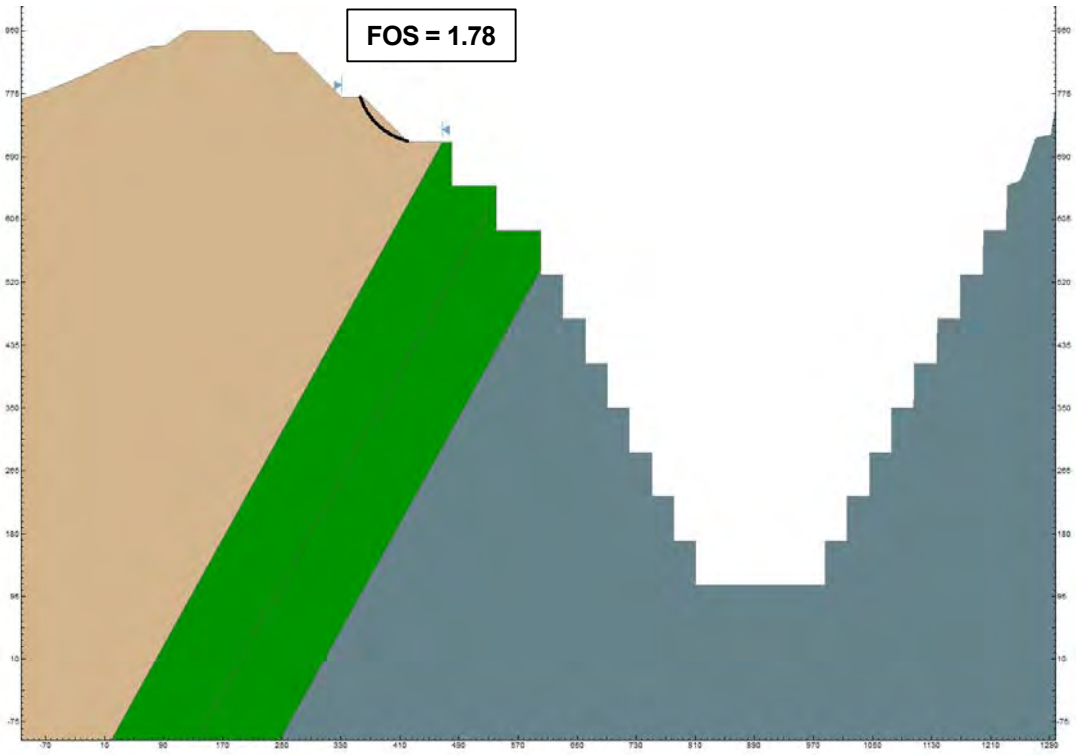
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PROPOSED SLOPES IN KNOXVILLE – OVERALL SLOPE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT 735 ft – REDUCED SHEAR STRENGTH

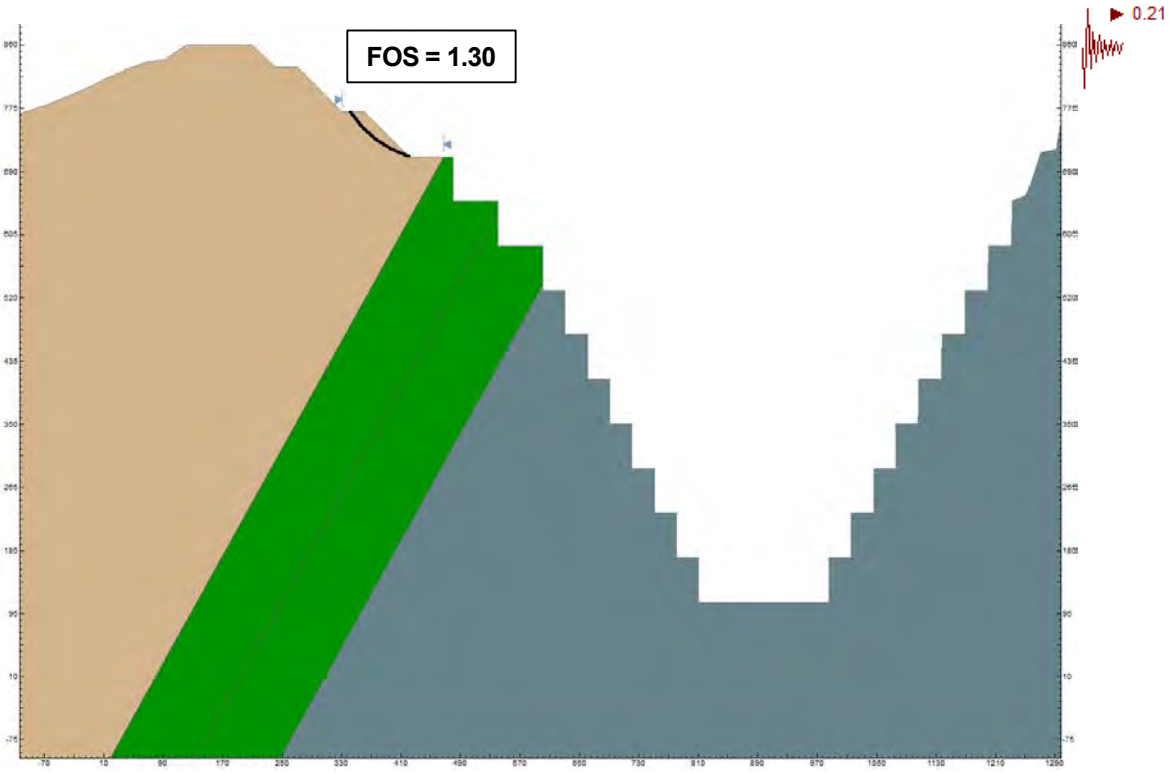
PROJECT NO. **1661332**
REV. **0**
FIGURE **6.15**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Material Name	Color
Kk (mod weathered) (Reduced Shear Strength)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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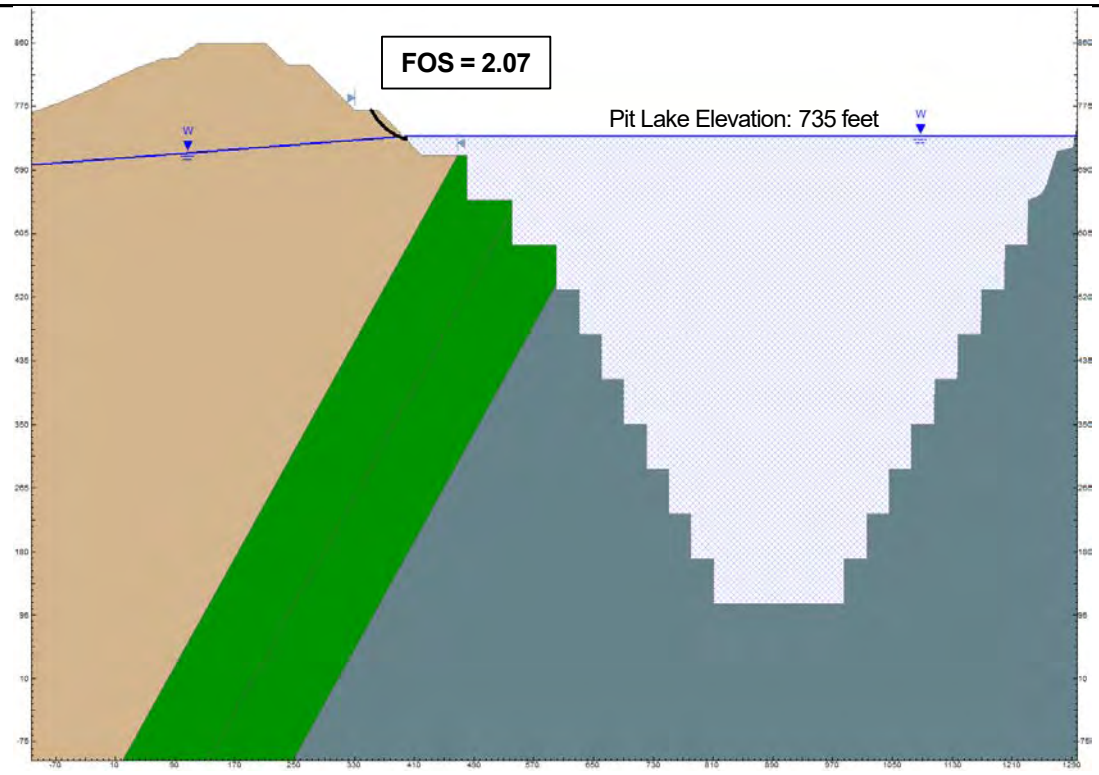
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
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CEMEX – CLAYTON QUARRY

TITLE
PROPOSED SLOPES IN KNOXVILLE – SINGLE BENCH STABILITY AT END OF QUARRY OPERATIONS – REDUCED SHEAR STRENGTH

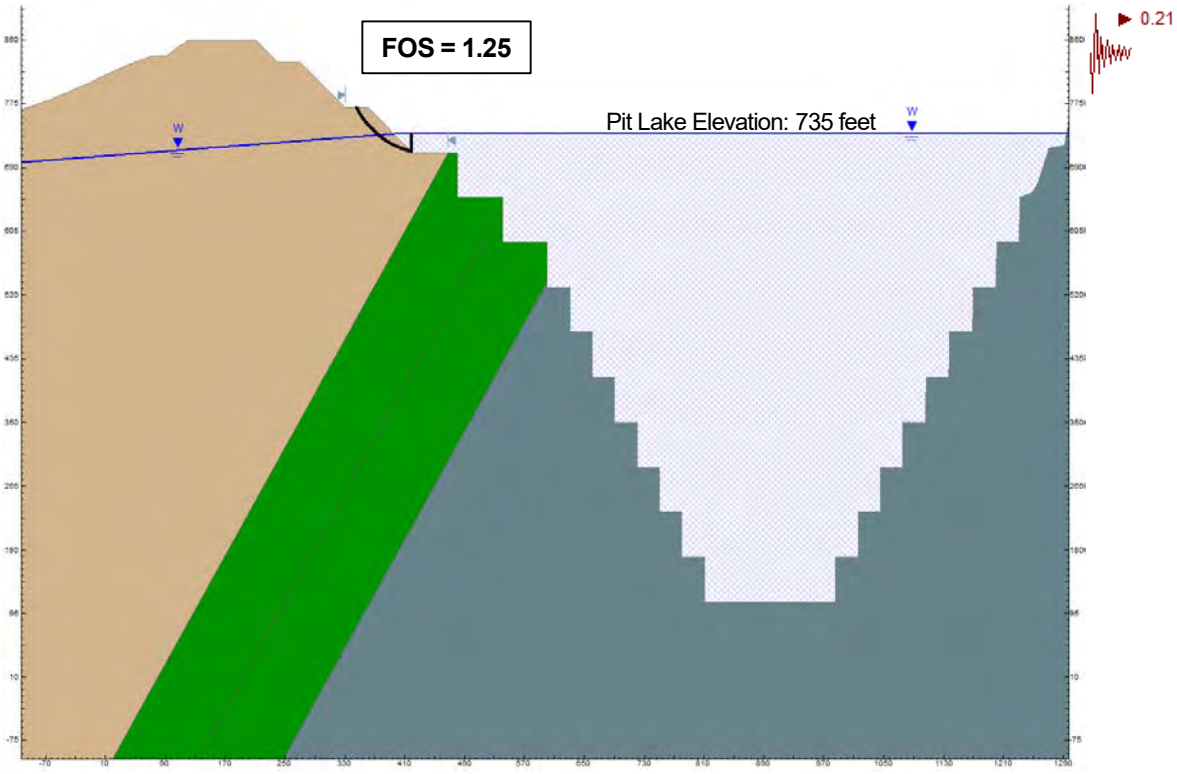
PROJECT NO. **1661332**
REV. **0**
FIGURE **6.16**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Material Name	Color
Kk (mod weathered) (Reduced Shear Strength)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CONSULTANT
Golder Associates

YYYY-MM-DD	2017-04-12
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DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
PROPOSED SLOPES IN KNOXVILLE – SINGLE BENCH STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT 735 ft – REDUCED SHEAR STRENGTH

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.17**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



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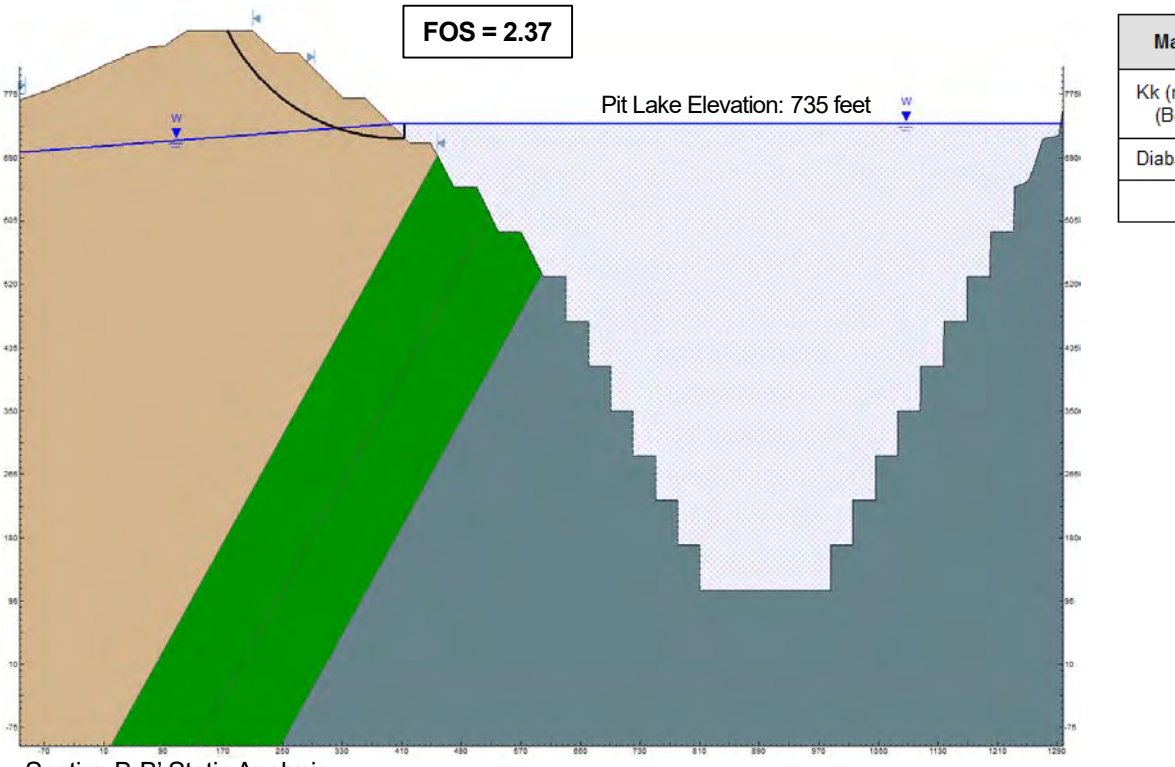
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

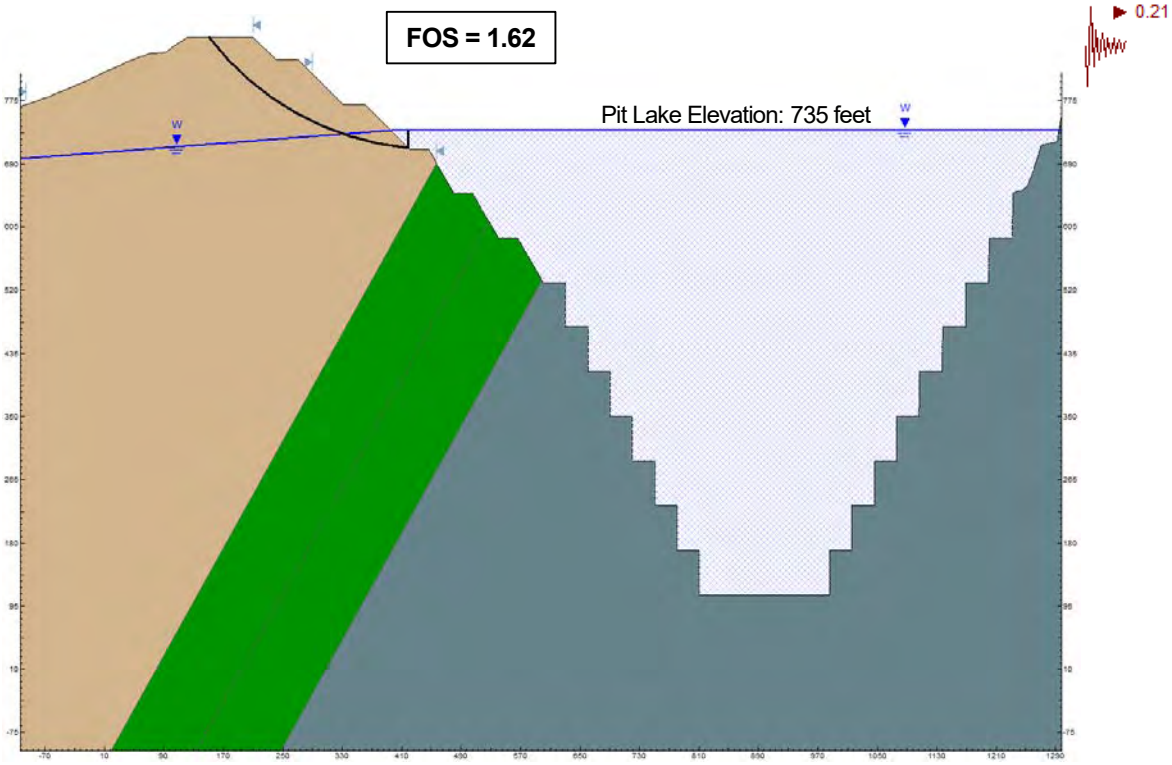
TITLE
PHOTOGRAPH OF EXISTING BENCH SLOPES IN KNOXVILLE /DIABASE CONTACT TAKEN MARCH 2014

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.18**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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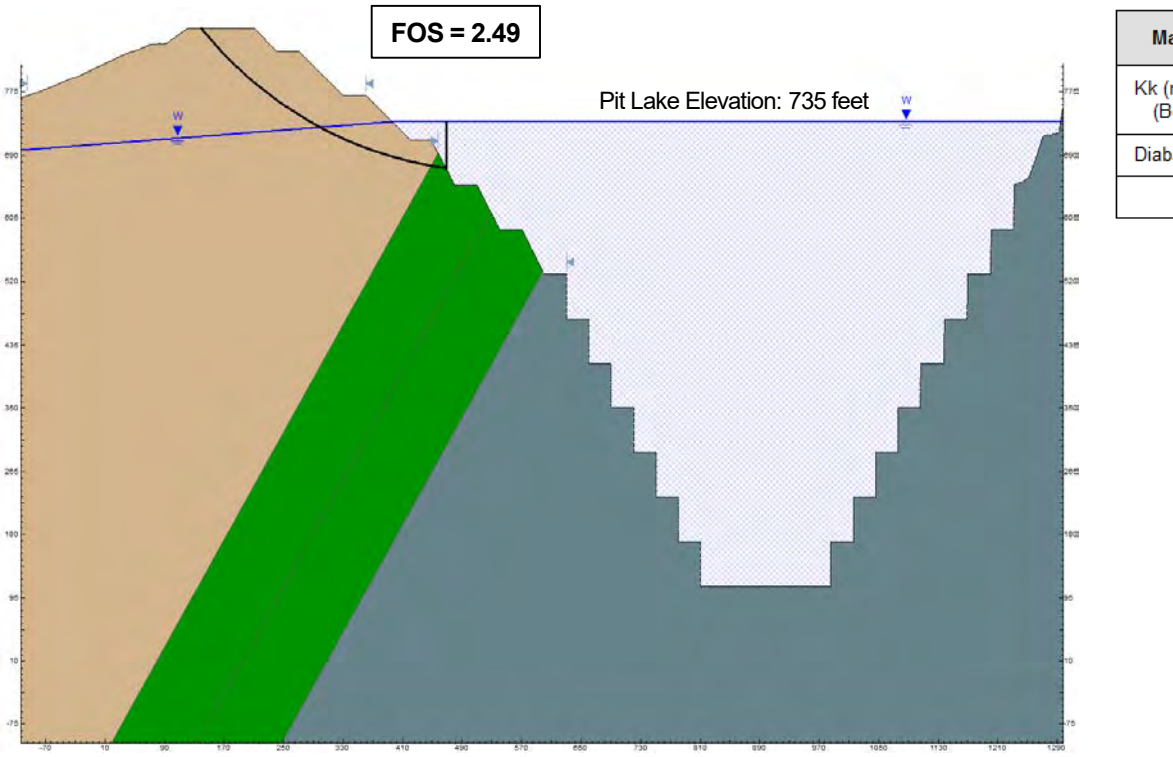
YYYY-MM-DD	2017-04-12
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REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

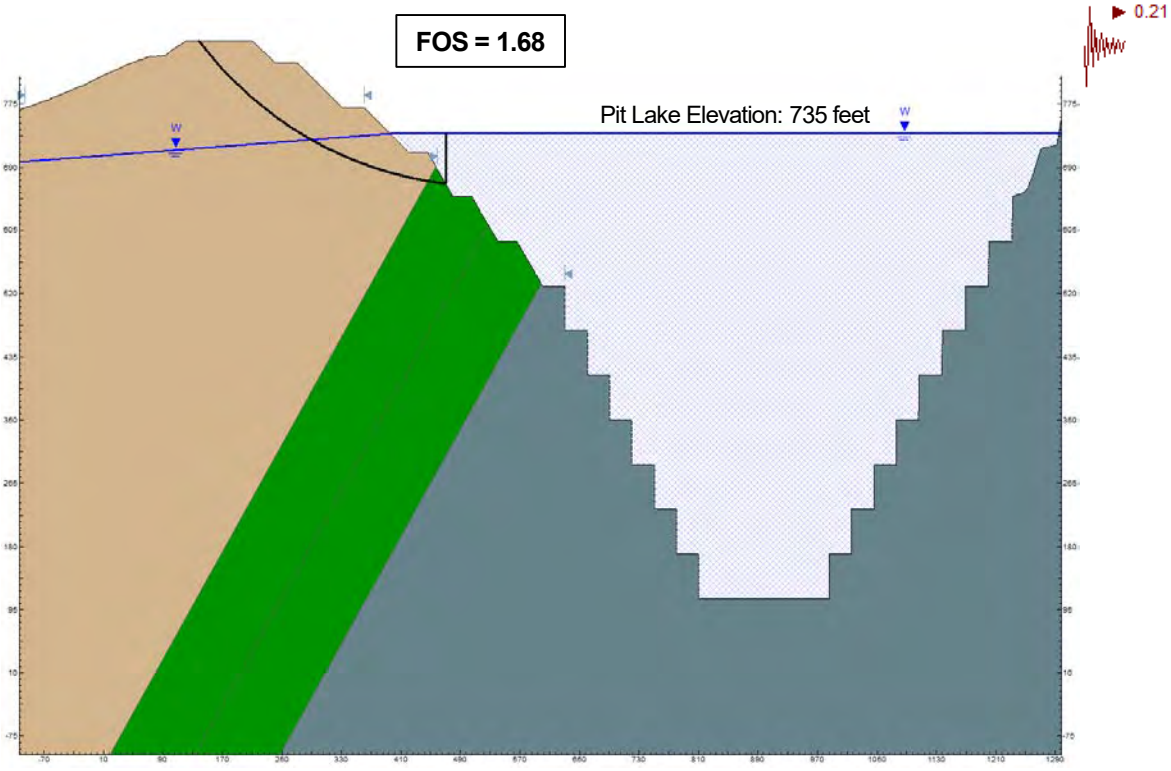
TITLE
SUBMERGED KNOXVILLE/DIABASE CONTACT – KNOXVILLE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft – BEST ESTIMATE OF SHEAR STRENGTH

PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.19**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

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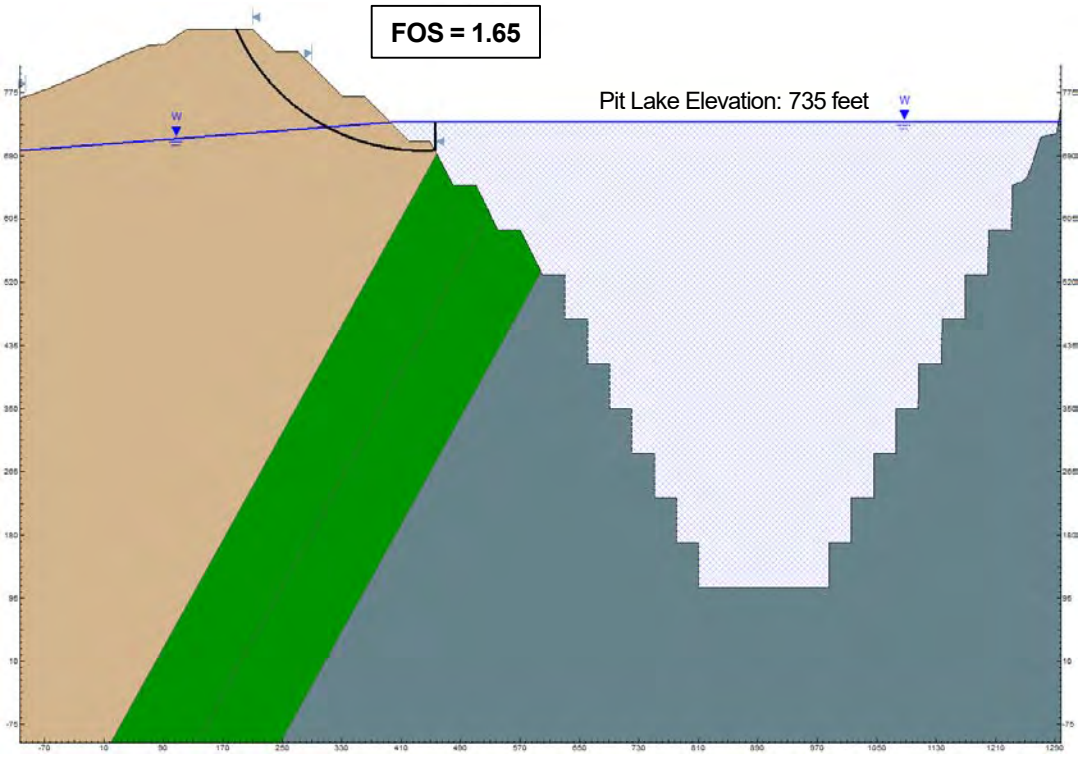
YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
SUBMERGED KNOXVILLE/DIABASE CONTACT – KNOXVILLE TO CONTACT ZONE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft – BEST ESTIMATE OF SHEAR STRENGTH

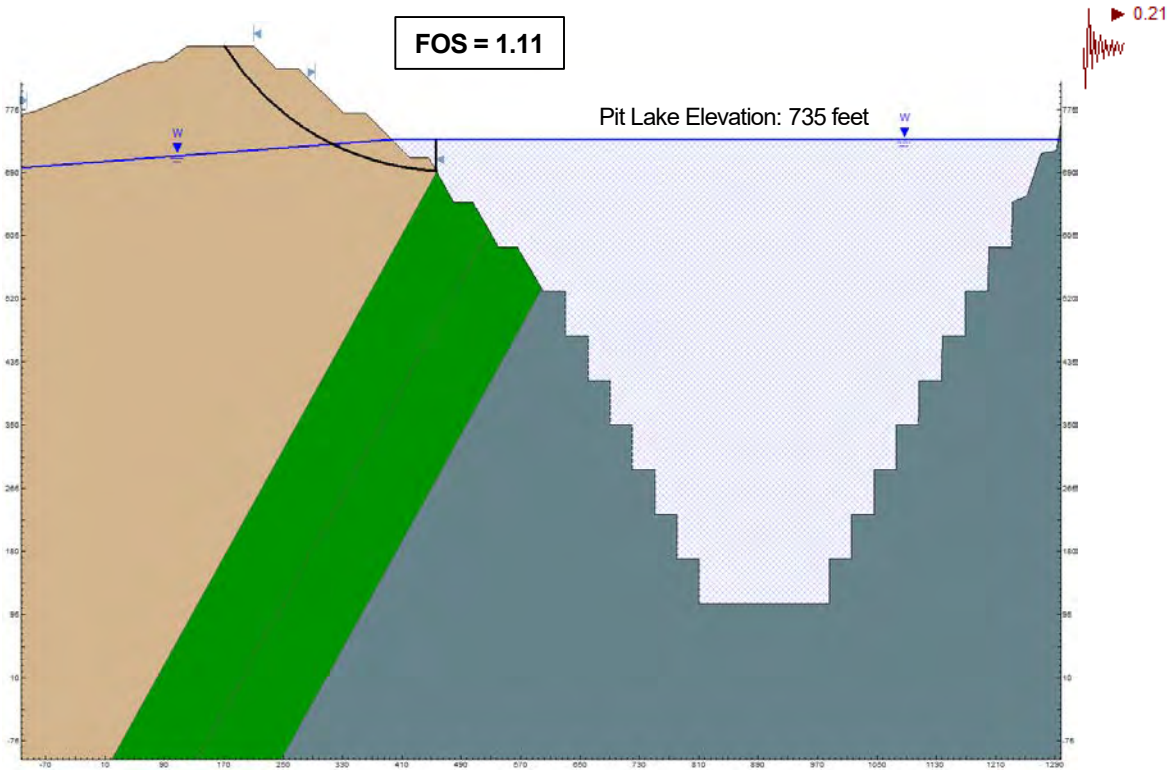
PROJECT NO. **1661332**
REV. **0**
FIGURE **6.20**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Material Name	Color
Kk (mod weathered) (Reduced Shear Strength)	
Diabase/Kk Contact	
Diabase	

Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

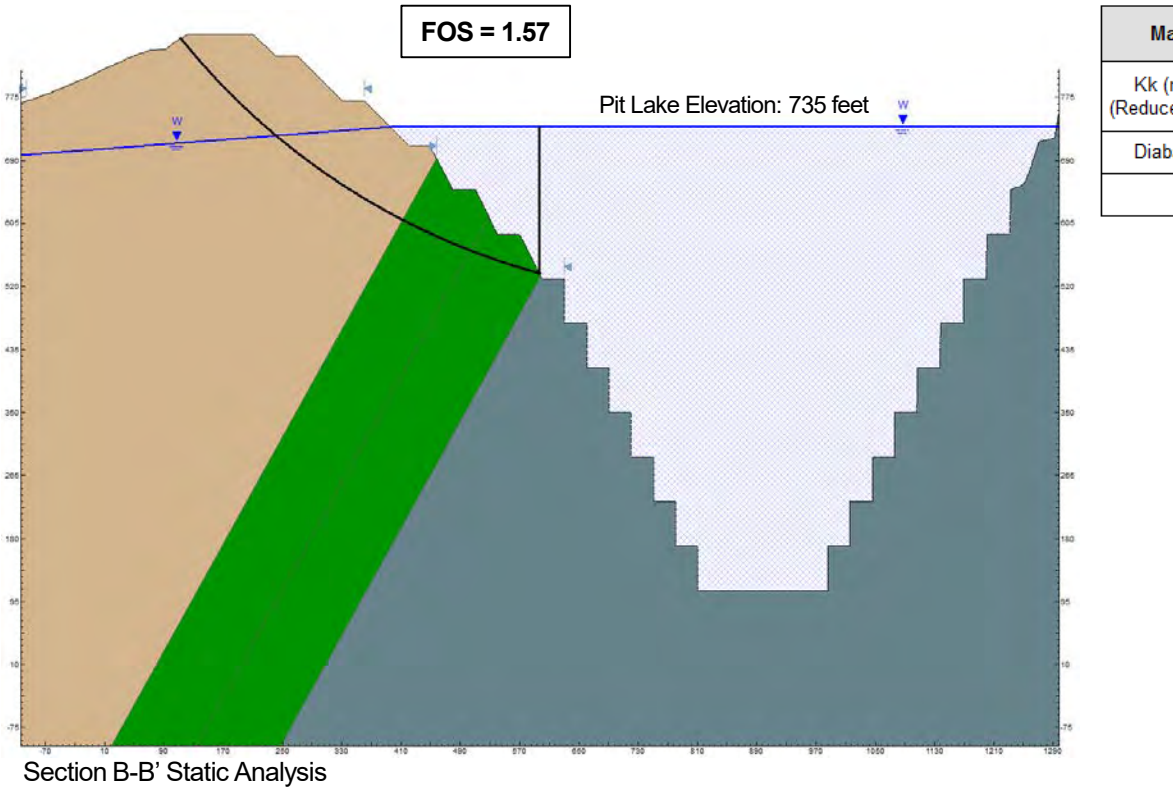
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DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

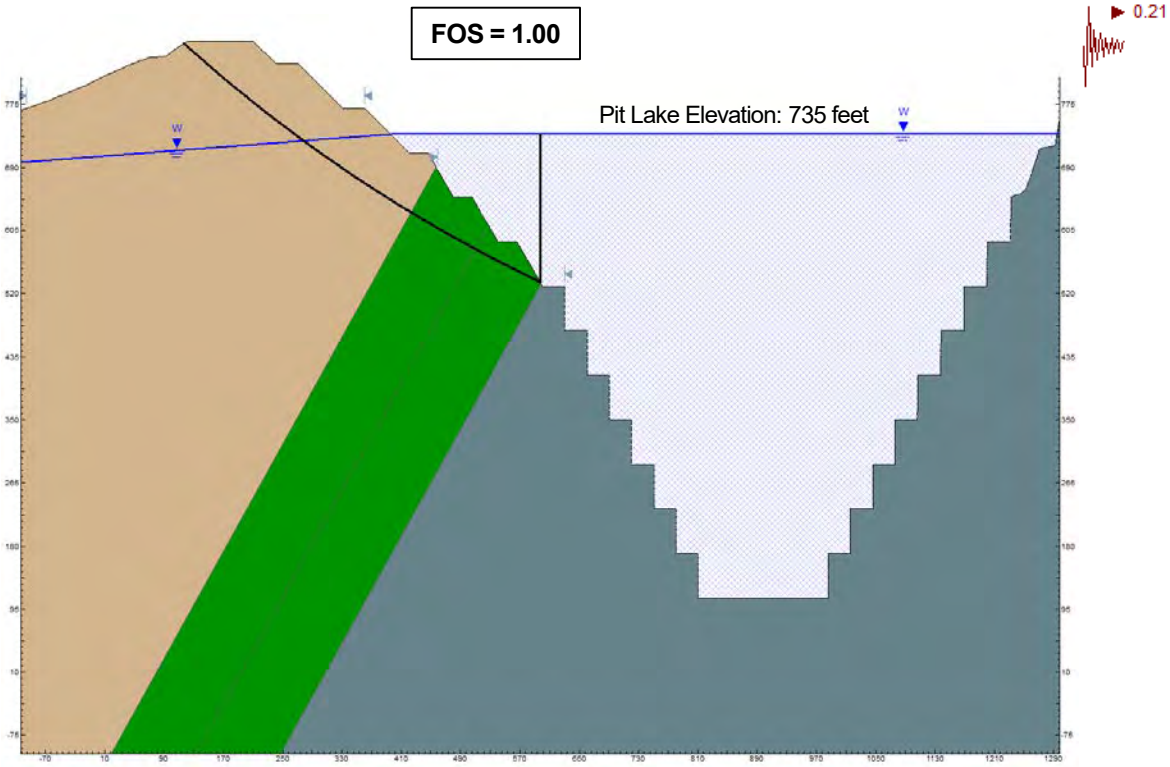
TITLE
SUBMERGED KNOXVILLE/DIABASE CONTACT – KNOXVILLE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft – REDUCED SHEAR STRENGTH

PROJECT NO.	REV.	FIGURE
1661332	**0**	**6.21**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section B-B' Static Analysis



Section B-B' Pseudo-static Analysis (k = 0.21 g)

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CLAYTON, CALIFORNIA

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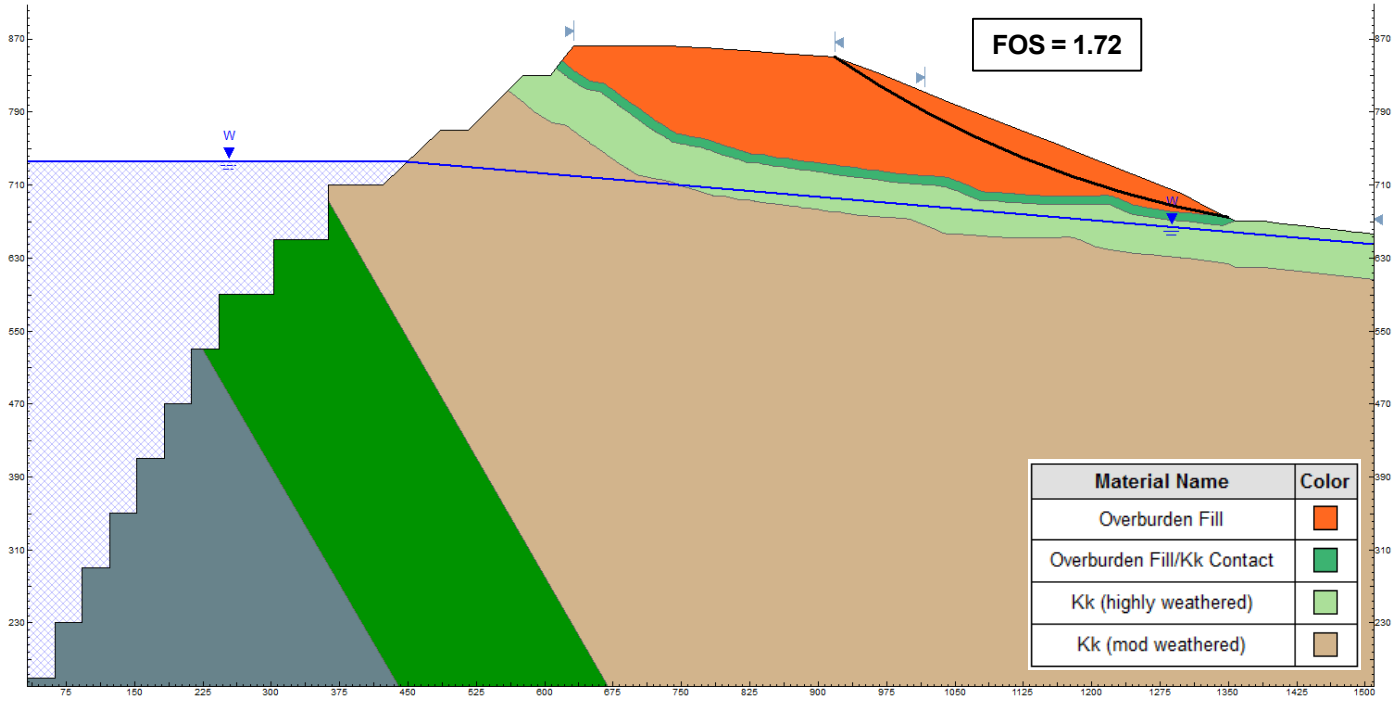
YYYY-MM-DD	2017-04-12
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DESIGNED	-
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APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

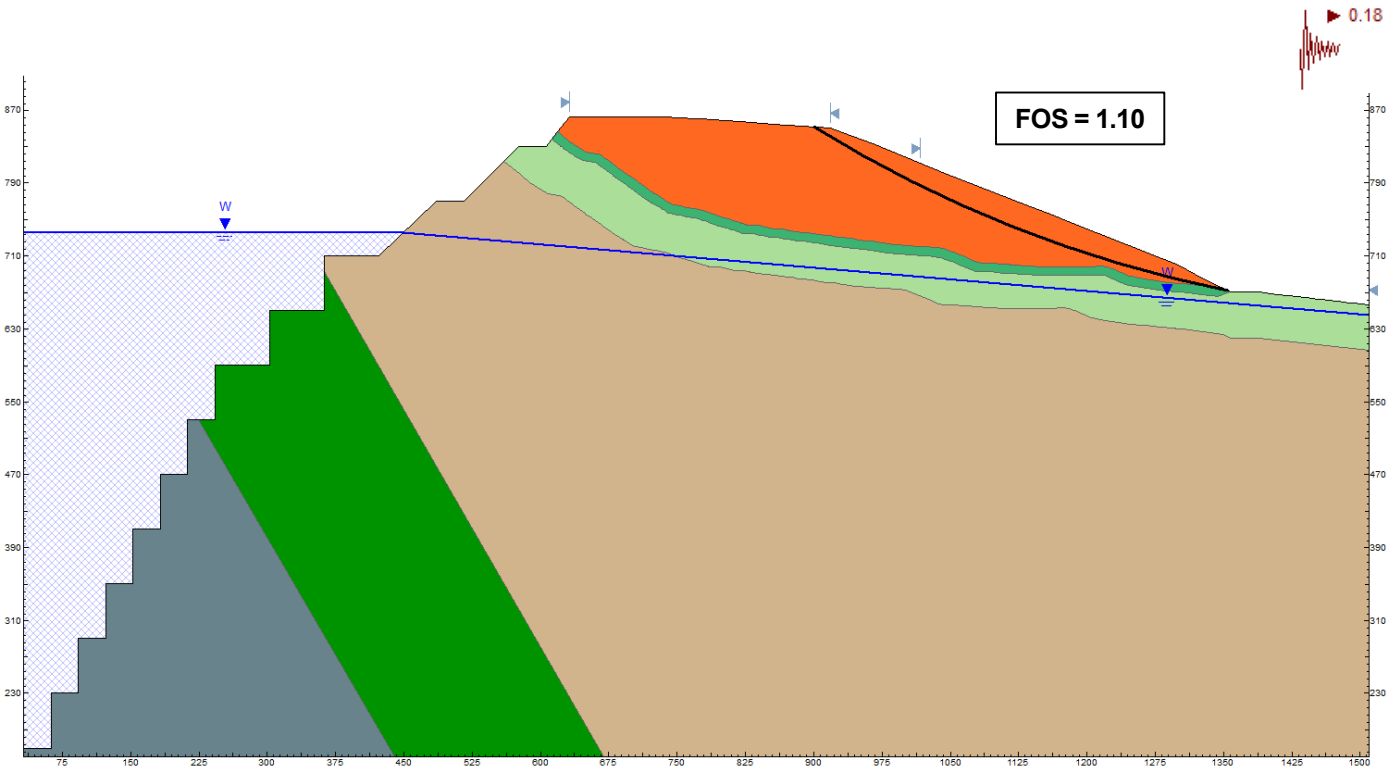
TITLE
SUBMERGED KNOXVILLE/DIABASE CONTACT – KNOXVILLE TO CONTACT ZONE STABILITY FOR RECLAIMED PIT WITH PIT LAKE AT ELEVATION 735 ft – REDUCED SHEAR STRENGTH

PROJECT NO. **1661332**
REV. **0**
FIGURE **6.22**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0



Section A-A' Static Analysis



Section A-A' Pseudo-static Analysis (k = 0.18 g)

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CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
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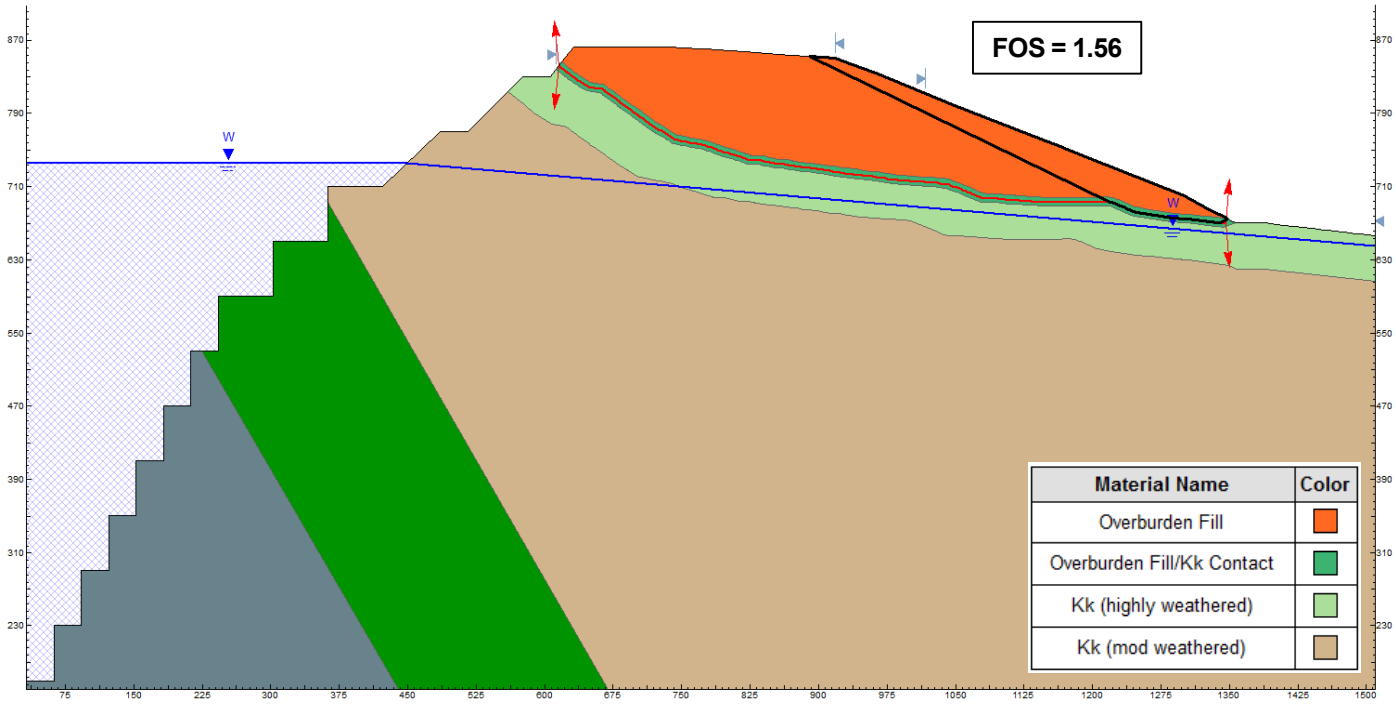
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PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
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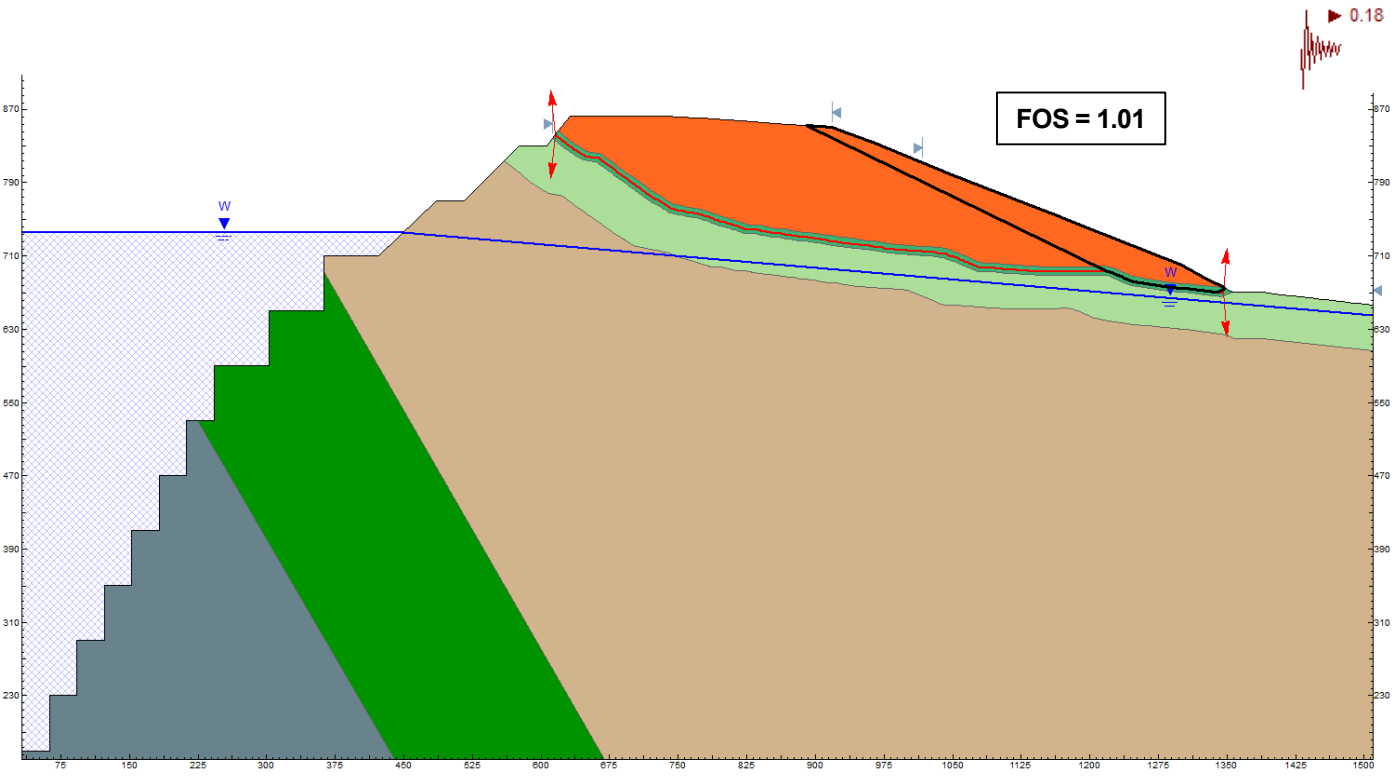
TITLE
PROPOSED SOUTH OFA – OVERALL STABILITY OF FILL SLOPES

PROJECT NO. **1661332** | REV. **0** | FIGURE **7.1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section A-A' Static Analysis



Section A-A' Pseudo-static Analysis (k = 0.18 g)

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CLAYTON, CALIFORNIA

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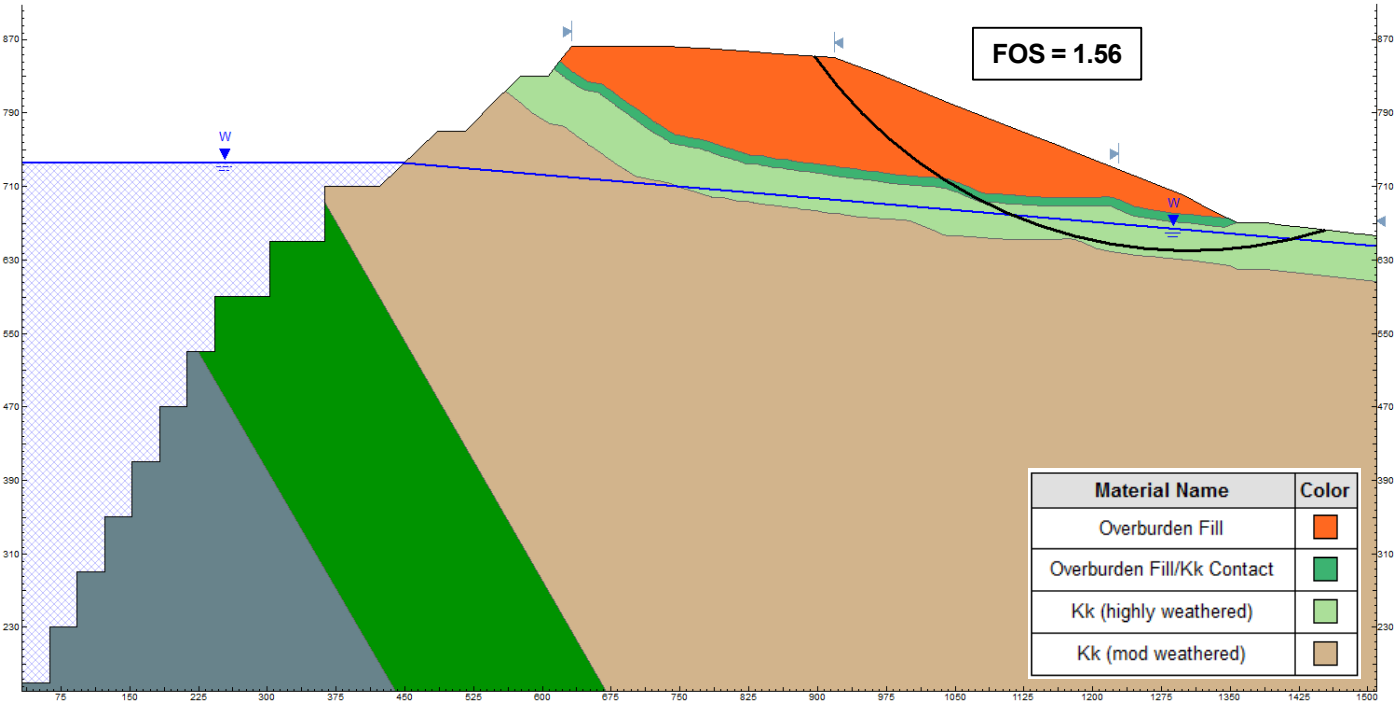
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PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

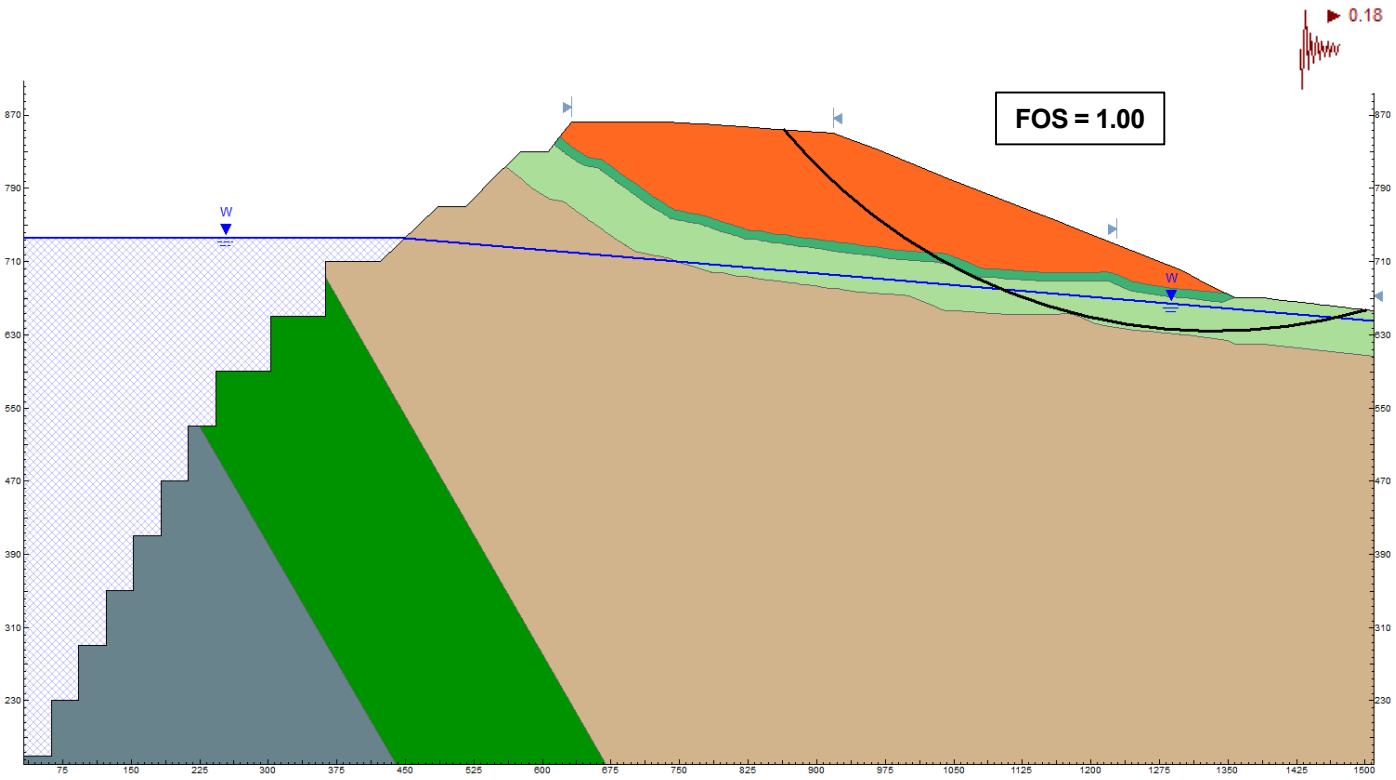
TITLE
PROPOSED SOUTH OFA – FILL/FOUNDATION CONTACT STABILITY

PROJECT NO. **1661332** | REV. **0** | FIGURE **7.2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section A-A' Static Analysis



Section A-A' Pseudo-static Analysis (k = 0.18 g)

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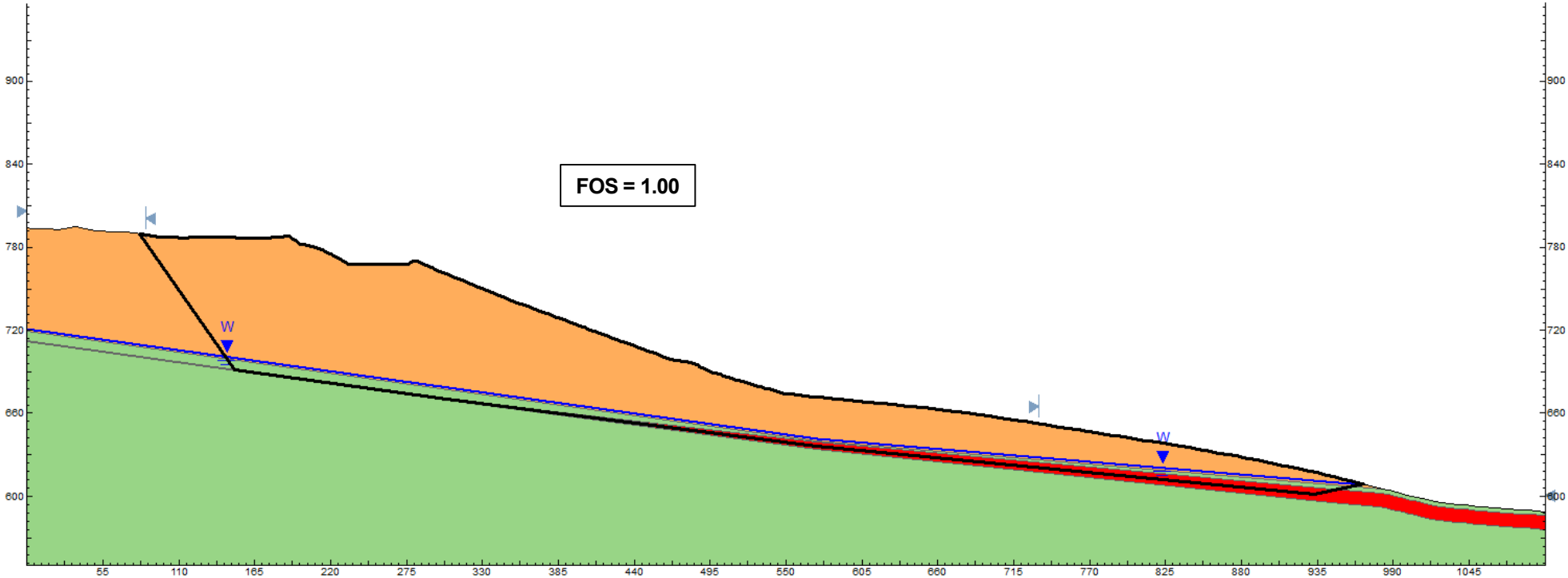
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PROJECT
GEOTECHNICAL EVALUATIONS FOR
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CEMEX – CLAYTON QUARRY

TITLE
PROPOSED SOUTH OFA – FOUNDATION STABILITY

PROJECT NO. **1661332** | REV. **0** | FIGURE **7.3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A



Section D-D' Static Analysis

Material Name	Color
Existing Overburden Waste	
Knoxville Residual Soil	
Knoxville Residual Soil (Slide Plane)	

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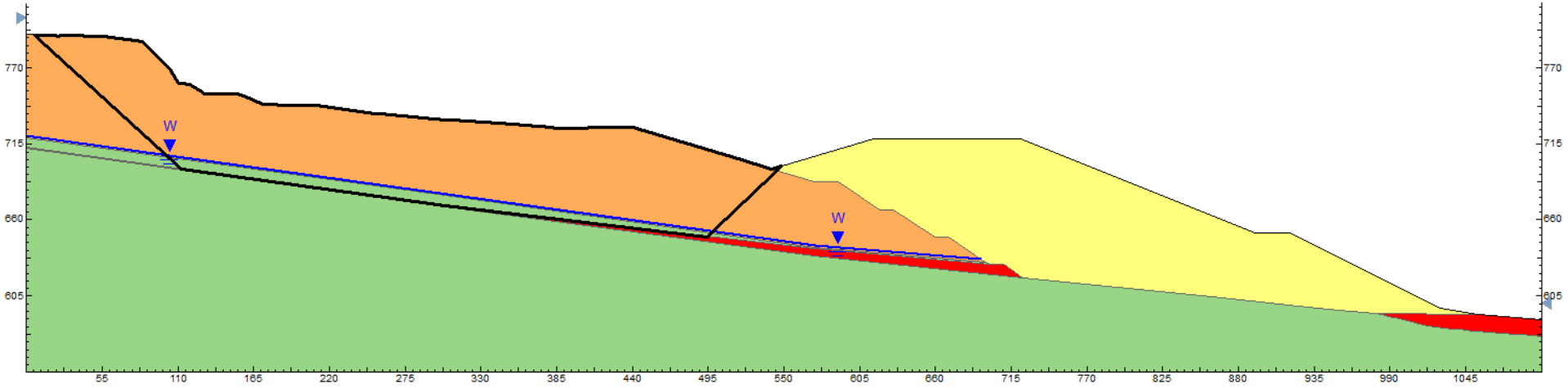
PROJECT
GEOTECHNICAL EVALUATIONS FOR
REVISED RECLAMATION PLAN
CEMEX – CLAYTON QUARRY

TITLE
SLIDE PLANE MATERIAL (RESIDUAL SOIL FROM KNOXVILLE) – BACK ANALYSIS OF SHEAR STRENGTH

PROJECT NO.	REV.	FIGURE
1661332	**0**	**8.1**

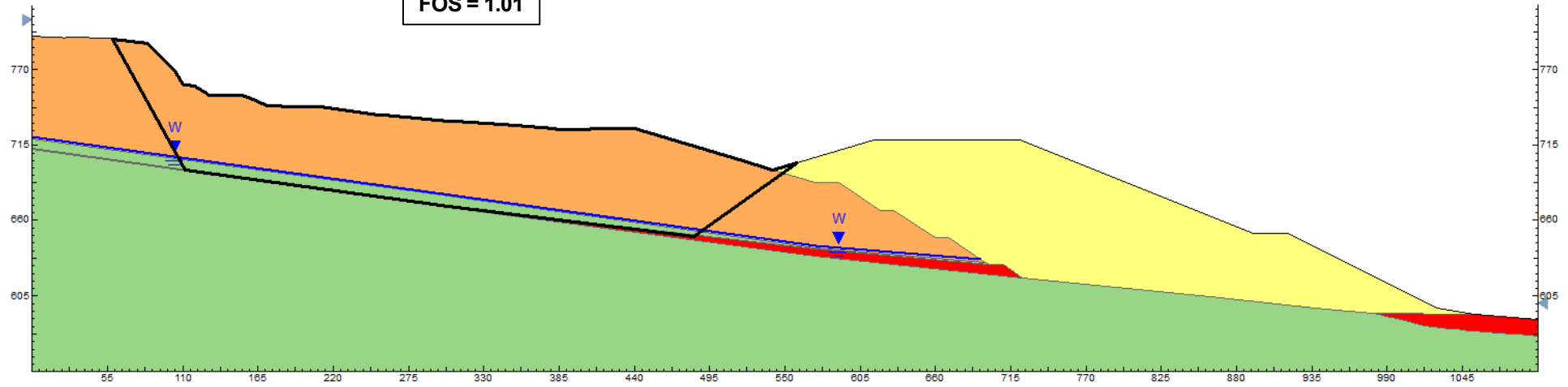
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

FOS = 1.91



Section D-D' Static Analysis

FOS = 1.01



Section D-D' Pseudo-static Analysis (k = 0.18 g)

Material Name	Color
Existing Overburden Waste	
Knoxville Residual Soil	
Knoxville Residual Soil (Slide Plane)	
Buttress (Overburden Fill)	

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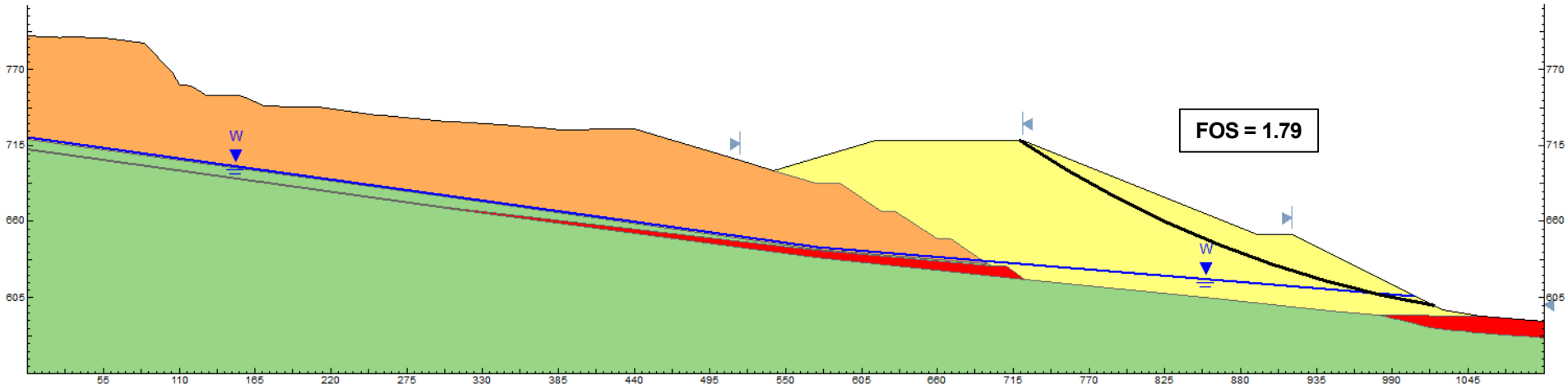
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REVIEWED	GTL
APPROVED	WLF

PROJECT
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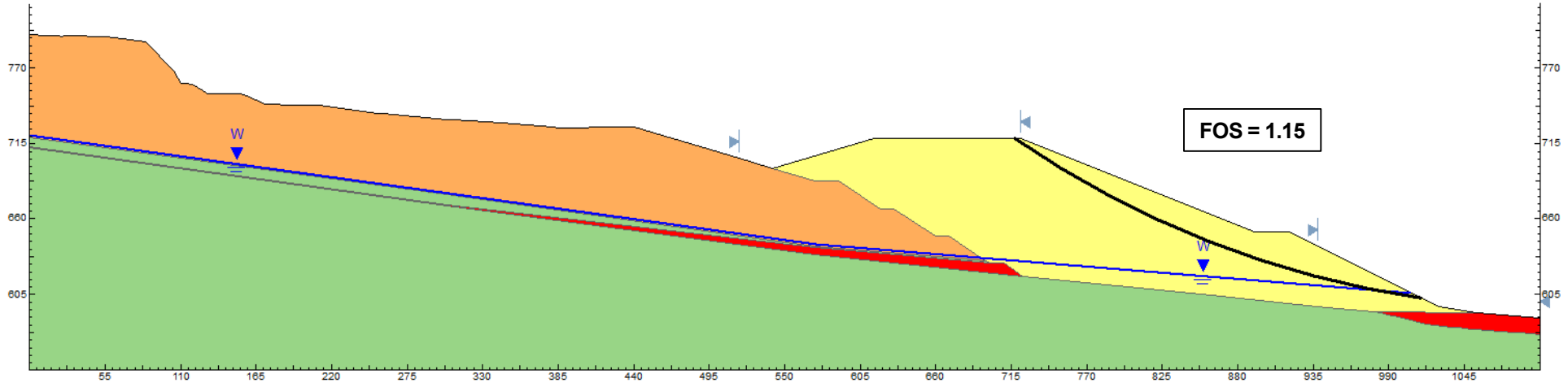
TITLE
NORTH OFA ULTIMATE BUTTRESS – BLOCK FAILURE STABILITY

PROJECT NO.	REV.	FIGURE
1661332	**0**	**8.2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



Section D-D' Static Analysis



Section D-D' Pseudo-static Analysis (k = 0.18 g)

Material Name	Color
Existing Overburden Waste	
Knoxville Residual Soil	
Knoxville Residual Soil (Slide Plane)	
Buttress (Overburden Fill)	

CLIENT
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-04-12
PREPARED	SAM
DESIGNED	-
REVIEWED	GTL
APPROVED	WLF

PROJECT
GEOTECHNICAL EVALUATIONS FOR
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TITLE
NORTH OFA ULTIMATE BUTTRESS – BUTTRESS FILL SLOPE STABILITY

PROJECT NO. **1661332** | REV. **0** | FIGURE **8.3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

APPENDIX A

EXPLORATION DATA

RECORD OF BOREHOLE GB-1

SHEET 1 OF 2

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/19/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2161982 E: 6145633
GS ELEV.: 610.4
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Near toe of Overburden Storage Facility, ~ 1-2 feet of waste overburden placed over native soils.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
0	0-2 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray to light brown, medium dense, fine subrounded to angular gravel, fine to coarse sand, low plasticity fines													0
2	2-5 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **SILTY CLAY**, moist, firm													2
4				MC	5 3 5	8	Moist	Firm	100					4
5	5-9.5 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **FAT CLAY**, moist, brown to dark brown, little fine sand, firm													5
9				MC	5 5 10	15	Moist	Firm	67					9
10	9.5-10 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, brown to dark brown, loose, mostly fine to coarse sand, some subangular to angular fine gravel, low plasticity fines													10
11	10-15 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **SANDY LEAN CLAY**, moist, very dark gray to black, little fine to coase sand, firm													11
14				MC	3 5 8	13	Moist	Firm	100					14
15	Color change to dark brown													15
16	15-19 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, brown to dark brown with orange and yellow mottling, medium dense, mostly fine to medium sand, some fine angular gravel, nonplastic fines.													16
19				MC	7 16	42	Moist	Medium Dense	78					19
20														20

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
PP - POCKET PENETROMETER (kg/cm^2)
W - WEATHERED
Mech-Poss. - MECHANICAL

JN - JOINT
FLT - FAULT
SHR - SHEAR
VN - VEIN
BD - BEDDING
FO - FOLIATION

PL - PLANAR
CU - CURVED
UN - UNDULATING
ST - STEPPED
IR - IRREGULAR
CO - CONTACT

VR - VERY ROUGH
SR - SLIGHTLY ROUGH
SM - SMOOTH
PO - POLISHED
SK - SLICKENSIDED
UN - UNDULATING
BX - BRECCIA

BR - BROKEN ROCK
Ca - CALCITE
CaX - CALCITE CRYSTALS
Chl - CHLORITE
Cl - CLAY
CN - CLEAN
CR - CARBON

FeOx - IRON OXIDE
ML - SILT
GO - GOUGE
GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-1

SHEET 2 OF 2

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/19/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2161982 E: 6145633
GS ELEV.: 610.4
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Near toe of Overburden Storage Facility, ~ 1-2 feet of waste overburden placed over native soils.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
20	19-23 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY GRAVEL**, moist, reddish brown to dark brown, mostly fine to medium angular gravel-sized rock fragments, some fine to coarse sand, low plasticity fines. *cont'd*			MC	26	42	Moist		78					20
21														21
22														22
23	23-36.5 **KNOXVILLE FORMATION** Highly weathered, very weak, highly fractured, orange brown, medium strong FE oxidation. Material is similar to a **CLAYEY SAND**, moist, mostly fine to coarse sand, little fine angular gravel, low plasticity fines.													23
24			1	CORE	R0-R1			W4 - W5	67	0	1			24
25														25
26												JN 60°, UN, R, Silty Clay infill		26
27			2	CORE	R0-R1			W4 - W5	96	0	0.4	JN 60°, UN, R, Silty Clay infill		27
28														28
29												JN 70°, UN, R, Clayey Sand infill		29
30														30
31												JN 45°, PL, R, Silty Clay infill		31
32	1-inch thick clay seam		3	CORE	R0-R2			W4 - W5	100	0	0.2			32
33														33
34														34
35												JN 80°, PL, SM, Silty Clay infill		35
36														36
37														37
38														38
39														39
40														40

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CR - CARBON

FeOx - IRON OXIDE
ML - SILT
GO - GOUGE
GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-2

SHEET 1 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/18/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2162067 E: 6145272
GS ELEV.: 687.5
GW DEPTH (ft): 43 feet
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Near center of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
0	0-14 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, brown, mostly fine to coarse sand, some fine to medium subangulra to angular gravel, low plasticity fines.													0
4				MC	9 8 11	19	Moist	Loose	67					4
9	Subangular to angular fine to coarse gravels observed in sample.			MC	13 15 18	33	Moist	Medium Dense	78					9
14	14-45 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray to light brown with iron staining, medium dense to dense, mostly fine to coarse sand, some subangular to angular fine to coarse gravel, low plasticity fines.			MC	10 13 16	29	Moist	Medium Dense	83					14
19				MC	11 18	39	Moist	Medium Dense	100					19
20														20

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
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JN - JOINT
FLT - FAULT
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BX - BRECCIA

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ML - SILT
GO - GOUGE
GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-2

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/18/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2162067 E: 6145272
GS ELEV.: 687.5
GW DEPTH (ft): 43 feet
DATUM: NAD 83, Zone 3
SURFACE CONDTIONS: Near center of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
20	14-45 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray to light brown with iron staining, medium dense to dense, mostly fine to coarse sand, some subangular to angular fine to coarse gravel, low plasticity fines. *cont'd*			MC	21	39	Moist		100					20
21														21
22														22
23														23
24				MC	18	40	Moist	Medium Dense	100					24
25					15 25									25
26														26
27														27
28														28
29				MC	13	31	Moist	Medium Dense	100					29
30					13 18									30
31														31
32														32
33														33
34	Diabase gravels observed in sample, sampler could not penetrate diabase waste likely due to presence of cobble or boulder-sized fragments.			MC	15 50/2"	50/2"	Moist	Very Dense	100					34
35														35
36				MC	12 20 28	48	Moist	Dense	83					36
37				MC	18	63	Moist	Dense	67					37
38					36 27									38
39				MC	18 26 38	64	Moist	Dense	100					39
40														40

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PO - POLISHED
SK - SLICKENSIDED
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FeOx - IRON OXIDE
ML - SILT
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GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-2

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/18/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2162067 E: 6145272
GS ELEV.: 687.5
GW DEPTH (ft): 43 feet
DATUM: NAD 83, Zone 3
SURFACE CONDTIONS: Near center of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION
40	14-45 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray to light brown with iron staining, medium dense to dense, mostly fine to coarse sand, some subangular to angular fine to coarse gravel, low plasticity fines. *cont'd*			MC	16 28 40	68	Moist	Dense	78				
41													
42				MC	15 31 46	76	Moist	Very Dense	100				
43													
44				MC	13 27 28	55	Moist to Wet	Dense	83				
45	45-47.5 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY GRAVEL WITH SAND**, moist, brown with iron staining, medium dense to dense, mosty fine to medium subrounded to subangular gravel, some fine to coarse sand, medium plasticity fines.			MC	13 25 33	58	Moist to Wet	Dense	100				
46													
47	47.5-48.5 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **FAT CLAY**, moist, dark brown, very stiff			MC	9 12 19	31	Moist to Wet	Very Stiff	100				
48	48.5-54 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **FAT CLAY WITH SAND**, moist, dark brown with iron staining, very stiff, little fine to coarse sand, trace fine subangular to angular gravel			MC	9 19 24	33	Moist to Wet	Very Stiff	100				
49													
50				MC	6 10 20	30	Moist to Wet	Very Stiff	100				
51													
52				MC	6 12 15	27	Moist to Wet	Very Stiff	100				
53	Increase in sand and gravel contents with about 25% fine to medium sand and 10% fine angular gravels.												
54	54-60 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, brown to dark brown, medium dense, mostly fine to medium sand, some fine to medium angular gravel, medium plasticity fines.			MC	7 14 20	34	Moist	Loose to Medium dense	100				
55				MC	9 17 24	41	Moist	Medium Dense	78				
56	Difficulty drilling through formation.												
57													
58				MC	10 20 31	51	Moist	Dense	100				
59													
60													

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CO - CONTACT

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S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

RECORD OF BOREHOLE GB-2

SHEET 4 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/18/2016
DRILLING END: 8/19/2016
COORDINATES: N: 2162067 E: 6145272
GS ELEV.: 687.5
GW DEPTH (ft): 43 feet
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Near center of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
60	60-64 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY GRAVEL WITH SAND**, moist, brown to dark gray, dense to very dense, mostly fine to coarse subangular gravels, some fine to coarse sands, few low plasticity fines.			MC	30 50/5"	50/5"	Moist	Very Dense	100					60
61														61
62														62
63														63
64	64-67 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY SAND**, moist, brown with iron staining, some fine to medium sand, firm			SPT	6 6 8	14	Moist	Loose	94					64
65														65
66														66
67	67-79.5 **KNOXVILLE FORMATION** Completely weathered, very weak, medium strong iron oxidation. Material classifies as a **CLAYEY SAND**, moist, brown with iron staining, very dense, mostly fine to medium sand, little fine subangular to angular gravel, high plasticity fines.													67
68														68
69				SPT	33 50/2"	50/2"	Moist	Very Dense	100					69
70														70
71														71
72														72
73														73
74														74
75														75
76														76
77														77
78														78
79				SPT	50	>50	Moist	Very Dense	0					79
80														80

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DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-3

SHEET 1 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/17/2016
DRILLING END: 8/18/2016
COORDINATES: N: 2162149 E: 6145017
GS ELEV.: 732.3
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Top of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
0	0-1 **OVERBURDEN WASTE** Waste material classifies as **CLAYEY GRAVEL WITH SAND**, dry, gray to reddish brown, medium dense mostly fine to medium gravel, little fine to coarse sand, little low plasticity fines													0
1														1
2	1-24 **OVERBURDEN WASTE** Waste material classification ranges from a **CLAYEY GRAVEL WITH SAND** to a **CLAYEY SAND WITH GRAVEL**, moist, gray to reddish brown, fine to coarse sand, fine to medium subrounded to angular gravel, low plasticity fines, medium dense													2
3														3
4				MC	7 15 22	37	Moist	Medium Dense	78					4
5														5
6														6
7														7
8														8
9				MC	7 16 17	33	Moist	Medium Dense	0					9
10														10
11														11
12														12
13														13
14				MC	15 14 13	27	Moist	Medium Dense	67					14
15														15
16														16
17														17
18														18
19				MC	7 35	85/11"	Moist	Very Dense	57					19
20														20

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
PP - POCKET PENETROMETER (kg/cm^2)
W - WEATHERED
Mech-Poss. - MECHANICAL

JN - JOINT
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Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-3

SHEET 2 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/17/2016
DRILLING END: 8/18/2016
COORDINATES: N: 2162149 E: 6145017
GS ELEV.: 732.3
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Top of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
20	1-24 **OVERBURDEN WASTE** Waste material classification ranges from a **CLAYEY GRAVEL WITH SAND** to a **CLAYEY SAND WITH GRAVEL**, moist, gray to reddish brown, fine to coarse sand, fine to medium subrounded to angular gravel, low plasticity fines, medium dense *cont'd*			MC	50	85/11"	Moist		57					20
21														21
22														22
23														23
24	24-38.5 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray to light brown, medium dense to dense, mostly fine to coarse sand, some fine subrounded to angular gravel, low plasticity fines			MC	16 50	50/5"	Moist	Very Dense	91					24
25														25
26														26
27														27
28														28
29				MC	25 30 38	68	Moist	Dense	100					29
30														30
31														31
32														32
33														33
34				MC	19 19 22	41	Moist	Medium Dense	78					34
35														35
36				MC	5 20 41	61	Moist	Dense	100					36
37				MC	21 25 25	50	Moist	Dense	100					37
38														38
39				MC	19 30 48	78	Moist	Very Dense	100					39
40														40

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
PP - POCKET PENETROMETER (kg/cm^2)
W - WEATHERED
Mech-Poss. - MECHANICAL

JN - JOINT
FLT - FAULT
SHR - SHEAR
VN - VEIN
BD - BEDDING
FO - FOLIATION

PL - PLANAR
CU - CURVED
UN - UNDULATING
ST - STEPPED
IR - IRREGULAR
CO - CONTACT

VR - VERY ROUGH
SR - SLIGHTLY ROUGH
SM - SMOOTH
PO - POLISHED
SK - SLICKENSIDED
UN - UNDULATING
BX - BRECCIA

BR - BROKEN ROCK
Ca - CALCITE
CaX - CALCITE CRYSTALS
Chl - CHLORITE
Cl - CLAY
CN - CLEAN
CR - CARBON

FeOx - IRON OXIDE
ML - SILT
GO - GOUGE
GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

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SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-3

SHEET 3 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/17/2016
DRILLING END: 8/18/2016
COORDINATES: N: 2162149 E: 6145017
GS ELEV.: 732.3
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Top of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
40	38.5-55 **OVERBURDEN WASTE** Waste material classifies as a **CLAYEY GRAVEL WITH SAND**, moist, reddish brown to brown with iron staining, medium dense to dense, mostly fine to coarse subrounded to angular gravel, some fine to coarse sand, little low to medium plasticity fines *cont'd*			MC	8 21 30	51	Moist	Dense	83					40
41														41
42				MC	22 24 32	56	Moist	Dense	83					42
43														43
44				MC	5 30 37	67	Moist	Dense	83					44
45				MC	14 30 50	80	Moist	Very Dense	83					45
46														46
47				MC	21 33	88/10"	Moist	Very Dense	75					47
48					50									48
49				MC	23 31 33	64	Moist	Dense	78					49
50				MC	15 26 32	58	Moist	Dense	67					50
51														51
52				MC	21 24 30	54	Moist	Dense	83					52
53														53
54				MC	15 32 35	67	Moist	Dense	89					54
55	55-62 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY GRAVEL WITH SAND**, moist, reddish brown, medium dense to dense, mostly fine to medium subrounded to subangular gravel, some fine to coarse sand, medium plasticity fines			MC	4 16 27	43	Moist	Medium Dense	100					55
56														56
57				MC	10 20 27	47	Moist	Dense	100					57
58														58
59	Color change to gray brown			MC	14 21 30	51	Moist	Dense	100					59
60														60

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
PP - POCKET PENETROMETER (kg/cm^2)
W - WEATHERED
Mech-Poss. - MECHANICAL

JN - JOINT
FLT - FAULT
SHR - SHEAR
VN - VEIN
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FO - FOLIATION

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CU - CURVED
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CO - CONTACT

VR - VERY ROUGH
SR - SLIGHTLY ROUGH
SM - SMOOTH
PO - POLISHED
SK - SLICKENSIDED
UN - UNDULATING
BX - BRECCIA

BR - BROKEN ROCK
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CR - CARBON

FeOx - IRON OXIDE
ML - SILT
GO - GOUGE
GR - GRAVEL
Py - PYRITE
S - SAND
TR - TRACE

DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

Golder Associates

SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

RECORD OF BOREHOLE GB-3

SHEET 4 OF 4

PROJECT: Overburden Storage Facility Improvements
PROJECT NO.: 1661332
LOCATION: Clayton Quarry
DRILLING START: 8/17/2016
DRILLING END: 8/18/2016
COORDINATES: N: 2162149 E: 6145017
GS ELEV.: 732.3
GW DEPTH (ft): -
DATUM: NAD 83, Zone 3

SURFACE CONDTIONS: Top of existing Overburden Storage Facility, devoid of vegetation, surface is rough graded.

DEPTH IN FEET	DESCRIPTION (NOTES)	LITHOLOGY	RUN NO.	SOIL SAMPLE TYPE	BLOWS/PER 6" OR ISRM STRENGTH INDEX	N-VALUE	MOISTURE	APPARENT DENSITY/CONSISTENCY OR ISRM WEATHERING INDEX	SAMPLE RECOVERY (%)	RQD (%)	APPROXIMATE FRACTURES PER FOOT	DISCONTINUITY DESCRIPTION	WELL CONSTRUCTION	DEPTH IN FEET
60	55-62 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY GRAVEL WITH SAND**, moist, reddish brown, medium dense to dense, mostly fine to medium subrounded to subangular gravel, some fine to coarse sand, medium plasticity fines *cont'd*			MC	14 30 36	66	Moist	Dense	100					60
61														61
62	62-63 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **FAT CLAY**, moist, gray to dark gray, trace fine sand, very stiff			MC	14 17 28	45	Moist	Very Stiff	100					62
63	63-74.4 **KNOXVILLE FORMATION, RESIDUAL SOIL** Material classifies as a **CLAYEY SAND WITH GRAVEL**, moist, gray brown to brown with iron staining, very stiff to hard, some fine to coarse sand, little fine to medium subangular to angular gravel, medium plasticity fines													63
64				MC	12 18 30	48	Moist	Very Stiff	100					64
65				MC	12 50/5"	50/5"	Moist	Hard	100					65
66														66
67														67
68														68
69				SPT	27 27 38	65	Moist	Hard	83					69
70														70
71														71
72														72
73														73
74				SPT		50/5"	Moist	Hard	0					74
75														75
76														76
77														77
78														78
79														79
80														80

SPT - 2" O.D. SPLIT-SPOON SAMPLER
ST - 3" O.D. THIN WALL SAMPLER
MC - 3-1/4" O.D. x 2-1/2" LINER
PP - POCKET PENETROMETER (kg/cm^2)
W - WEATHERED
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JN - JOINT
FLT - FAULT
SHR - SHEAR
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VR - VERY ROUGH
SR - SLIGHTLY ROUGH
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FeOx - IRON OXIDE
ML - SILT
GO - GOUGE
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Py - PYRITE
S - SAND
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DRILLING CO.: Geo-Ex Subsurface Exploration
DRILLER: Ryan
DRILL RIG: Truck Mounted CME 75

LOGGED BY: MDB
CHECKED BY: MLP
REVIEWED: GTL

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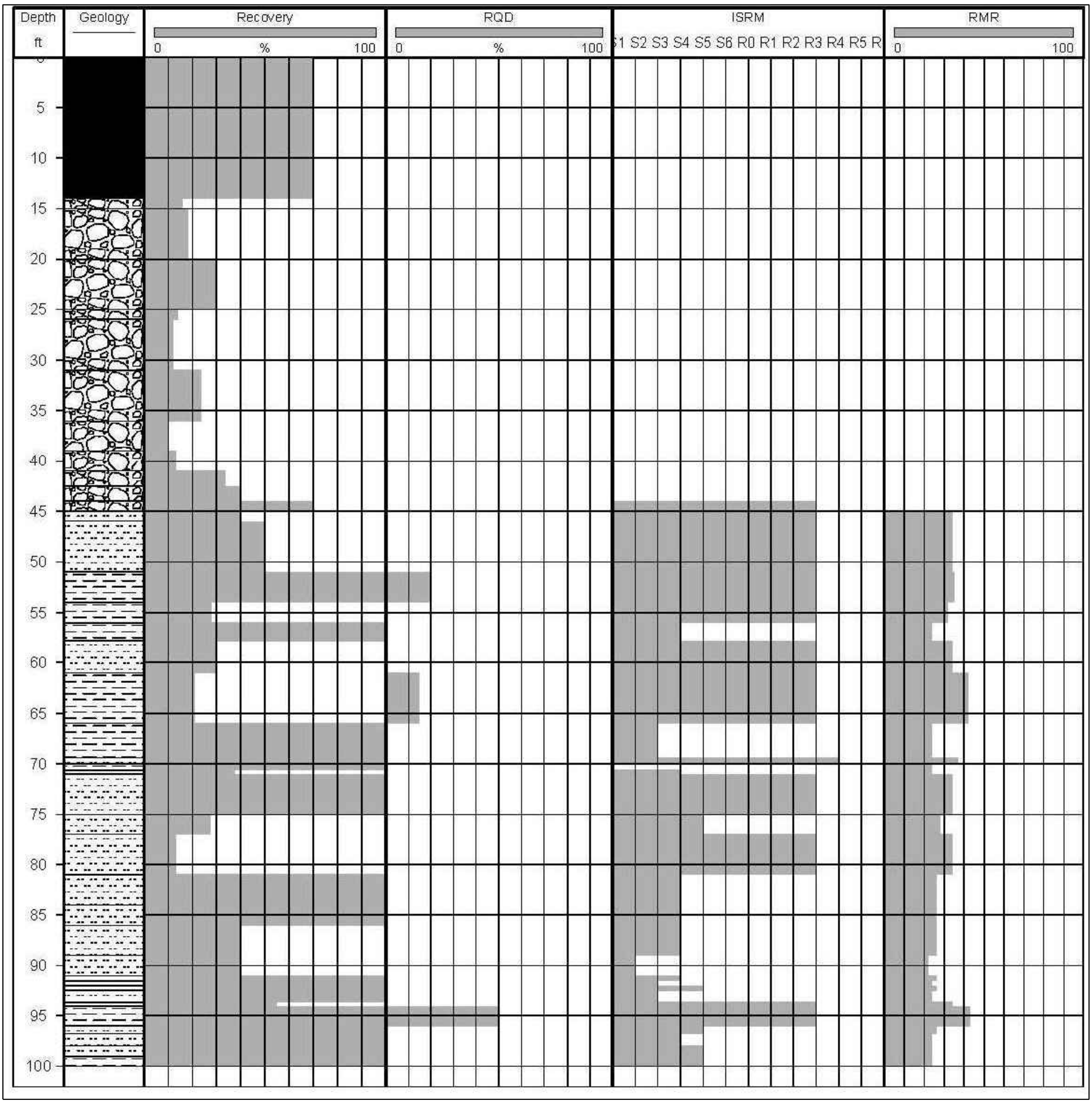
SOIL-ROCK BORING LOG (GOLDER-RENO) 1661332.GPJ GLDR_OAK.GDT 10/5/16

Clayton Quarry Geotechnical Drilling

Project No.	1520962.002		**Azimuth**			**Elevation**	879		**Date:**	2/17/15-2/19/15
Borehole #	B1		**Inclination**	Vertical		**Ref. Point**			**Sheet**	1 of 1
Drilling Method	HQ		**N**	37°	55 25	**W**	121°	56 49	**Logged by**	Leah Feigelson
									Drill Rig	mud rotary

Golder Associates

ROCK TYPE	RUN	Run Data: Recovery & Other Basic Information: From (ft.)	To (ft.)	Recovery	Bedding Dominant	RQD, ft	Natural Fracture Count (N/A for "ice cube" bx)	JCR: Average	Minimum	Strength Index	Weathering Index	Detailed Discontinuity Data: Depth	TYPE	Count	α	Shape	Roughness	Infill	Thickness (mm)	JRC	JCR	Rubble Gouge: Gouge From	TO	Type	Broken Core (smaller than core diameter) From	TO	ADDITIONAL TESTING OR COMMENTS, SAMPLES COLLECTED
CASING set to 14 feet.		0.0	14.0																								CASING set to 14 feet.
	1	14.0	15.0	0.7																							Drilling through waste dump; loosing
	2	15.0	20.0	0.8																							circulation, therefore low recovery. Fines
	3	20.0	25.0	0.9																							washed away, gravel/cobbles stay.
	4	25.0	26.0	0.3																							
	5	26.0	31.0	0.7																							
WASTE DUMP	6	31.0	36.0	0.6																							checked depth with tape, confirmed at 36 feet.
	7	36.0	39.0	0.7																							
	8	39.0	41.0	0.2																							checked depth with tape, confirmed at 41 feet.
	9	41.0	42.5	0.2																							
	10	42.5	44.0	0.5																							
	11	44.0	45.0	0.4																							
	11	45.0	46.0	0.7	N	0.0	7	10	8	R3	W3	46.0	B2	1	64	PL	K	ml	C	8	8				45.4	45.7	Broken shale pieces are angular and have
	12	46.0	51.0	2.0	N	0.0	20	12	10	R3	W3														46.0	51.0	slicks, some pyrite on quartz vein
	13	51.0	54.0	1.5	N	0.0	15	12	10	R3	W3	52.9	J2	1	47	PL	SR	ml	C	8	10						
												52.9	J2	1	32	PL	SM	ml	C	2	8						rods stuck at 54 feet (took 1 day to un-plug)
CLAYSTONE, dark brownish-gray												53.5	J3	1	47	I	SR	ml	C	10	14						
	14	54.0	56.0	2.0	N	0.4	16	12	10	R3	W2	54.2	B2	1	41	I	K	ml	C	10	8						at 55.3'- a 0.3' section of sheared shale
												55.3	B2	1	41	PL	K	ml	C	8	6						(fine bedding with some slicks)
												55.5	B2	1	67	PL	SR	ml	C	12	10						
	15	56.0	57.8	0.5	N	0.0	5	10	8	R3	W3																at 57.8'- finely sheared at contact
clayey SILTSTONE, heavily fractured	15	57.8	61.0	3.2	N	0.0	32	6	4	S4	W4											57.8	61.0	cl, ml			*sample collected 59.5-60.0 clayey siltstone
CLAYSTONE, dark gray, fractured	16	61.0	66.0	1.5	N	0.0	15	12	10	R3	W3	65.7	V1	1	62	PL	R	ml, cl	<1	10	12				64.5	66.0	blocky fractures, angular
CLAYSTONE, light gray, abundant quartz veining	17	66.0	69.4	0.7	N	0.5	2	14	12	R3	W2	69.4	C2	1	62	I	VR	ml, cl	C	16	14						
clayey SILTSTONE, dark gray	17	69.4	70.0	0.6	N	0.0	6	6	4	S3	W4	70.0	C1	1	36	I	SR	ml, cl	<1	12	16	69.4	70.0	cl, ml			at 70'- quartz veins and pyrite
CLAYSTONE, light gray, abundant quartz veining	17	70.0	70.6	0.6	N	0.0	4	12	10	R4	W2	70.4	V1	1	36	PL	SR	ml, cl	C	8	12						
clayey SILTSTONE, dark gray	17	70.6	71.0	0.4	N	0.0	4	6	4	S1	W6	70.6	V2	1	85	I	R	ml, cl	<1	18	20	70.6	71.0	cl, ml			material from the shoe, therefore broken
clayey SILTSTONE, dark gray, heavily fractured	18	71.0	75.0	1.5	N	0.0	15	6	4	S4	W4											71.0	75.0	cl, ml			heavily fractured, blocky
	19	75.0	77.0	2.0	N	0.0	20	12	10	R3	W3														75.0	77.0	
	20	77.0	81.0	1.1	N	0.0	11	10	8	S5	W4																
	21	81.0	84.0	0.4	N	0.0	4	12	10	R3	W3	84.0	C2	1	44	I	VR	ml, cl	C	18	16						
	21	84.0	86.0	2.0	N	0.0	20	8	6	S4	W4	85.5	J2	1	44	C	VR	ml, cl	<2	16	14	84.0	89.0	cl, ml			some slicks at contact at 84.7'
	22	86.0	89.0	3.0	N	0.0	30	8	6	S4	W4	87.1	J2	1	64	I	VR	ml, cl	<2	16	14						
clayey SILTSTONE to silty CLAYSTONE, dark gray, fractured												87.8	J2	1	48	PL	R	ml, cl	<1	14	14						*sample collected 86.8-87.6' clayey siltstone (direct shear/triax)
	23	89.0	91.0	0.8	N	0.0	8	8	6	S4	W4																
	24	91.0	91.5	0.2	N	0.0	2	4	2	S2	W6											91.0	94.0	cl, ml			
	24	91.5	92.0	0.5	N	0.0	5	8	6	S4	W4																*sample collected 91.4-92.0' silty claystone
	24	92.0	92.4	0.4	N	0.0	4	6	4	S3	W5																
	24	92.4	93.6	1.2	N	0.0	12	8	6	S5	W4	92.8	J1	1	50	PL	SR	ml, cl	C	10	8						
	24	93.6	94.0	0.4	N	0.0	4	6	4	S3	W5																
silty CLAYSTONE	25	94.0	96.0	1.1	N	0.0	11	12	10	R3	W3	95.4	J2	1	53	2	C	ml, cl	C	8	10						
	26	96.0	96.8	0.8	N	0.4	4	12	10	R3	W3																
clayey SILTSTONE	26	96.8	98.0	1.2	N	0.0	12	8	6	S5	W4																*sample collected 96.9-97.5' silty claystone
	26	98.0	99.0	1.0	N	0.0	10	6	4	S4	W4											98.0	99.0	cl, ml			
silty CLAYSTONE	27	99.0	100.0	1.0	N	0.0	10	8	6	S5	W4																*sample collected 99.2-99.7' silty claystone
																											TD=100'



LEGEND

- CASING
- WASTE DUMP
- CLAYSTONE
- SILTSTONE

RMR CLASSIFICATION

0 - 20	VERY POOR
21 - 40	POOR
41 - 60	FAIR
61 - 80	GOOD
81 - 100	VERY GOOD

ISRM STRENGTH	DESCRIPTION	UCS RANGE (PSI)
S1	VERY SOFT CLAY	<4
S2	SOFT CLAY	4-7
S3	FIRM CLAY	7-15
S4	STIFF CLAY	15-35
S5	VERY STIFF CLAY	35-70
S6	HARD CLAY	>70
R0	EXTREMELY WEAK ROCK	35-150
R1	VERY WEAK ROCK	150-725
R2	WEAK ROCK	725-3,500
R3	MEDIUM STRONG ROCK	3,500-7,500
R4	STRONG ROCK	7,500-15,000
R5	VERY STRONG ROCK	15,000-35,000
R6	EXTREMELY STRONG ROCK	<35,000

CLIENT
CEMEX
CONTRA COSTA COUNTY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-16
DESIGNED	JGE
PREPARED	
REVIEWED	GL
APPROVED	GL

PROJECT
CLAYTON QUARRY
2015 GEOTECHNICAL INVESTIGATION

TITLE
B1 DOWNHOLE PLOT

PROJECT NO. 152-0952 | REV. | FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
1 in
0

Golder Associates
Telephone: 408-220-9223
Fax: 408-220-9224

BORING NUMBER B2

PROJECT NUMBER 152-0962
PROJECT NAME Clayton Quarry
LOCATION Clayton, CA
DRILLING METHOD
GROUND ELEVATION
TOP OF CASING ----
LOGGED BY LF
REMARKS
CONTINUED

DATE STARTED 2/20/15
DATE COMPLETED 2/20/15
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY Neat cement grout.

SAMPLING METHOD AND SAMPLE ID	BLOW COUNT	INCHES	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
				ML		CLAYEY SILT, low to medium plastic fines, some fine sand, trace medium to coarse sand, sub-angular to angluar; reddish-brown; moist; very soft.	2.0
				ML		gravelly CLAYEY SILT, low to medium plastic fines, some fine to coarse sand; reddish-brown, mottled; moist; soft.	
MC B2-5	3 5 6 N=11	18/18	5				
SPT B2-10	5 8 11 N=19	18/18	10	ML		gravelly CLAYEY SILT, low to medium plastic fines, some fine to coarse sand; reddish-brown, mottled; moist; very stiff.	10.0
MC B2-15	6 8 11 N=19	18/18	15	CL		SILTY CLAY, medium plastic fines, some medium to coarse sand, sub-angular; yellowish-brown; moist; firm.	15.0
SPT B2-20	7 11 12 N=23	18/18	20	CL-CH		SILTY CLAY to CLAY, medium to high plastic fines, trace fine to coarse sand, yellowish-brown; moist; very stiff.	20.0
MC B2-25	4 8 12 N=20	18/18	25	CL		gravelly SILTY CLAY, medium plastic fines, some sand, sub-angular to angular; yellowish-brown, mottled tan, green, red; moist; firm.	25.0
SPT B2-30	4 8 11 N=19	12/18	30	CL		gravelly SILTY CLAY, medium plastic fines, some sand, sub-angular to angular; yellowish-brown, mottled tan, green, red; moist; very stiff.	30.0
						Bottom of borehole at 31.5 feet.	31.5

Golder Associates
Telephone: 408-220-9223
Fax: 408-220-9224

BORING NUMBER B3

PROJECT NUMBER 152-0962
PROJECT NAME Clayton Quarry
LOCATION Clayton, CA
DRILLING METHOD
GROUND ELEVATION
TOP OF CASING ----
LOGGED BY LF
REMARKS
CONTINUED

DATE STARTED 2/20/15
DATE COMPLETED 2/20/15
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY Neat cement grout.

SAMPLING METHOD AND SAMPLE ID	BLOW COUNT	INCHES	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
				CH		CLAY, medium to high plastic fines, trace coarse sand, trace roots; brown; moist; very soft.	5.0
MC B3-5	8 21 26 N=47	12/18	5			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; hard.	10.0
SPT B3-10	9 11 15 N=26	12/18	10			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; very stiff.	15.0
MC B3-15	13 50 for 5"	9/11	15			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; hard.	20.0
SPT B3-20	5 9 17 N=26	15/18	20			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; very stiff.	25.0
MC B3-25	9 27 35 N=62	12/18	25			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; hard.	30.0
SPT B3-30	8 10 13 N=23	12/18	30			CLAYSTONE/SILTSTONE, weathered; yellowish-brown; moist; very stiff.	31.5
						Bottom of borehole at 31.5 feet.	

CLAYTON QUARRY BORING GINT STD US LAB_CLAYTON.GPJ LOG A EWNN01.GDT 3/13/15

DISCONTINUITY SURVEY DATA SHEET

GENERAL INFORMATION

Location/Pit	Project #	Project Title		Month	Day	Year				
Clayton Quarry, Clayton, CA	113-01127	GeoTech Slope Evaluation	Date	3	12-13	2014	Inspector	GL, LF	Discontinuity data sheet no.	1 of 2

NATURE AND ORIENTATION OF DISCONTINUITY

Location	Type	Strike Right	Dip	Persistence	Termination	Aperture/ Width	Nature of Filling	Strength of Filling	Roughness	Shape	Spacing, m	JRC	Number	Comment
Station 5	JS	225	57	5	-	4-5	11	-	2	3	0.3-1.0	-	-	checked measured STR/DIP= 200/54
	JS	50	57	1-2	-	1-2	1-2	-	2	3	0.1-0.3	-	-	
	JS	337	82	2	-	2-3	2, 8, 11	-	2	2	0.2-0.5	-	-	
	F	20	76	6	-	5	3, 11	-	5	2	-	-	-	
Station 6	JS	225	46	5	-	2-3	2, 11	-	2	3	0.3-1.5	-	-	
	JS	2	25	1-2	-	1-2	11	-	2	3, 4	0.1-0.2	-	-	
	JS	random		1-3	-	1-3	1, 11	-	2	3, 4	-	-	-	
Station 7	JS	227	40	3-4	-	3-4	11	-	2	3	0.3-0.4	-	-	
	F	100	80	5	-	5	11, 9	-	2	2	2-10	-	-	two parallel faults, 2 ft spacing at base of slope, 10 ft spacing at top of slope
Station 8	JS	18	50	3	-	3	3, 11	-	2, 3	3	0.3-1.0	-	-	
	JS	150	77	2-4	-	2-4	2, 3, 11	-	2	2, 3	0.2-2.0	-	-	
	F	160	60	5	-	5	1, 4	-	3	3	-	-	-	forms left hand structure of wedge failure
	F	143	65	5	-	5	3-4	-	3	2, 3	-	-	-	

Type

FZ - Fault Zone
F -- Fault
J -- Joint (single)
JS -- Joint Set
Sch -- Schistosity
SH -- Shear
Fo -- Foliation
TC -- Tension Crack
B -- Bedding

Persistence

1. Very low persistence <1m
2. Low persistence 1-3 m
3. Medium persistence 3-10 m
4. High persistence 10-20 m
5. Very high persistence 20-40 m
6. Extremely high persistence > 40 m

Termination

0. Neither end visible
1. One end visible
2. Both ends visible

Aperture/width

1. Very tight (<0.1 mm)
2. Tight (0.1-0.25 mm)
3. Partly open (0.25-0.5 mm)
4. Open (0.5-2.5 mm)
5. Moderately wide (2.5-10 mm)
6. Wide (>10 mm)
7. Very wide (1-10 cm)
8. Extremely wide (10-100 cm)
9. Cavernous (>1 m)

Surface shape

1. Stepped
2. Undulating
3. Planar
4. Curved
5. Irregular

Nature of filling

1. Clean
2. Surface staining
3. Non-cohesive
4. Inactive clay or clay matrix
5. Swelling clay or clay matrix
6. Cemented
7. Chlorite
8. Other - specify
9. Crushed Rock
10. Silty sand
11. Hard - calcite

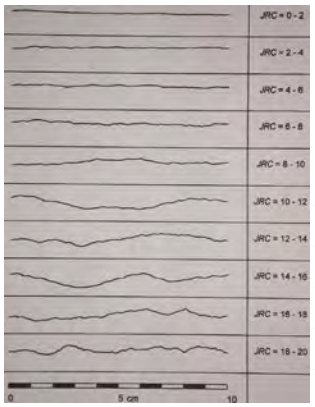
Surface roughness

1. Very Rough
2. Rough
3. Smooth
4. Polished
5. Slickensided

Compressive strength of infilling

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

JRC
Refer to Full-Sized Profiles



Notes:

DISCONTINUITY SURVEY DATA SHEET

GENERAL INFORMATION

Location/Pit	Project #	Project Title	Month	Day	Year	Inspector	Discontinuity data sheet no.		
Clayton Quarry, Clayton, CA	113-01127	GeoTech Slope Evaluation	Date 3	12-13	2014	GL, LF	2	of	2

NATURE AND ORIENTATION OF DISCONTINUITY

Location	Type	Strike Right	Dip	Persistence	Termination	Aperture/ Width	Nature of Filling	Strength of Filling	Roughness	Shape	Spacing, m	JRC	Number	Comment
Station 9	JS	254	45	2-3	-	2-3	2, 11	-	2	3	0.2-0.5	-	-	
	F	254	45	2-3	-	4-5	4, 9	-	3, 5	2	-	-	-	
	F	278	75	3	-	5	11	-	2, 5	2	-	-	-	
					-			-				-	-	
Station 10	JS	217	37	3	-	3, 4	3, 11		2	2, 4		-	-	to south of station 10, lost bench crest
	JS	266	86	2, 3	-	2, 3	3, 12	-	2	3, 4		-	-	
					-			-				-	-	
Station 11	JS	228	49	3	-	4	3, 11	-	2	2		-	-	structures form wedge
	J	178	44	3	-	4	3, 11		2	2		-	-	
	F	164	90	4	-	5	3, 11	-	2	2, 3		-	-	
					-			-				-	-	
Station 14	JS	266	68	3	-	2, 3	2, 3		2	1, 3		-	-	
	J	181	65	2	-	1, 2	2, 3	-	2	2		-	-	
	J	361	46	1	-	1, 2	2, 11	-	2	3		-	-	
					-			-				-	-	
					-			-				-	-	

Type
- FZ - Fault Zone
- F -- Fault
- J -- Joint (single)
- JS -- Joint Set
- Sch -- Schistosity
- SH -- Shear
- Fo -- Foliation
- TC -- Tension Crack
- B -- Bedding

Persistence
1. Very low persistence <1m
2. Low persistence 1-3 m
3. Medium persistence 3-10 m
4. High persistence 10-20 m
5. Very high persistence 20-40 m
6. Extremely high persistence > 40 m

Termination
0. Neither end visible
1. One end visible
2. Both ends visible

Aperture/width
1. Very tight (<0.1 mm)
2. Tight (0.1-0.25 mm)
3. Partly open (0.25-0.5 mm)
4. Open (0.5-2.5 mm)
5. Moderately wide (2.5-10 mm)
6. Wide (>10 mm)
7. Very wide (1-10 cm)
8. Extremely wide (10-100 cm)
9. Cavernous (>1 m)

Surface shape
1. Stepped
2. Undulating
3. Planar
4. Curved
5. Irregular

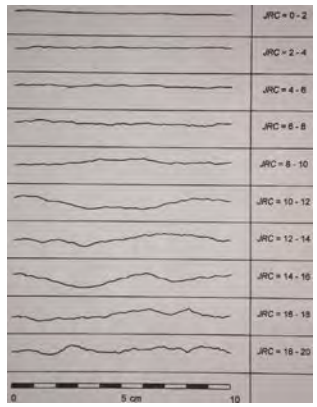
Nature of filling
1. Clean
2. Surface staining
3. Non-cohesive
4. Inactive clay or clay matrix
5. Swelling clay or clay matrix
6. Cemented
7. Chlorite
8. Other - specify
9. Crushed Rock
10. Silty sand
11. Hard - calcite

Surface roughness
1. Very Rough
2. Rough
3. Smooth
4. Polished
5. Slickensided

Compressive strength of infilling

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

JRC
Refer to Full-Sized Profiles



0-2
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20

Notes:

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

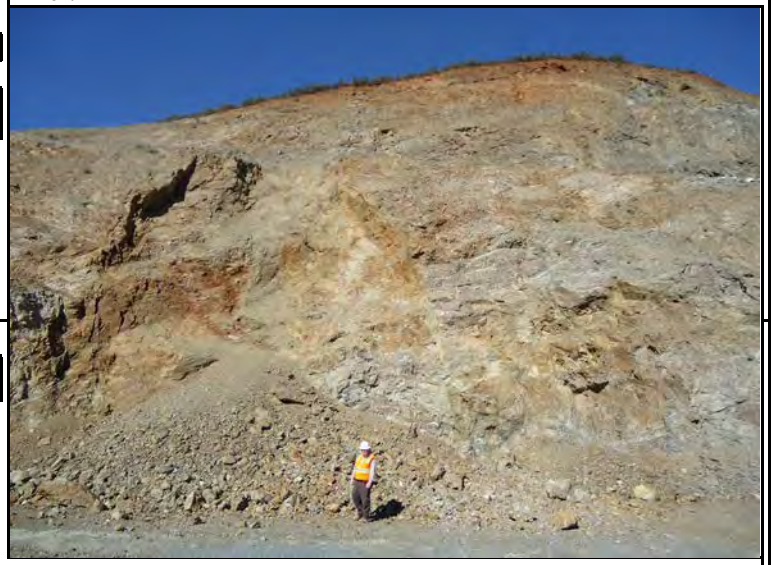
Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x1		3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	80'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
60'	6°	75°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1-2	2	4	1	R3-R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3	3	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	6
2	
3	
4	
5	

GSI	Discontinuity spacing
40-50	1. Extremely close (<20 mm) 2. Very close (20-60 mm)] 3. Close (60 - 200 mm) 4. Moderately (200-600 mm) 5. Wide (600-2000 mm) 6. Very wide (2000-6000 mm) 7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 14.2, W 121 56 59.4

Collected 1 sample for point load testing.

Discontinuity set = 1 and is relatively flat.

Fault running perpendicular to slope bench.
Strike/Dip: 254/84 *RH

Material is Diabase, slightly to moderately weathered, reddish-brown.

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

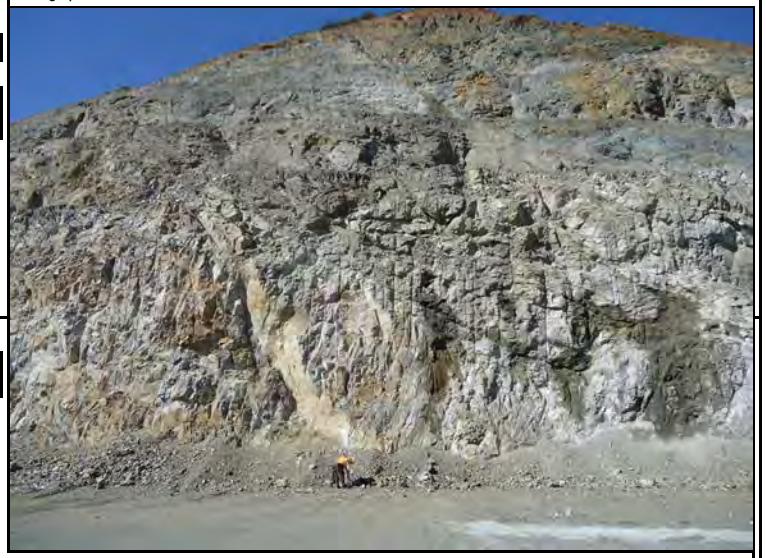
Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x2		3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	150'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
60'	355°	85°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	1,3,9	9	2	R3-R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		Compressive strength MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength: [ ]
1. Measured
2. Assessed

Rock Type: Db

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3-4	2-3	0

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	4, random
2	
3	
4	
5	

GSI: 50-60

Discontinuity spacing
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 18.1, W 121 56 58.5

Collected 2 samples at this location.

Db is light pinkish-yellowish gray with abundant white veining (hardness ~M4).

Bench faces are not formed by joint sets; no well developed joint sets.

Seep out of joints in rock face (dripping water).

Possible fault on slope face:
Strike/Dip: 195/74 *RH

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x3		3	12	14	LF/GL

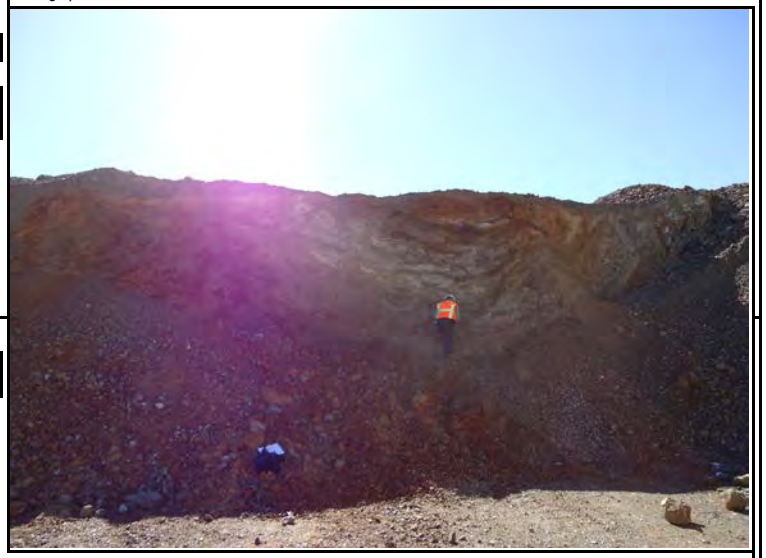
Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	20'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth
30'	240°

Slope Angle
65°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1-2	2, 4	9	2	R1-R3

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		Compressive strength MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db/Kk

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1, 4	3-4	4	0

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	2
2	
3	
4	
5	

GSI
20-30

Discontinuity spacing

1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 16.4, W 121 56 56.8

Contact between Db and Kk at this location.
Strike/Dip: 50/75 *RH

Rock strength varies from R1 to R3; weak rock looks possibly altered Kk.

Blocky/disturbed rock mass; moderate white veining.

Bench face is weathered to soil-like material.

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x4		3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	85'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth
60'	28°

Slope Angle
85°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	4, 9	9	4	R4-R5

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3-4	2	0

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	3
2	
3	
4	
5	

GSI: 50-60

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 24.4, W 121 56 59.0

Size of blocks in face are ~6" to 2'

Abundant white veining in blocky rock mass.

Joint sets are indestinct; random and don't form slope faces.

Few faint water seeps in slope face.

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x5		3	12	14	LF/GL

Locality Type	3	Slope Length	50'	No. of supplementary sheets of discontinuity data sheets	1
		Slope Height	50-60'	Azimuth	355°
		Slope Angle	85°		

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	9, 4	9	4	R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	2-3	1-2	3

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 70-80

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 23.8, W 121 56 59.2

Large fault in slope face.
Strike/Dip: 20/76 *RH

3 major joint sets (see attached sheet with discontinuity data for joints).

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x6		3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	75'	1

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth
50'	85°

Slope Angle
75°

ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	5, 4	9	4	R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Photograph



Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3	1-2	2

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 70-80

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 31.1, W 121 56 56.3

1 major joint set and some random discontinuities.

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date (Month)	Day	Year	Inspector
	x7	3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	70'	1

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
60'	355°	78°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	4, 5, 9	9	4	R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3-4	3	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 50-60

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 31.0, W 121 56 56.9

This station is between stations x4 and x5.

Blocky, abundant white veining, large seep in slope face.

1 major joint set and random jointing.

Fault zone on slope face.

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit: Station ID: x8 | Date: Month 3, Day 12, Year 14 | Inspector: LF/GL

Locality Type: 3

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Length: 60'

Slope Height: 50-60'

Slope Angle: 76°

Azimuth: 215°

No. of supplementary sheets of discontinuity data sheets: 1

Photograph



ROCK MATERIAL INFORMATION

Color: 2, 6, 9

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

Grain size: 4

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

Compressive strength: R1-R3

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength:

1. Measured
2. Assessed

Rock Type: Db

ROCK MASS INFORMATION

Fabric: 1, 4

1. Blocky
2. Tabular
3. Columnar
4. Shattered

Block size: 3, 4

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

State of weathering: 3, 4

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

No. of major discontinuity sets: 2

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 30-40

Discontinuity spacing:

1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 31.0, W 121 56 53.4

This is an example of a slope failure face. Two main faults run down slope face, one with slickensided surface. Rock is weak (R1-R3), dark greenish-gray with slicks. Seep on slope face near Fault 1.

2 major joint sets and 2 major faults. Strike/Dip (*RH):

Joint Set 1= 18/50 (flat lying)
Joint Set 2= 150/77 (long joints)

Fault 1= 160/60 (formed left-hand structure of failure; gouge on this fault is dark greenish-gray to black clayey silt, moist to wet)
Fault 2= 143/65

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x9		3	12	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	35-40'	1

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
30-40'	271°	73°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	1, 4, 9	9	4	R3-R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		Compressive strength MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength: [ ]
1. Measured
2. Assessed

Rock Type: Db

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3-4	3	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 40-50

Discontinuity spacing
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 26.8, W 121 56 55.0

1 major joint set and random discontinuities.

1 fault with same orientation as joint set; smooth and slickensided surface.

1 inactive fault that forms bench face, filled with Quartz, rough, slickensided.

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit | Station ID: x10 | Date: Month 3, Day 13, Year 14 | Inspector: LF/GL

Locality Type: 3

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Length: 60'

Slope Height: 50-60'

Azimuth: 205°

Slope Angle: 76°

No. of supplementary sheets of discontinuity data sheets: 1

Photograph



ROCK MATERIAL INFORMATION

Color: 1-2 | 4, 5, 9 | 9

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

Grain size: 4

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

Compressive strength: R4

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength:

1. Measured
2. Assessed

Rock Type: Db

ROCK MASS INFORMATION

Fabric: 1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

Block size: 3

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

State of weathering: 2-3

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

No. of major discontinuity sets: 2

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 40-50

Discontinuity spacing:

1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 26.5, W 121 56 55.0

2 major joint sets in slope face (flat lying horizontal and vertical).

Eastern side of slope face is a plane shear failure (bench crest lost).

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x11		3	13	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
3	25'	1

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
50'	196°	80°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1-2	5, 9	9	4	R3-R5

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3-4	2-3	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attached)
2	
3	
4	
5	

GSI: 40-50

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 23.8, W 121 56 54.0

1 major joint set (running ~ NE-SW)

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date (Month)	Day	Year	Inspector
	x13	3	13	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
2	30'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth
40'	NA

Slope Angle: 45-55°

ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
2	8	9, 10	4	R2

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Photograph



Methods to determine compressive strength: 1. Measured, 2. Assessed

Rock Type: Kk/Db

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
4	4-5	4	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	2-3
2	
3	
4	
5	

GSI: 15-25

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 27.6, W 121 56 47.5

Outcrop of Kk and Db off the side of the road. Exposure is about 30'x40'.

Kk/Db contact:
Strike Dip: 175/70 *RH

Note: *RH= right hand rule

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x14		3	13	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
2	30'	1

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
40'	220°	76°

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	4	9, 10	4	R4

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Db

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
1	3	2-3	1-2

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	(see attachment)
2	
3	
4	
5	

GSI: 50-60

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 27.4, W 121 56 48.1

1 to possibly 2 major joint sets.

Db here is characteristic of Db further southwest on road.

ROCK MASS DESCRIPTION DATA SHEET

GENERAL INFORMATION

Location/Pit	Station ID	Date	Month	Day	Year	Inspector
	x15		3	13	14	LF/GL

Locality Type	Slope Length	No. of supplementary sheets of discontinuity data sheets
2	30'	0

1. Natural exposure
2. Road cut
3. Mine Bench
4. Test Pit
5. Adit
6. Tunnel
7. Drill hole

Slope Height	Azimuth	Slope Angle
30'	NA	NA

Photograph



ROCK MATERIAL INFORMATION

Color			Grain size	Compressive strength
1	1, 2	4	3-4	R0

1. Light
2. Dark

1. Pinkish
2. Reddish
3. Yellowish
4. Brownish
5. Olive
6. Greenish
7. Bluish
8. Greyish
9. Whitish

1. Pink
2. Red
3. Yellow
4. Brown
5. Olive
6. Green
7. Blue
8. White
9. Grey
10. Black

1. Very coarse (>60 mm)
2. Coarse (2-60 mm)
3. Medium (60 μ - 2 mm)
4. Fine (2-60 μ)
5. Very fine (<2 μ)

		MPa
S1	Very soft clay	<0.025
S2	Soft clay	0.025-0.05
S3	Firm clay	0.05-0.10
S4	Stiff clay	0.10-0.25
S5	Very stiff clay	0.25-0.50
S6	Hard clay	>0.50
R0	Extremely weak rock	0.25-1.0
R1	Very weak rock	1.0-5.0
R2	Weak rock	5.0-25
R3	Medium strong rock	25-50
R4	Strong rock	50-100
R5	Very strong rock	100-250
R6	Extremely strong rock	>250

Methods to determine compressive strength	Rock Type
	Kk

1. Measured
2. Assessed

ROCK MASS INFORMATION

Fabric	Block size	State of weathering	No. of major discontinuity sets
4	4-5	4-5	1

1. Blocky
2. Tabular
3. Columnar
4. Shattered

1. Very large (>8 m3)
2. Large (0.2-8 m3)
3. Medium (0.008-0.2 m3)
4. Small (0.0002 - 0.008 m3)
5. Very small (<0.0002 m3)

1. Fresh
2. Slightly
3. Moderately
4. Highly
5. Completely
6. Residual soil

Set #	Spacing
1	
2	
3	
4	
5	

GSI: 15-25

Discontinuity spacing:
1. Extremely close (<20 mm)
2. Very close (20-60 mm)]
3. Close (60 - 200 mm)
4. Moderately (200-600 mm)
5. Wide (600-2000 mm)
6. Very wide (2000-6000 mm)
7. Ext. wide (>6000 m)

REMARKS (exposure type/age, stability condition, design issues etc.)

GPS location: N 37 55 30.4, W 121 56 44.8

Kk formation off side of road at north end of Haul Road (across from station x13).

1 major discontinuity (bedding planes):
Strike/Dip: 350/78 *RH

Note: *RH= right hand rule

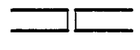
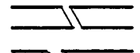
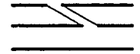
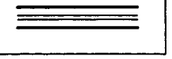
TABLE 1

ABBREVIATIONS FOR GEOTECHNICAL ROCK CORE LOGGING				
Type Code	**Description**		**Planarity Code**	**Description**
J1	Natural joint		PL	Planar
J2	Joint, origin uncertain		C	Curved
J3	Joint caused by drilling or handling		U	Undulating
B1	Natural fracture along bedding plane		ST	Stepped
B2	Fracture along bedding plane, origin uncertain		I	Irregular
B3	Fracture along bedding plane caused by drilling or handling			
BT	Trace of intact bedding plane		**Roughness Code**	**Description**
FO1	Natural fracture along foliation plane		P	Polished
FO2	Fracture along foliation plane, origin uncertain		K	Slickensided
FO3	Fracture along foliation plane caused by drilling or handling		SM	Smooth
FOT	Trace of intact foliation		R	Rough
V1	Natural fracture along vein		VR	Very Rough
V2	Fracture along vein, origin uncertian			
V3	Fracture along vein caused by drilling or handling		**Infill Type Code**	**Description**
VT	Trace of intact vein		Ca	Calcite
FB1	Natural fracture along flow banding		Cl	Clay
FB2	Fracture along flow banding, origin uncertain		Si	Silica
FB3	Fracture along flow banding caused by drilling or handling		Qtz	Quartz
FBT	Trace of intact flow banding		Chl	Chlorite
C1	Natural fracture along contact		G	Gouge
C2	Fracture along contact, origin uncertain		Bx	Breccia
C3	Fracture along contact caused by drilling or handling		Hm	Hematite
CT	Trace of intact contact		Lm	Limonite
F	Fault		FeOx	Iron Oxide
S	Shear			

MODIFIED CORE RECOVERY (RQD) AS AN INDEX OF ROCK QUALITY

RQD (%)	Description of Rock Quality
0–25	Very Poor
25–50	Poor
50–75	Fair
75–90	Good
90–100	Excellent

FRACTURE ORIENTATION WRT CORE AXIS

Angle	Schematic
90°	
60°	
30°	
0°	

POINT LOAD TEST ORIENTATION DESIGNATION

Symbol	Description
A	Axial
D	Diametral
I	Irregular Lump

SAMPLES

Symbol	Description
UC	Unconfined Compression
DS	Direct Shear
TX	Triaxial Compression
SS	Standard Penetration (2" OD Sampler)
XX	Identification Sample (XX denotes sample number)

WEATHERING INDEX

Term	Description	Grade
Fresh (FR)	No visible sign of rock material weathering: perhaps slight discoloration on major discontinuity surfaces.	I
Slightly Weathered (SW)	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.	II
Moderately Weathered (MW)	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.	III
Highly Weathered (HW)	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.	IV
Completely Weathered (CW)	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil (RS)	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

JOINT CONDITION RATING

BARTON'S "Q" SYSTEM

Joint Roughness (Jr)		Joint Alteration (Ja)	
Condition of Joints	Rating	Condition of Joints	Rating
Noncontinuous joints	4.0	FILLING AND WALL–ROCK ALTERATION, ESSENTIALLY UNFILLED	
Rough and wavy	3.0	Healed joints	0.75
Smooth and wavy	2.0	Staining only, no alteration	1.0
Rough and planar	1.5	Slightly altered joint walls	2.0
Smooth and planar	1.0	Silty or sandy coatings	3.0
Slick and planar	0.5	Clay coatings	4.0
Filled discontinuities	1.0		
		FILLING AND WALL–ROCK ALTERATION, FILLED JOINT	
		Sand or crushed rock filling	4.0
		Stiff clay filling less than 5mm thick	6.0
		Soft clay filling less than 5mm thick	8.0
		Swelling clay filling less than 5mm thick	12.0
		Stiff clay filling more than 5mm thick	10.0
		Soft clay filling more than 5mm thick	15.0
		Swelling clay filling more than 5mm thick	20.0

JOINT CONDITION RATING

BIENIAWSKI'S RMR SYSTEM

Condition of joints	Rating
Very rough surfaces Not continuous No separation Fresh (Hard) joint wall rock	25
Slightly rough surfaces Separation <1mm Slightly weathered (Hard) joint wall rock	20
Slightly rough surfaces Separation <1mm Highly weathered (Soft) joint wall rock	12
Slickensided surfaces –or– Gouge <5mm thick –or– Separation 1–5mm Continuous	6
Soft gouge > 5mm thick –or– Separation >5mm Continuous	0

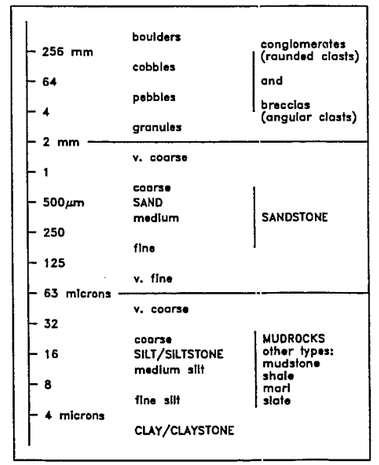
STRENGTH INDEX

Grade	Description	Field Identification	Approximate Range of Uniaxial Compressive Strength	
			(MPa)	(psi)
S1	Very soft clay	Easily penetrated several inches by fist	<0.025	<4
S2	Soft clay	Easily penetrated several inches by thumb	0.025–0.05	4–7
S3	Firm clay	Can be penetrated several inches by thumb with moderate effort	0.05–0.10	7–15
S4	Stiff clay	Readily indented by thumb but penetrated only with great effort	0.10–0.25	15–35
S5	Very stiff clay	Readily indented by thumbnail	0.25–0.50	35–70
S6	Hard clay	Indented with difficulty by thumbnail	>0.50	>70
R0	Extremely weak rock	Indented by thumbnail	0.25–1.0	35–150
R1	Very weak rock	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	1.0–5.0	150–725
R2	Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	5.0–25	725–3,500
R3	Medium strong rock	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	25–50	3,500–7,500
R4	Strong rock	Specimen requires more than one blow of geological hammer to fracture it	50–100	7,500–15,000
R5	Very strong rock	Specimen requires many blows of geological hammer to fracture it	100–250	15,000–35,000
R6	Extremely strong rock	Specimen can only be chipped with geological hammer	>250	>35,000

Note: Grades S1 to S6 apply to cohesive soils, for example, clays, silty clays and combinations of silts and clays with sand, generally slow draining. Some rounding of the strength values has been made when converting to S.I. units.

GRAIN SIZE CLASSIFICATION

GRAIN SIZE CLASSES AND SILICICLASTIC ROCKTYPES



CRYSTALLINE ROCKS

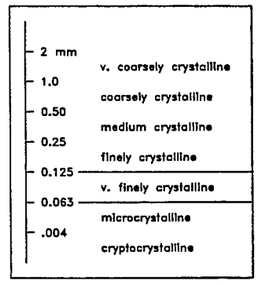


FIGURE **4**

ROCK CLASSIFICATION

TP–1.2–2

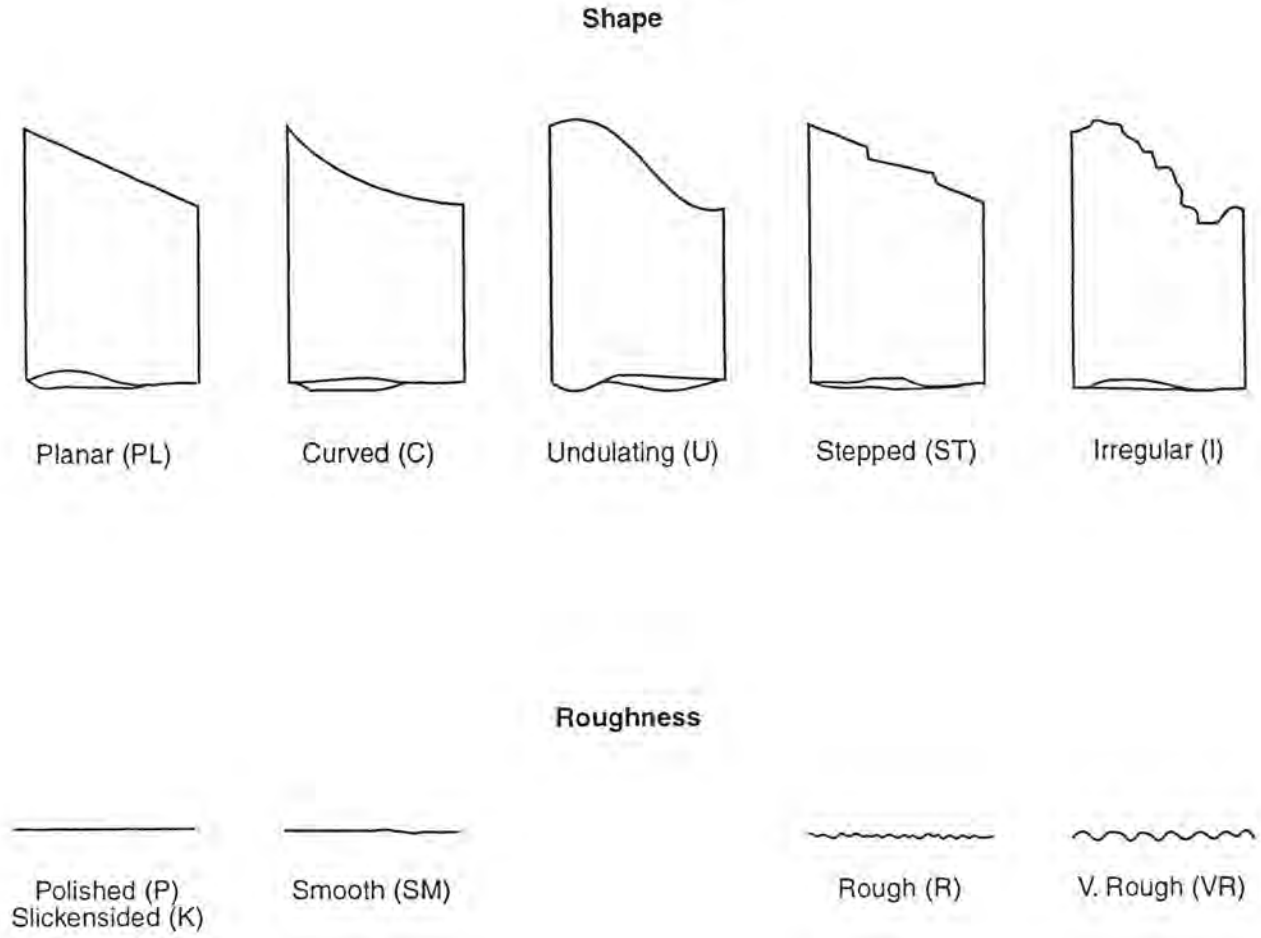


FIGURE 5
PHYSICAL DESCRIPTIVE TERMS
TP-1.2-2

Suggested Methods for the Quantitative Description of Discontinuities

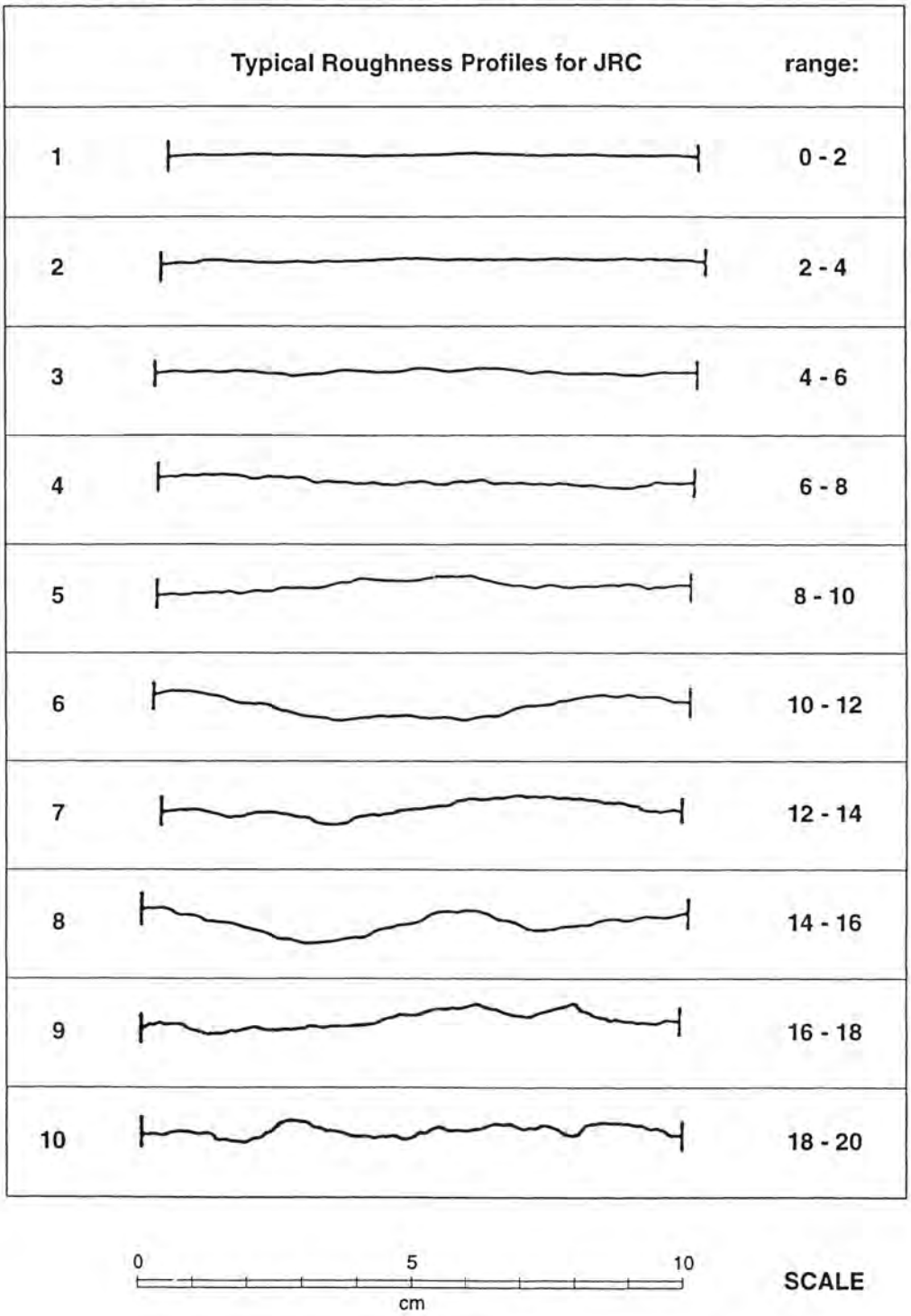
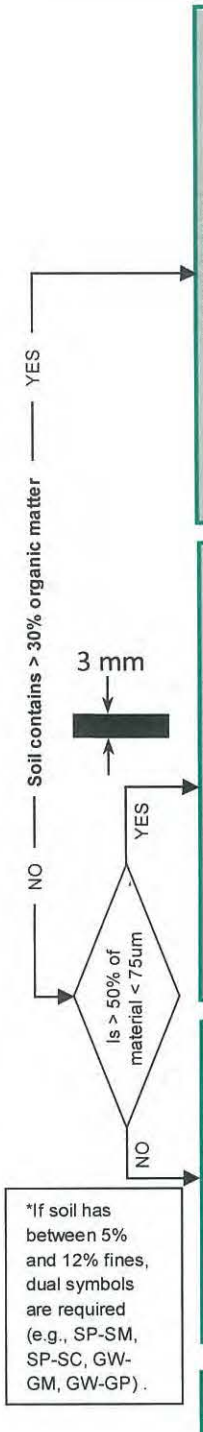


FIGURE **6**

DISCONTINUITY ROUGHNESS PROFILE

TP-1.2-2



	Category	Group Symbol and Name	Organic Content (% by mass)	Distinguishing Characteristics for Visual Identification
ORGANIC SOILS	Highly Organic Soils	(PT) Fibrous PEAT	75% to 100%	Light weight, spongy, and often elastic at natural water content. Plant structure easily identifiable. Shrinks considerably upon air drying. Much water squeezes from sample.
		(PT) Amorphous PEAT	75% to 100%	Light weight, spongy, but not usually elastic at natural water content. Plant structure visibly altered to unidentifiable. Shrinks considerably on air drying. Much water squeezes from sample.
		(PT) SILTY PEAT	30% to 75%	Relatively light weight, spongy. Thread usually weak and spongy near plastic limit. Shrinks on air drying; medium dry strength. Usually can squeeze water from sample readily. Low dilatancy.
		(PT) SANDY PEAT	30% to 75%	Sand fraction visible. Thread weak and friable near plastic limit, shrinks on air drying, low dry strength. Usually can squeeze water from sample readily, high dilatancy, "gritty."
	Organic Soils	(OH) ORGANIC SILT	5% to 30%	Often has strong H_2S odor. Thread may be tough depending on clay fraction. Medium dry strength, low dilatancy.
		(OL) ORGANIC SILT	5% to 30%	Threads weak and friable near plastic limit, or threads may not be rolled. Low dry strength; medium to high dilatancy.

FINE GRAINED SOILS	**Dilatancy**	None	None	None	None	Slow to V. Slow	Slow to V. Slow	Slow	Rapid
	Dry strength	High	Medium to High	Low to Medium	Medium to High	Low to Medium	Low to Medium	None to Low	None
	Shine Test	Shiny	Slight to Shiny	Slight	Dull to Slight	Slight	Dull to Slight	Dull	None
	Thread diameter (mm)	< 1	1 to 3	~ 3	1 to 3	3 to 6	3 to 6	3 to 6	> 6
	Toughness (of 3mm thread)	High	Medium	Low to Medium	Medium to High	Low to Medium	Low	None to Low	can't roll 3mm
	Organic content (%)	0 to 30	0 to 30	0 to 30	5 to 30	< 5	5 to 30	<5	<5
		↓	↓	↓	↓	↓	↓	↓	↓
	USCS Group Symbol	**CH**	**CL**	**CL**	**OH**	**MH**	**OL**	**ML**	**ML**
	Soil group name	CLAY	SILTY CLAY	SILTY CLAY	ORGANIC SILT	CLAYEY SILT	ORGANIC SILT	CLAYEY SILT	SILT

COARSE GRAINED SOILS	**Size of coarse fraction**	(>50% of coarse fraction is smaller than 4.75mm) SANDS				(>50% of coarse fraction is larger than 4.75mm) GRAVELS			
	Fines content	<12% fines*		>12% fines		<12% fines*		>12% fines	
	Gradation or plasticity	Well graded	Poorly graded	Plastic fines	Non-plastic fines	Well graded	Poorly graded	Plastic fines	Non-plastic fines
		↓	↓	↓	↓	↓	↓	↓	↓
	USCS Group Symbol	**SW**	**SP**	**SC**	**SM**	**GW**	**GP**	**GC**	**GM**
	Soil group name	SAND	SAND	CLAYEY SAND	SILTY SAND	GRAVEL	GRAVEL	CLAYEY GRAVEL	SILTY GRAVEL

Secondary and minor constituents

Constituents	% (by mass)	Modifier
Minor	≤ 5	Use "trace" or omit
	>5 to 12	Use "some"
Secondary	>12 to 35	Prefix primary soil name with "gravelly, clayey" as applicable.
	>35	Use 'and' to combine major constituents (i.e., SAND and GRAVEL, SILTY CLAY and SAND)

Order/Item/Parameter
1) FILL, REFUSE/WASTE, ROCK FILL, TAILINGS, TOPSOIL (if applicable).
2A) USCS Group Symbol – in (BLOCK LETTERS) e.g., (ML)
2B) Soil Group Name - in BLOCK LETTERS. e.g., CLAYEY SILT
3) Description of Primary Constituents; Particle size, grading (for sands and gravels containing <12% fines) and shape (optional) for coarse-grained soils. Plasticity for fine-grained soils.
4) Description of Secondary Constituents; including modifiers, with an estimate of their percentage (optional), and giving their particle size for coarse-grained or plasticity for fine-grained.
5) Other minor constituents including modifiers.
6) Color.
7) Weathering (if applicable).
8) Structure: e.g., zoning, fissuring, cementation, lamination, stratification, discrete layers or features (if applicable).
9) Sensitivity (if applicable).
10) Contamination, staining, and odor (if applicable).
11) Additional observations: origin or geological notes (e.g., TILL, ALLUVIUM, LOESS) or presence of cobbles/boulders, deleterious materials (e.g., with pieces of brick, asphalt and concrete) or mineralogy (e.g., calcareous, micaceous) (if applicable).
12) Behavior (non-cohesive or cohesive).
13) Field Moisture Condition (non-cohesive soils). Water Content (cohesive soils).
14) Compactness (non-cohesive soils). Consistency (cohesive soils).

Particle sizes

Soil constituent	Particle size description	Particle Size	
		Millimetres	Inches (US std. sieve size)
BOULDERS	Not applicable	>300	>12
COBBLES	Not applicable	75 to 300	3 to 12
GRAVEL	Coarse	19 to 75	0.75 to 3
	Fine	4.75 to 19	(4) to 0.75
SAND	Coarse	2.00 to 4.75	(10) to (4)
	Medium	0.425 to 2.00	(40) to (10)
	Fine	0.075 to 0.425	(200) to (40)
SILT/CLAY	Not applicable	<0.075 mm	< (200)

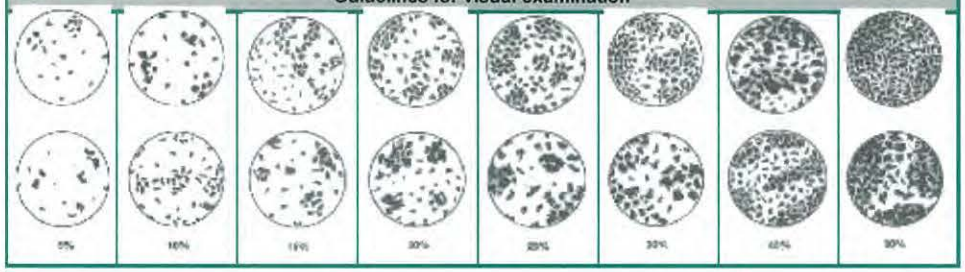
Particle shape and angularity

Shape and Angularity	Term	Description	Visual Example
Angularity	Rounded	Smoothly curved sides No edges Smooth or polished surfaces	
	Sub-rounded	Plane sides Well-rounded edges Partially polished surfaces	
	Sub-angular	Plane Sides Partially rounded edges Unpolished surfaces	
	Angular	Plane sides Sharp edges Unpolished surfaces	
Shape (Typically gravel)	Flat	Width to thickness ratio >3	
	Elongated	Length to width ratio >3	

Particle size distribution

Particle Size Distribution	Sub category	Description	Visual Example
Well Graded	-	Even distribution of particle sizes	
Poorly Graded	-	Uneven distribution of particle sizes	
	Gap Graded	Intermediate particle sizes absent	
	Uniformly Graded	Primarily one particle size	

Guidelines for visual examination



Color

Describe the color of the soil in its moist condition – Note if soil represents dry condition. Use primary color modified, if appropriate, with single adjective (e.g., grey, dark/pale grey). Borderline cases can be hyphenated, (e.g., grey-brown). Describe streaks or splotches of other colors as "mottled" (e.g., grey mottled red-brown). The suffix "ish" may be used if appropriate (reddish-brown).

Zoning and Fissures

Term	Description
Heterogeneous	Soil mass is of non-uniform, variable composition or structure.
Homogeneous	Soil mass is of uniform composition or structure.
Repetitive Structures	
Laminated	Closely spaced, alternating layers of differing soils and/or differing colors or shades of soils of similar gradation, usually arranged in a regular pattern. The following terms may be used: Thinly laminated – mean spacing under 6 mm (1/4 in) Thickly laminated – 6 to 20 mm (1/4 to 3/4 in)
Stratified, Layered, or Bedded	Differing soils or visible variations in soil constituents or color arranged in layers, generally but not necessarily parallel to one another. The following terms may be used: Very thinly bedded – 20 to 60 mm (3/4 to 2 1/2 in) Thinly bedded – 60 to 200 mm (2 1/4 to 8 in) Medium bedded – 200 to 600 mm (8 in to 2 ft) Thickly bedded – 600 to 2 m (2 to 6 ft) Very thickly bedded – over 2 m (over 6 ft)
Discrete layers or features	
Varved	A laminated soil consisting of two distinct soils (usually clay and silt) occurring in a regularly repeating pattern resulting from seasonal variations in sediment load in a lacustrine environment.
Lens	An inclusion of a different soil type within surrounding soils, which thins out laterally (horizontally) and may not be continuous over any significant distance. Typically identified by test pits or correlation between boreholes.
Parting	Paper thin separation of one soil type by another. Usually applied to fine grained soils.
Pocket	A different soil type of very limited thickness or lateral extent (a small lens).
Seam	A soil layer of considerable extent but with a thickness of less than about 10 mm (1/2 inch).
Term	**Field identification**
Fissured	Generally applied to dried or overconsolidated fine grained soils (silts and clays) containing cracks or physical discontinuities which can be vertical, horizontal, or inclined. Described as highly, moderately, and slightly fissured.
Friable, blocky, platy	Otherwise cohesive soil breaks into small (friable), larger (blocky) or thin, plate like (platy) fragments with little effort.
Slickensided	Polished or striated surfaces. Often an indication of an existing failure or slip surface. If continuous slickensided shear zones are found an estimate should be made of their angle in relation to the horizontal plane

Consistency (Cohesive Soils)

Term	Field identification	Unconfined compressive strength (tsf)	Unconfined compressive strength (kPa)	SPT 'N' (blows/foot) *
Very soft	Extrudes between fingers when squeezed	<0.25	<25	0 to 2
Soft	Molded by light finger pressure	0.25 to 0.5	25 to 50	2 to 4
Firm	Molded by strong finger pressure	0.5 to 1	50 to 100	4 to 8
Stiff	Indented by thumb	1 to 2	100 to 200	8 to 15
Very stiff	Indented by thumbnail	2 to 4	200 to 400	15 to 30
Hard	Difficult to indent with thumbnail	>4	>400	30

* Uncorrected for overburden pressure. 'N'-values should be considered ONLY an approximate guide to consistency; for sensitive clays the 'N'-value approximation for consistency terms does not apply.

Water content (Cohesive Soils)

Term	Field Identification
w < PL	Material is estimated to be drier than the Plastic Limit (cannot be rolled to a thread diameter of 4 mm).
w ~ PL	Material is estimated to be close to the Plastic Limit (can be rolled a thread diameter of between 2 mm and 4 mm).
w > PL	Material is estimated to be wetter than the Plastic Limit (can be rolled to a thread diameter of less than 2 mm).

Compactness (Non-cohesive soils)

Term	SPT 'N' (blows/foot) *	Field Identification of soil exposures
Very loose	0 to 4	Easily penetrated with shovel handle.
Loose	4 to 10	Easily penetrated with 12 mm (1/2 in) rebar pushed by hand. Easily excavated with hand shovel.
Compact	10 to 30	Easily penetrated with 12 mm (1/2 in) rebar driven with 2.3 kg (5 lb) hammer. Difficult to excavate with hand shovel.
Dense	30 to 50	Penetrated to a max depth of 300 mm (1 ft) with 12 mm (1/2 in) driven rebar. Must be loosened with pick to excavate.
Very dense	>50	Penetrated to a max depth of 50 mm (2 in) with 12 mm (1/2 inch) driven rebar. Very difficult to excavate even with pick.

* Uncorrected for overburden pressure

Field moisture condition (Non-cohesive soils)

Term	Field Identification
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

otes:

- **Odor of samples should only be recorded if incidentally noticed during regular inspection – Do not deliberately smell samples.**
- **SPT**: The number of blows by a 63.5 kg. (140 lb.) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) drive open sampler for a distance of 300 mm (12 in). The first interval is to "seat" the sampler, the second and third intervals are added together for the SPT N, (e.g., 4, 7, 11; N=18 4, 7, 11=Blows per 150mm (6 in.)). Where practical refusal occurs, the blows and penetration for that interval are reported.
  WR-Penetration occurred under the rod weight only. WH-Penetration occurred under the hammer and rod weight only.
- **It is essential to note the type and weight of hammer used.**
- **Soil description examples** ((GROUP symbol) Group Name, Constituents; Gen. Characteristics; Bulk Behavior).
  FILL - (SC) gravelly CLAYEY SAND; grey brown; non-cohesive, moist, compact.
  (GP) sandy GRAVEL, fine to coarse, subangular; light brown; non-cohesive, dry, dense.
  (CL) SILTY CLAY and SAND, trace fine gravel; grey brown; cohesive, w<PL, stiff.
  (ML) sandy SILT, trace gravel; brown, hydrocarbon odor; non-cohesive, moist, dense.
- **Groundwater not observed:** The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage, or cave in of the borehole/testpit.
- **Groundwater not encountered:** The borehole/test pit was dry after excavation.
- **Sample labeling**: Project #, Borehole/Testpit ID, Sample #, Depth, Date of sampling, Engineer or Technician name initials

Sample labeling
Project Number Borehole/Testpit ID Sample Number Depth Date Initials

Samples			
AS	Auger sample	RC	Rock core
CS	Chunk sample	SC	Soil core
DO	Drive Open (SPT)*	ST	Slotted tube
DP	Direct Push	TO	Thin-walled, open*
DS	Denison type sample	TP	Thin-walled, piston*
FS	Foil sample	WS	Wash sample
PS	Pitcher type sample		

*Note size

APPENDIX B

LABORATORY TEST RESULTS

Summary of Point Load Tests From 2014 Investigation

PLT Serial No. 048A10016
Model Roctest PIL-7
Piston Area 0.000948 m^2

FAILURE TYPE KEY
1= failure through fresh rock
2= failure through existing, healed structure
3= combination of 1 and 2
4= failue did not pass through loading points
5= did not fail

Station #	Sample ID	Depth	Rock Type	Weathering/ Alteration	Test Type (Axial, Diametral, Lump)	Width, W (mm)	Distance, D_a, after failure (mm)	Distance, D_b, before failure (mm)	Failure Load	Gauge Units	Failure Type	Split Core?	Date	Initials	P, Load (MN)	D_e^2 (m)	F	I_{s50} (Mpa)	I_{s50} (psi)	UCS (Mpa)	UCS (psi)	Strength
1	1-1	Surface	Db	mod. To high	L	75	40	45	2.54	MPa	2	N	3/21/2014	kmd	0.002408	0.004058	1.115179	0.661647	95.96375	15.87953	2303.13	R2
2	2-1	Surface	Db	slight	L	66	32	42	23.42	MPa	1	N	3/20/2014	kmd	0.022202	0.003109	1.050294	7.499814	1087.756	179.9955	26106.14	R5
2	2-2	Surface	Db	slight	L	57	43	50	6.38	MPa	1	N	3/20/2014	kmd	0.006048	0.003375	1.069836	1.91738	278.0923	46.01711	6674.216	R3
3	3-1	Surface	Db	mod.	L	75	46	50	6.38	MPa	2	N	3/20/2014	kmd	0.006048	0.004584	1.146136	1.512351	219.348	36.29644	5264.352	R3
3	3-2	Surface	Db	mod.	L	50	35	42	4.16	MPa	2	N	3/20/2014	kmd	0.003944	0.002451	0.995555	1.601865	232.3309	38.44477	5575.941	R3
4	4-1	Surface	Db	fresh to mod	L	47	32	36	12.98	MPa	1	N	3/20/2014	kmd	0.012305	0.002035	0.954713	5.773899	837.433	138.5736	20098.39	R5
4	4-2	Surface	Db	fresh to mod	L	61	23	28	8.06	MPa	1	N	3/20/2014	kmd	0.007641	0.001981	0.948941	3.661021	530.9861	87.86451	12743.67	R4
4	4-3	Surface	Db	fresh to mod	L	47	29	32	6.38	MPa	1	N	3/20/2014	kmd	0.006048	0.001825	0.931661	3.087301	447.775	74.09522	10746.6	R4
5	5-1	Surface	Db	fresh	L	50	37	40	21.36	MPa	1	N	3/20/2014	kmd	0.020249	0.002451	0.995555	8.224962	1192.93	197.3991	28630.31	R5
5	5-2	Surface	Db	fresh	L	51	48	49	26.58	MPa	1	N	3/20/2014	kmd	0.025198	0.003149	1.053328	8.427616	1222.322	202.2628	29335.73	R5
6	6-1	Surface	Db	fresh	L	42	37	41	22.28	MPa	1	N	3/20/2014	kmd	0.021121	0.002086	0.960039	9.722734	1410.163	233.3456	33843.91	R5
6	6-2	Surface	Db	fresh	L	72	30	34	10.42	MPa	1	N	3/20/2014	kmd	0.009878	0.002934	1.036637	3.490682	506.2805	83.77637	12150.73	R4
6	6-3	Surface	Db	fresh	L	60	53	54	33.22	MPa	5	N	3/20/2014	kmd	0.031493	0.004087	1.116945	8.606463	1248.262	206.5551	29958.28	R5
7	7-1	Surface	Db	fresh	L	61	18	23	21.04	MPa	1	N	3/20/2014	kmd	0.019946	0.001592	0.903467	11.31807	1641.547	271.6337	39397.12	R6
7	7-2	Surface	Db	fresh	L	50	25	29	12.66	MPa	1	N	3/20/2014	kmd	0.012002	0.001719	0.919165	6.417879	930.8344	154.0291	22340.03	R5
8	8-1	Surface	Db	slight	L	53	52	56	12.34	MPa	1	N	3/20/2014	kmd	0.011698	0.003644	1.088476	3.49432	506.8082	83.86368	12163.4	R4
8	8-2	Surface	Db	slight	L	46	34	42	4.54	MPa	3	N	3/20/2014	kmd	0.004304	0.002226	0.974182	1.883878	273.2333	45.21307	6557.599	R3
8	8-3	Surface	Db	slight	L	58	20	23	9.74	MPa	1	N	3/20/2014	kmd	0.009234	0.001588	0.902897	5.250842	761.57	126.0202	18277.68	R5
9	9-1	Surface	Db	slight	L	82	NA	35	NA	MPa	NA	N	3/21/2014	kmd								
9	9-2	Surface	Db	slight	L	43	30	33	7.98	MPa	1	N	3/21/2014	kmd	0.007565	0.001725	0.919853	4.034973	585.2232	96.83936	14045.36	R4
10	10-1	Surface	Db	slight	L	37	16	21	7.60	MPa	1	N	3/21/2014	kmd	0.007205	0.000872	0.78891	6.521773	945.9029	156.5225	22701.67	R5
10	10-2	Surface	Db	slight	L	43	20	25	10.52	MPa	1	N	3/21/2014	kmd	0.009973	0.001232	0.852785	6.904031	1001.345	165.6967	24032.27	R5
11	11-1	Surface	Db	slight to mod	L	48	37	40	7.22	MPa	1	N	3/21/2014	kmd	0.006845	0.002353	0.986453	2.869523	416.189	68.86855	9988.535	R4
11	11-2	Surface	Db	slight to mod	L	75	36	40	13.04	MPa	1	N	3/21/2014	kmd	0.012362	0.003629	1.087448	3.704583	537.3042	88.90999	12895.3	R4
13	13-1	Surface	Db	slight to mod	L	75	59	69	8.34	MPa	2	N	3/21/2014	kmd	0.007906	0.006112	1.222778	1.581869	229.4307	37.96486	5506.336	R3
13	13-2	Surface	Db	slight to mod	L	65	30	33	1.30	MPa	1	N	3/21/2014	kmd	0.001232	0.002607	1.009471	0.477212	69.21372	11.45309	1661.129	R2
13	13-3	Surface	Db	slight to mod	L	40	19	28	2.98	MPa	1	N	3/21/2014	kmd	0.002825	0.001197	0.84727	1.999902	290.0612	47.99764	6961.468	R3
14	14-1	Surface	Db	slight	L	60	25	31	25.24	MPa	1	N	3/21/2014	kmd	0.023928	0.002139	0.965524	10.80043	1566.47	259.2104	37595.28	R6
14	14-2	Surface	Db	slight	L	35	28	30	2.64	MPa	2	N	3/21/2014	kmd	0.002503	0.001292	0.862031	1.669395	242.1253	40.06549	5811.007	R3
13	13-4	Near Contact	Jk/Db Contact		L	60	24	27	1.46	MPa	1	N	3/24/2014	kmd	0.001384	0.001948	0.945418	0.671713	97.42365	16.1211	2338.168	R2
13	13-5	Near Contact	Jk/Db Contact		L	30	18	21	2.50	Mpa	1	N	3/24/2014	kmd	0.00237	0.000745	0.761515	2.423041	351.4322	58.15298	8434.374	R4
13	13-6	Near Contact	Jk/Db Contact		L	76	49	55	8.10	MPa	1	N	3/24/2014	kmd	0.007679	0.005032	1.170448	1.786152	259.0594	42.86765	6217.425	R3
13	13-7	Near Contact	Jk/Db Contact		L	49	27	34	5.30	MPa	1	N	3/24/2014	kmd	0.005024	0.001903	0.940437	2.483179	360.1546	59.5963	8643.71	R4
13	13-8	Near Contact	Jk/Db Contact		L	64	30	32	3.32	MPa	1	N	3/24/2014	kmd	0.003147	0.002526	1.00234	1.248849	181.1301	29.97237	4347.123	R3
13	13-9	Near Contact	Jk/Db Contact		L	43	26	29	4.20	MPa	1	N	3/24/2014	kmd	0.003982	0.001506	0.892172	2.359364	342.1967	56.62473	8212.72	R4
13	13-10	Near Contact	Jk/Db Contact		L	41	24	26	4.26	MPa	1	N	3/24/2014	kmd	0.004038	0.001305	0.863935	2.673407	387.7448	64.16177	9305.876	R4
13	13-11	Near Contact	Jk/Db Contact		L	54	27	32	4.40	MPa	1	N	3/24/2014	kmd	0.004171	0.002028	0.954041	1.962013	284.5659	47.08832	6829.581	R3
13	13-12	Near Contact	Jk/Db Contact		L	56	20	25	2.60	MPa	1	N	3/24/2014	kmd	0.002465	0.001604	0.905006	1.390441	201.6664	33.37059	4839.994	R3
13	13-13	Near Contact	Jk/Db Contact		L	29	16	19	1.80	MPa	1	N	3/24/2014	kmd	0.001706	0.000646	0.73755	1.947718	282.4925	46.74523	6779.821	R3
13	13-14	Near Contact	Jk/Db Contact		L	36	22	24	3.46	MPa	1	N	3/24/2014	kmd	0.00328	0.001054	0.823427	2.561941	371.578	61.48658	8917.872	R4
13	13-15	Near Contact	Jk/Db Contact		L	37	23	28	1.52	MPa	1	N	3/24/2014	kmd	0.001441	0.001201	0.847979	1.01715	147.5251	24.41161	3540.603	R2
13	13-16	Near Contact	Jk/Db Contact		L	36	31	34	2.88	MPa	1	N	3/24/2014	kmd	0.00273	0.00149	0.890041	1.631229	236.5897	39.1495	5678.153	R3
13	13-17	Near Contact	Jk/Db Contact		L	68	35	38	2.38	MPa	1	N	3/24/2014	kmd	0.002256	0.00316	1.054141	0.752614	109.1573	18.06273	2619.776	R2
13	13-18	Near Contact	Jk/Db Contact		L	50	31	34	2.46	MPa	1	N	3/24/2014	kmd	0.002332	0.002069	0.958319	1.080165	156.6647	25.92397	3759.953	R3
13	13-19	Near Contact	Jk/Db Contact		L	46	26	30	1.58	MPa	1	N	3/24/2014	kmd	0.001498	0.00164	0.909493	0.83069	120.4813	19.93655	2891.552	R2
13	13-20	Near Contact	Jk/Db Contact		L	37	25	28	3.10	MPa	1	N	3/24/2014	kmd	0.002939	0.001248	0.85535	2.013522	292.0365	48.32452	7008.877	R3
13	13-21	Near Contact	Jk/Db Contact		L	36	19	21	2.70	MPa	1	N	3/24/2014	kmd	0.00256	0.000917	0.797936	2.22791	323.1309	53.46983	7755.141	R4
13	13-22	Near Contact	Jk/Db Contact		L	44	28	31	2.58	MPa	1	N	3/24/2014	kmd	0.002446	0.001653	0.911077	1.348337	195.5596	32.36008	4693.431	R3
13	13-23	Near Contact	Jk/Db Contact		L	41	28	31	1.90	MPa	1	N	3/24/2014	kmd	0.001801	0.00154	0.896715	1.048819	152.1183	25.17166	3650.839	R3
13	13-24	Near Contact	Jk/Db Contact		L	37	24	28	4.28	MPa	1	N	3/24/2014	kmd	0.004057	0.001225	0.851692	2.821302	409.1952	67.71125	9820.684	R4
13	13-25	Near Contact	Jk/Db Contact		L	38	19	21	2.40	MPa	1	N	3/24/2014	kmd	0.002275	0.000968	0.807702	1.899097	275.4407	45.57833	6610.577	R3
13	13-26	Near Contact	Jk/Db Contact		L	43	21	22	1.76	MPa	1	N	3/24/2014	kmd	0.001668	0.001177	0.844107	1.196469	173.5331	28.71525	4164.793	R3
13	13-27	Dump	Jk		L	36	31	34	2.36	MPa	1	N	3/24/2014	kmd	0.002237	0.00149	0.890041	1.336702	193.8721	32.08084	4652.931	R3
13	13-28	Dump	Jk		L	35	30	34	1.58	MPa	1	N	3/24/2014	kmd	0.001498	0.001426	0.881338	0.92572	134.2643	22.21728	3222.343	R2
13	13-29	Dump	Jk		L	37	26	31	2.02	MPa	1	N	3/24/2014	kmd	0.001915	0.001343	0.869468	1.2401	179.8613	29.7624	4316.671	R3
13	13-30	Dump	Jk		L	34	21	24	1.00	MPa	1	N	3/24/2014	kmd	0.000948	0.000974	0.808895	0.787279	114.1852	18.89471	2740.445	R2
13	13-31	Dump	Jk		L	33	18	20	1.90	MPa	1	N	3/24/2014	kmd	0.001801	0.000798	0.773488	1.74517	253.1154	41.88408	6074.771	R3
13	13-32	Dump	Jk		L	37	22	25	2.76	MPa	1	N	3/24/2014	kmd	0.002616	0.001107	0.832538	1.967622	285.3794	47.22293	6849.104	R3
13	13-33	Dump	Jk		L	31	20	21	0.94	MPa	1	N	3/24/2014	kmd	0.000891	0.000809	0.775835	0.854436	123.9255	20.50648	2974.212	R2
13	13-34	Dump	Jk		L	30	26	28	2.08	MPa	1	N	3/24/2014	kmd	0.001972	0.001031	0.819365	1.566585	227.2139	37.59804	5453.133	R3

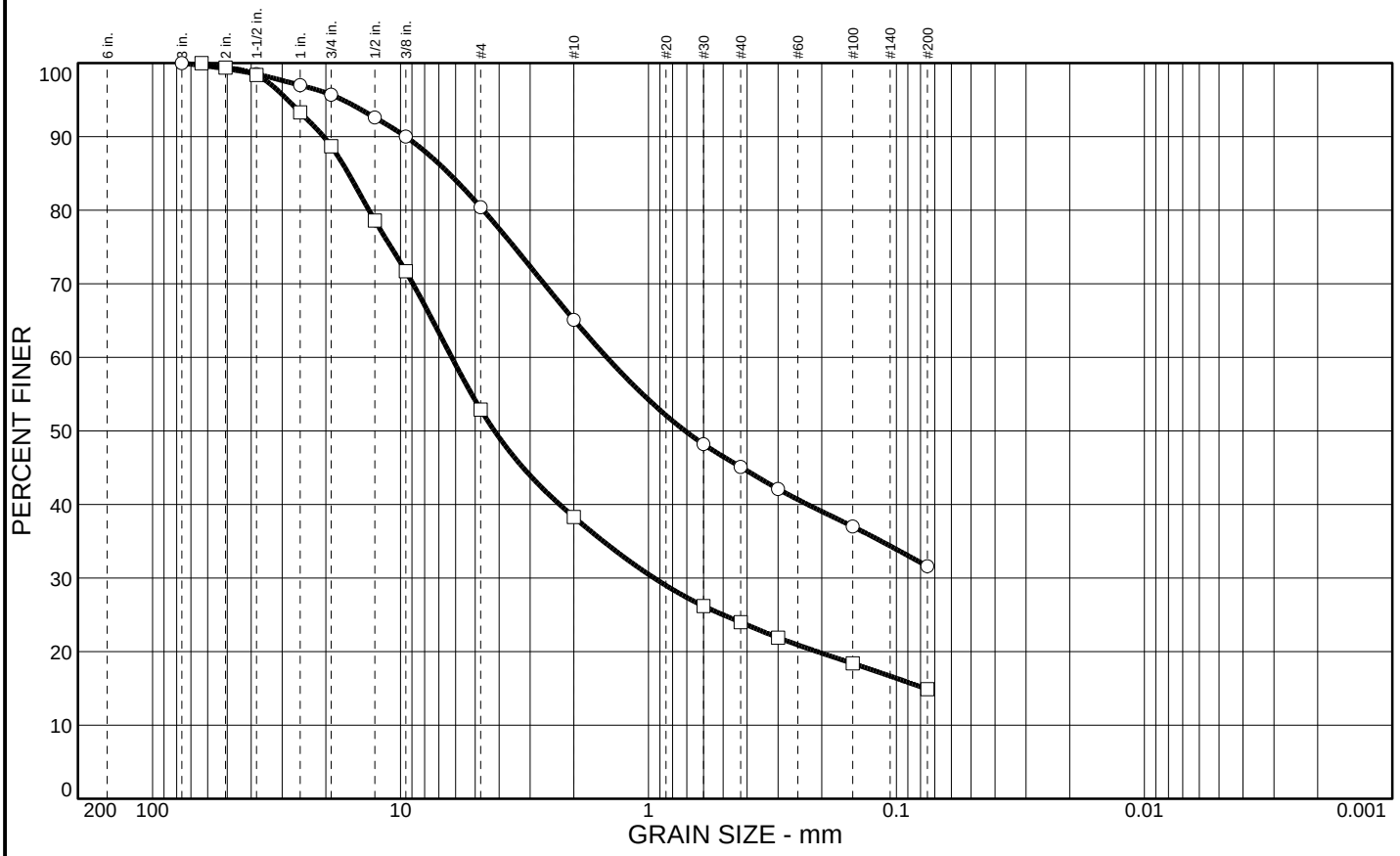
Summary of Point Load Tests From 2015 Investigation

PLT Serial No. 048A08012
Model Roctest PIL-7
Piston Area 0.000948 m^2

FAILURE TYPE KEY
1= failure through fresh rock
2= failure through existing, healed structure
3= combination of 1 and 2
4= failue did not pass through loading points
5= did not fail

BoreHole	Sample ID	Depth	Rock Type	Weathering/ Alteration	Test Type (Axial, Diametral, Lump)	Width, W (mm)	Distance, D_a, after failure (mm)	Distance, D_b, before failure (mm)	Failure Load	Gauge Units	Failure Type	Split Core?	Date	Initials	P, Load (MN)	D_e^2 (m)	F	I_{s50} (Mpa)	I_{s50} (psi)	UCS (Mpa)	UCS (psi)	Strength
B-1	1	45.8	Claystone	W3	Diametral	62	62	57	1.82	MPa	3	N	3/16/2015	SAM	0.001725	0.004697	1.152452	0.423335	61.39946	10.16003	1473.587	R2
B-1	2	65.9	Claystone	W2	Diametral	62	62	59	9.78	MPa	2	N	3/16/2015	SAM	0.009271	0.004776	1.156782	2.245646	325.7034	53.89551	7816.881	R4

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		19.6	48.8	31.6		SC		18.3	37.7
□		47.1	38.0	14.9		GC		17.0	25.5

SIEVE inches size	PERCENT FINER ○	□	
3"	100.0		
2.5		100.0	
2		99.4	
1.5"	98.5	98.4	
1"	97.0	93.3	
3/4"	95.7	88.7	
1/2	92.6	78.6	
3/8"	90.0	71.7	
GRAIN SIZE			
D_{60}	1.47	6.22	
D_{30}		0.949	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	
#4	80.4	52.9	
#10	65.1	38.3	
#30	48.2	26.2	
#40	45.1	24.0	
#50	42.1	21.9	
#100	37.0	18.4	
#200	31.6	14.9	

SOIL DESCRIPTION

○ Dark Yellowish Brown Lean Clayey SAND w/ Gravel

□ Yellowish Brown Lean Clayey GRAVEL w/ Sand

REMARKS:

○

□

○ Source: X19 Elev./Depth: Surface

□ Source: X20+21 Sample No.: Composite Elev./Depth: Surface

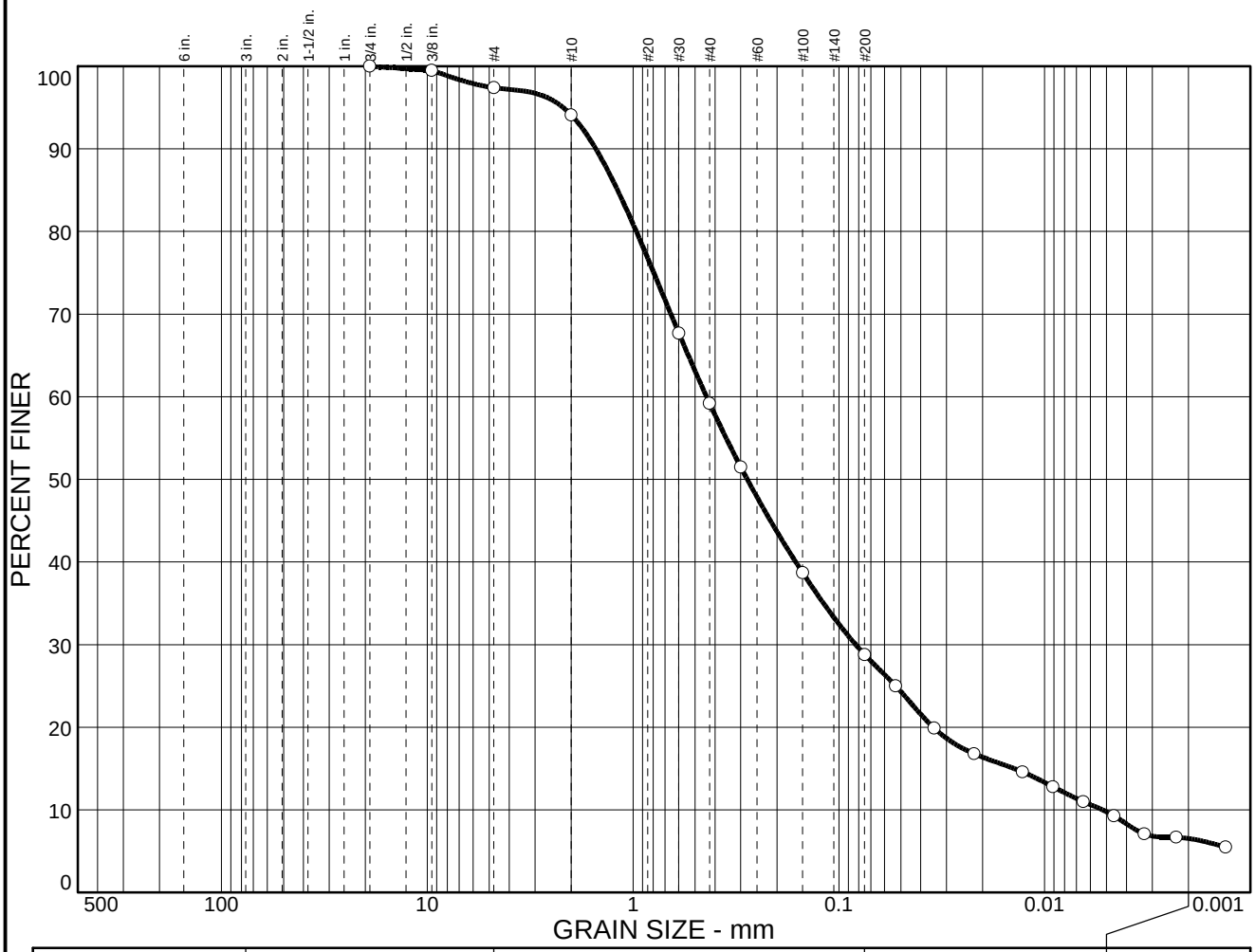
COOPER TESTING LABORATORY

Client: Golder Associates, Inc.

Project: Clayton Quarry Slope Evaluation - 113-01127

Project No.: 287-147 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.6	68.6	22.2	6.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
3/8 in.	99.5		
#4	97.4		
#10	94.1		
#30	67.7		
#40	59.2		
#50	51.5		
#100	38.7		
#200	28.8		
#270	25.0		
0.0345 mm.	19.9		
0.0220 mm.	16.8		
0.0128 mm.	14.6		
0.0091 mm.	12.8		
0.0065 mm.	11.0		
0.0046 mm.	9.3		
0.0033 mm.	7.1		
0.0023 mm.	6.7		
0.0013 mm.	5.5		

* (no specification provided)

Soil Description

Very Dark Gray Silty, Clayey SAND

Atterberg Limits

PL= 18 LL= 25 PI= 7

Coefficients

D_{85}= 1.19 D_{60}= 0.440 D_{50}= 0.279
D_{30}= 0.0829 D_{15}= 0.0140 D_{10}= 0.0052
C_u= 84.17 C_c= 2.99

Classification

USCS= SC-SM AASHTO=

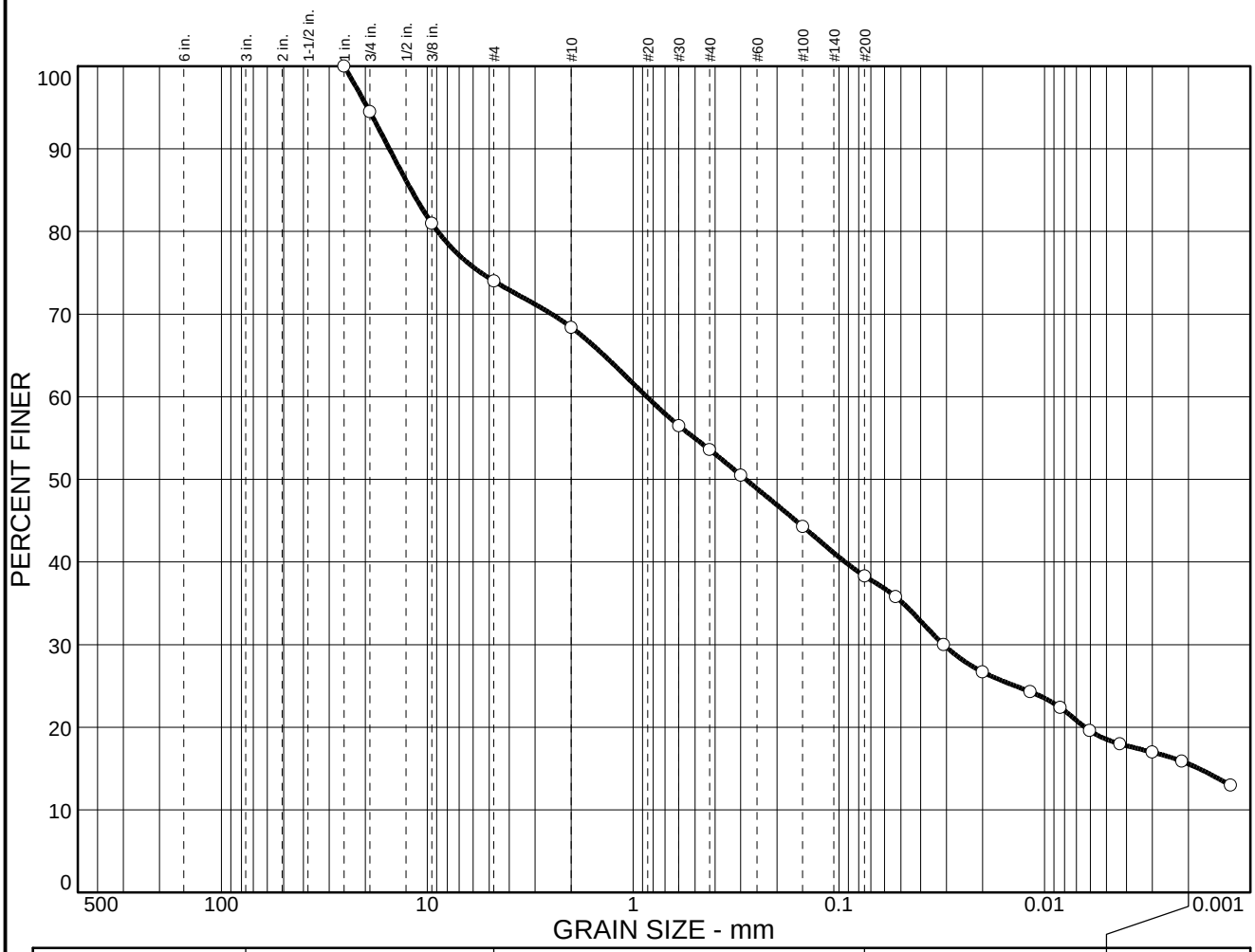
Remarks

Sample No.: **Source of Sample:** B-1 **Date:** 3/13/15
Location: **Elev./Depth:** 91.4-92'

COOPER TESTING LABORATORY

Client: Golder Associates
Project: Clayton Quarry - 1520962
Project No: 287-201 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	26.0	35.7	22.7	15.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	94.5		
3/8 in.	81.0		
#4	74.0		
#10	68.4		
#30	56.5		
#40	53.6		
#50	50.5		
#100	44.3		
#200	38.3		
#270	35.8		
0.0310 mm.	30.0		
0.0200 mm.	26.7		
0.0118 mm.	24.3		
0.0084 mm.	22.4		
0.0060 mm.	19.6		
0.0043 mm.	18.0		
0.0030 mm.	17.0		
0.0022 mm.	15.9		
0.0013 mm.	13.0		

* (no specification provided)

Soil Description

Dark Yellowish Brown Lean Clayey SAND w/ Gravel

Atterberg Limits

PL= 18 LL= 36 PI= 18

Coefficients

D_{85}= 12.0 D_{60}= 0.858 D_{50}= 0.284
D_{30}= 0.0310 D_{15}= 0.0018 D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

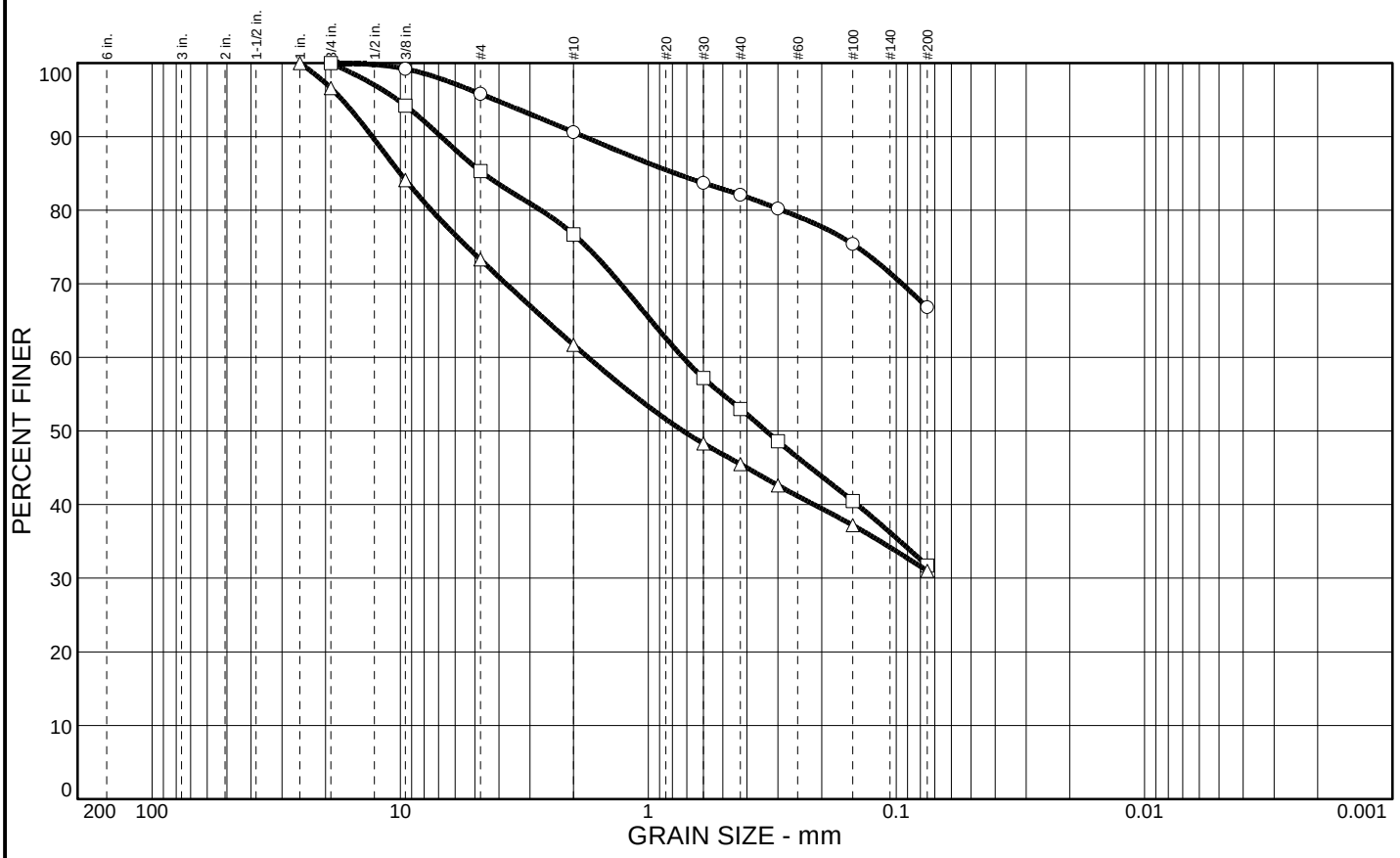
Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

Sample No.: **Source of Sample:** B-2 **Date:** 3/13/15
Location: **Elev./Depth:** 5.5-6'

COOPER TESTING LABORATORY

Client: Golder Associates
Project: Clayton Quarry - 1520962
Project No: 287-201 **Figure**

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		4.2	29.0	66.8		CL		24	48
□		14.7	53.6	31.7		SC		19	37
△		26.7	42.3	31.0		SC		19	34

SIEVE inches size	PERCENT FINER ○	□	△
1"			100.0
3/4"	100.0	100.0	96.6
3/8"	99.2	94.2	84.1
GRAIN SIZE			
D_{60}		0.726	1.75
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	95.8	85.3	73.3
#10	90.6	76.7	61.7
#30	83.7	57.2	48.3
#40	82.1	53.0	45.5
#50	80.2	48.6	42.6
#100	75.4	40.5	37.2
#200	66.8	31.7	31.0

SOIL DESCRIPTION

○ Dark Brown Sandy Lean CLAY

□ Strong Brown Lean Clayey SAND

△ Strong Brown Lean Clayey SAND w/ Gravel

REMARKS:

○

□

△

○ Source: GB-1 Elev./Depth: 10-10.5'

□ Source: GB-2 Elev./Depth: 57.5-58.0'

△ Source: GB-3 Elev./Depth: 39.0-39.5'

COOPER TESTING LABORATORY

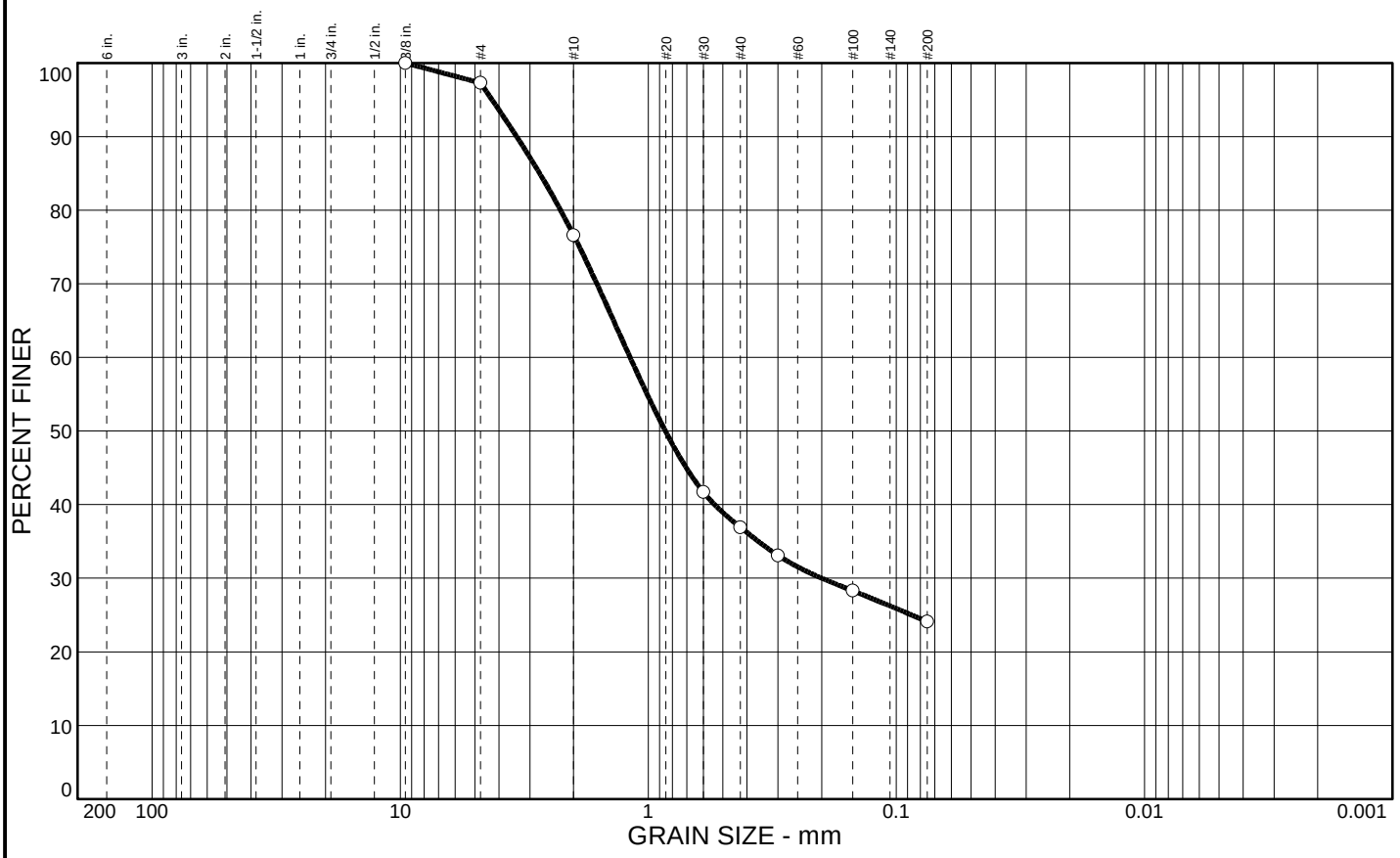
Client: Golder Associates

Project: Clayton Quarry - 1661332

Project No.: 287-244

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		2.7	73.2	24.1		SC		21	40

SIEVE inches size	PERCENT FINER ○		
3/8"	100.0		
	GRAIN SIZE		
D_{60}	1.18		
D_{30}	0.200		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	97.3		
#10	76.6		
#30	41.7		
#40	36.9		
#50	33.1		
#100	28.3		
#200	24.1		

SOIL DESCRIPTION

○ Dark Brown Mottled Pale Brown Lean Clayey SAND w/ Claystone fragments

REMARKS:

○

○ Source: GB-3

Elev./Depth: 64-64.5'

COOPER TESTING LABORATORY

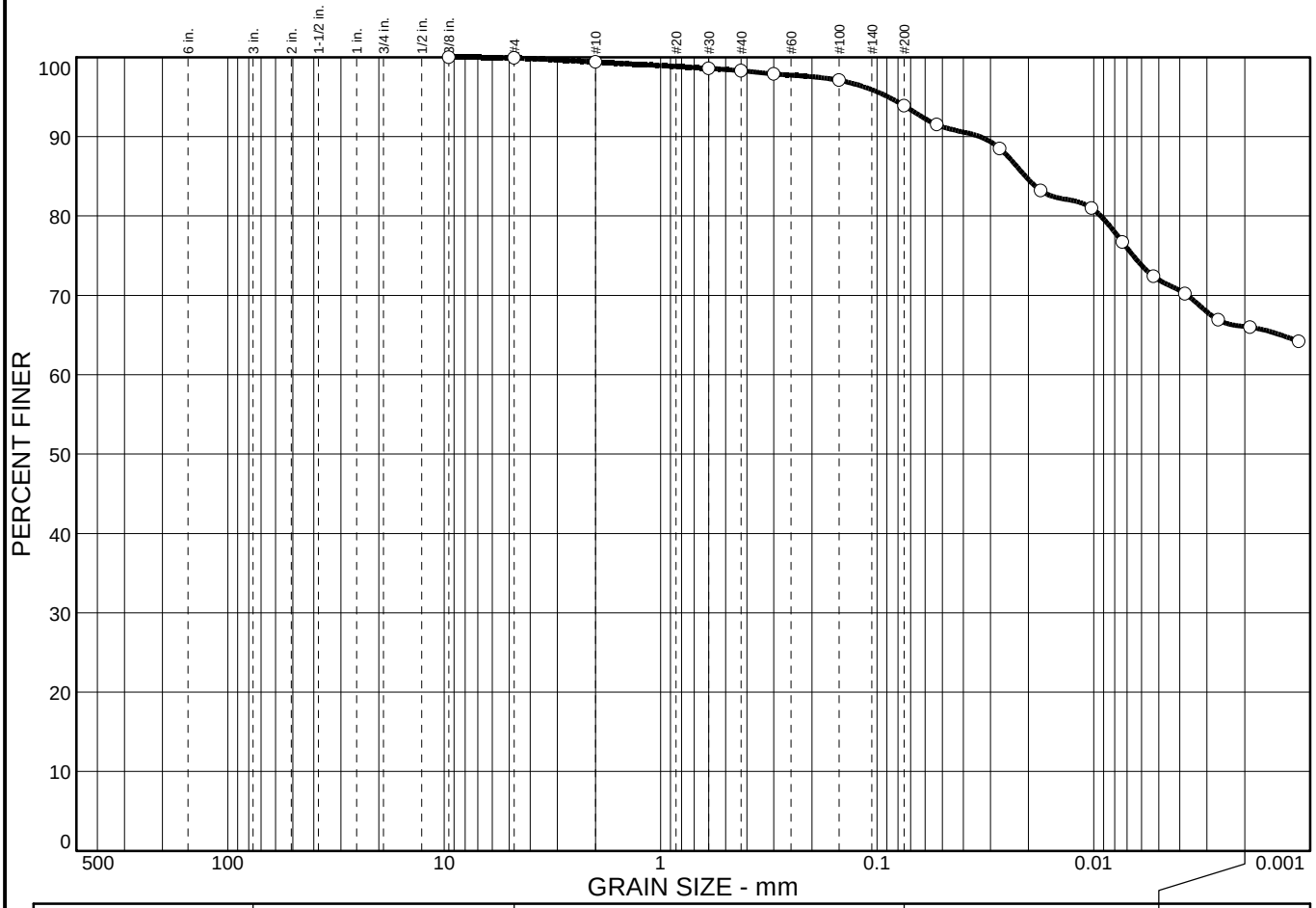
Client: Golder Associates

Project: Clayton Quarry - 1661332

Project No.: 287-244

Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	6.0	27.8	66.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	99.9		
#10	99.4		
#30	98.6		
#40	98.3		
#50	97.9		
#100	97.1		
#200	93.9		
#270	91.5		
0.0271 mm.	88.5		
0.0176 mm.	83.2		
0.0102 mm.	81.0		
0.0074 mm.	76.7		
0.0053 mm.	72.4		
0.0038 mm.	70.2		
0.0027 mm.	66.9		
0.0019 mm.	66.0		
0.0011 mm.	64.2		

* (no specification provided)

Soil Description

Dark Brown Fat CLAY

Atterberg Limits

PL= 23 LL= 73 PI= 50

Coefficients

D_{85}= 0.0207 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO=

Remarks

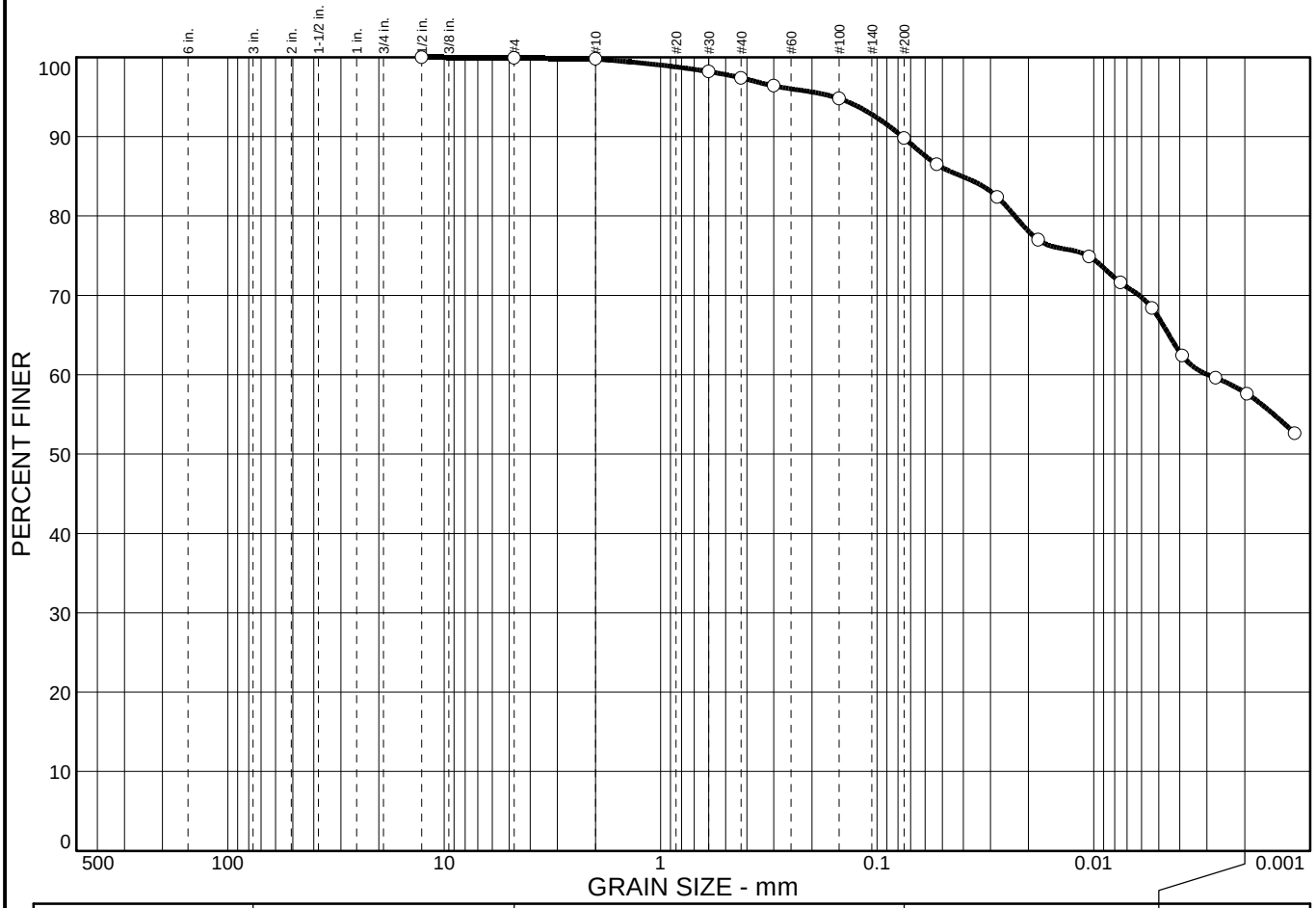
Sample No.: **Source of Sample:** GB-2 **Date:** 8/31/16
Location: **Elev./Depth:** 47.5-48'

COOPER TESTING LABORATORY

Client: Golder Associates
Project: Clayton Quarry - 1661332

Project No: 287-244 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	10.1	32.0	57.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
#4	99.9		
#10	99.8		
#30	98.2		
#40	97.4		
#50	96.4		
#100	94.8		
#200	89.8		
#270	86.5		
0.0279 mm.	82.4		
0.0180 mm.	77.0		
0.0105 mm.	74.9		
0.0075 mm.	71.6		
0.0054 mm.	68.4		
0.0039 mm.	62.4		
0.0027 mm.	59.6		
0.0020 mm.	57.6		
0.0012 mm.	52.6		

* (no specification provided)

Soil Description

Dark Greenish Gray Fat CLAY

Atterberg Limits

PL= 23 LL= 66 PI= 43

Coefficients

D_{85}= 0.0406 D_{60}= 0.0030 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO=

Remarks

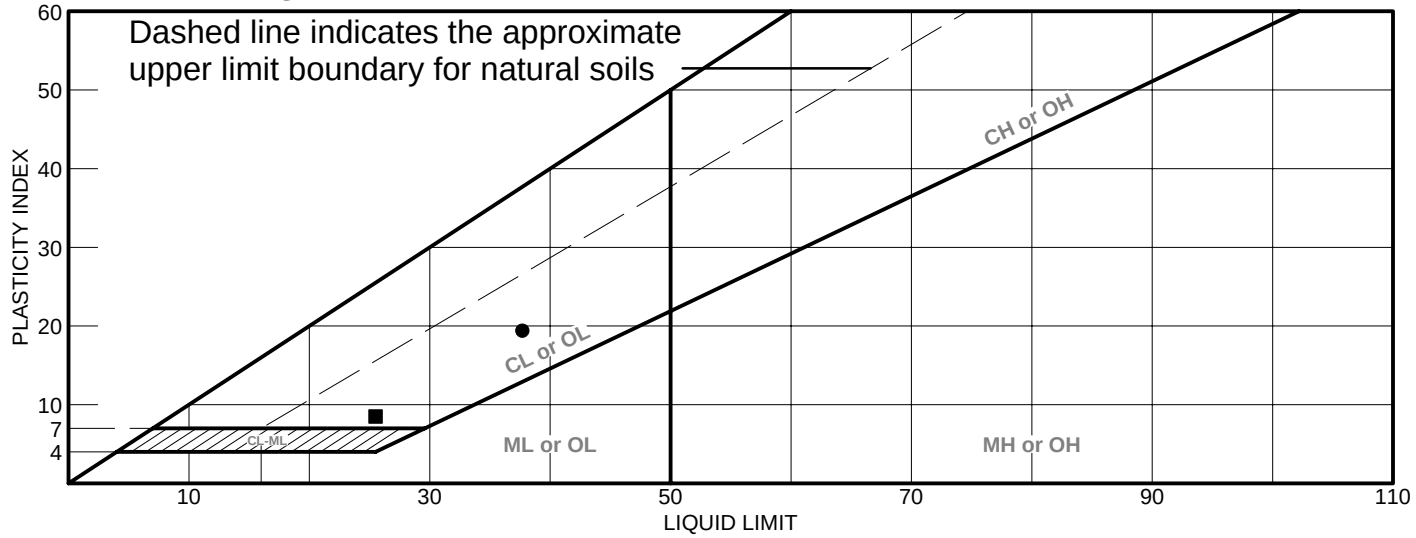
Sample No.: **Source of Sample:** GB-3 **Date:** 9/1/16
Location: **Elev./Depth:** 62.5-63'

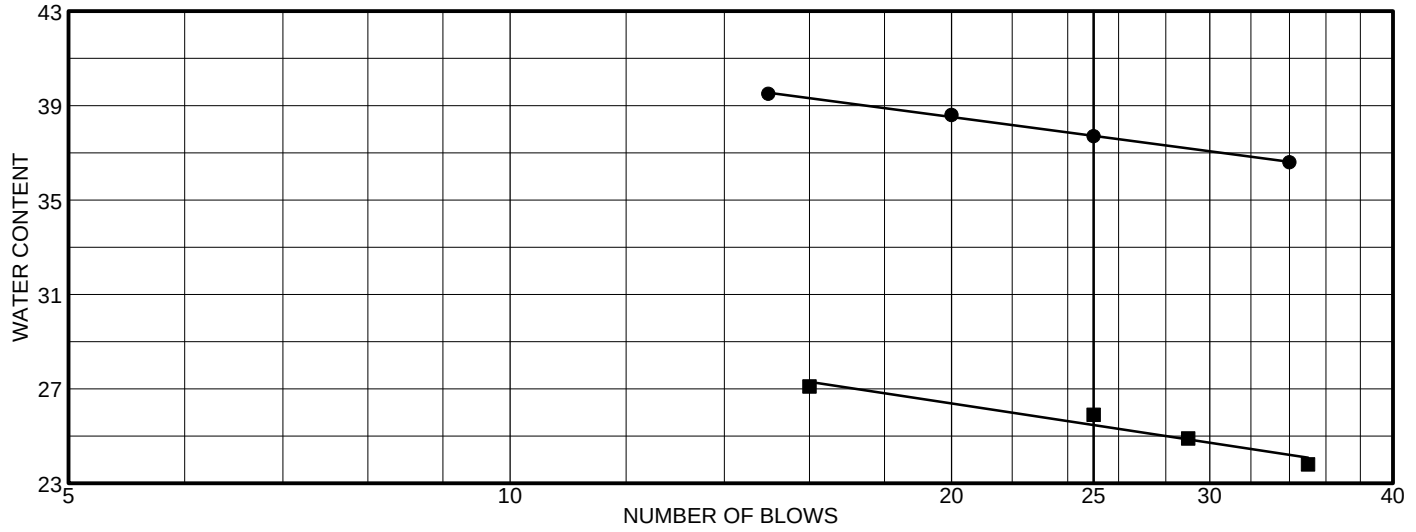
COOPER TESTING LABORATORY

Client: Golder Associates
Project: Clayton Quarry - 1661332

Project No: 287-244 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Yellowish Brown Lean Clayey SAND w/ Gravel	37.7	18.3	19.4	45.1	31.6	SC
■	Yellowish Brown Lean Clayey GRAVEL w/ Sand	25.5	17.0	8.5	24.0	14.9	GC

Project No. 287-147 **Client:** Golder Associates, Inc.

Project: Clayton Quarry Slope Evaluation - 113-01127

● **Source:** X19 **Elev./Depth:** Surface

■ **Source:** X20+21 **Sample No.:** Composite **Elev./Depth:** Surface

Remarks:

●

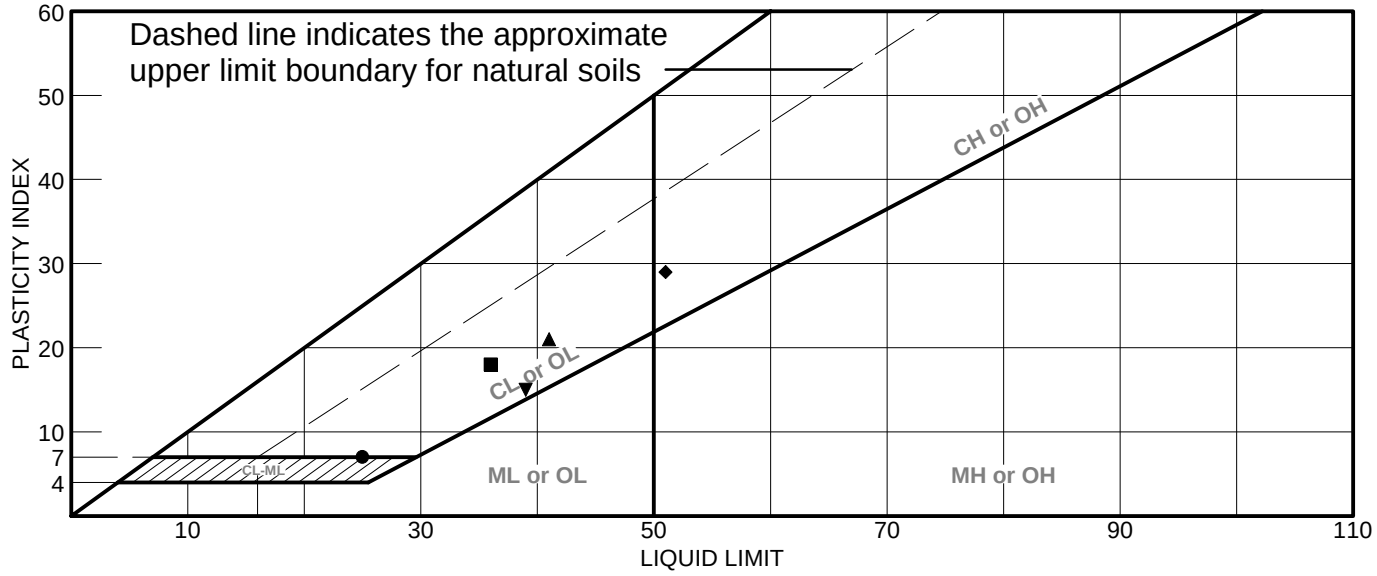
■

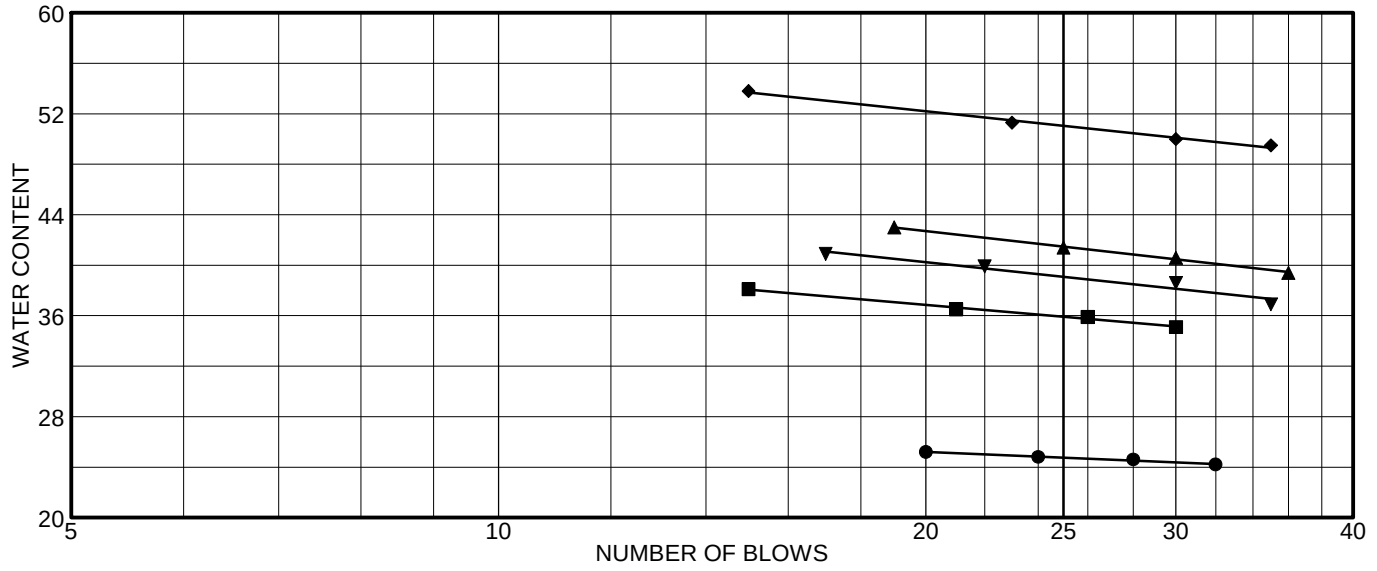
LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very Dark Gray Silty, Clayey SAND	25	18	7	59.2	28.8	SC-SM
■	Dark Yellowish Brown Lean Clayey SAND w/ Gravel	36	18	18	53.6	38.3	SC
▲	Dark Yellowish Brown Sandy Lean CLAY	41	20	21			
◆	Dark Yellowish Brown Sandy Fat CLAY/ Fat Clayey SAND w/ Gravel	51	22	29			
▼	Yellowish Brown Lean Clayey SAND	39	24	15			

Project No. 287-201 **Client:** Golder Associates

Project: Clayton Quarry - 1520962

● **Source:** B-1 **Elev./Depth:** 91.4-92'

■ **Source:** B-2 **Elev./Depth:** 5.5-6'

▲ **Source:** B-2 **Elev./Depth:** 10-11.5'

◆ **Source:** B-3 **Elev./Depth:** 5.5-6'

▼ **Source:** B-3 **Elev./Depth:** 10.5-11.5'

Remarks:

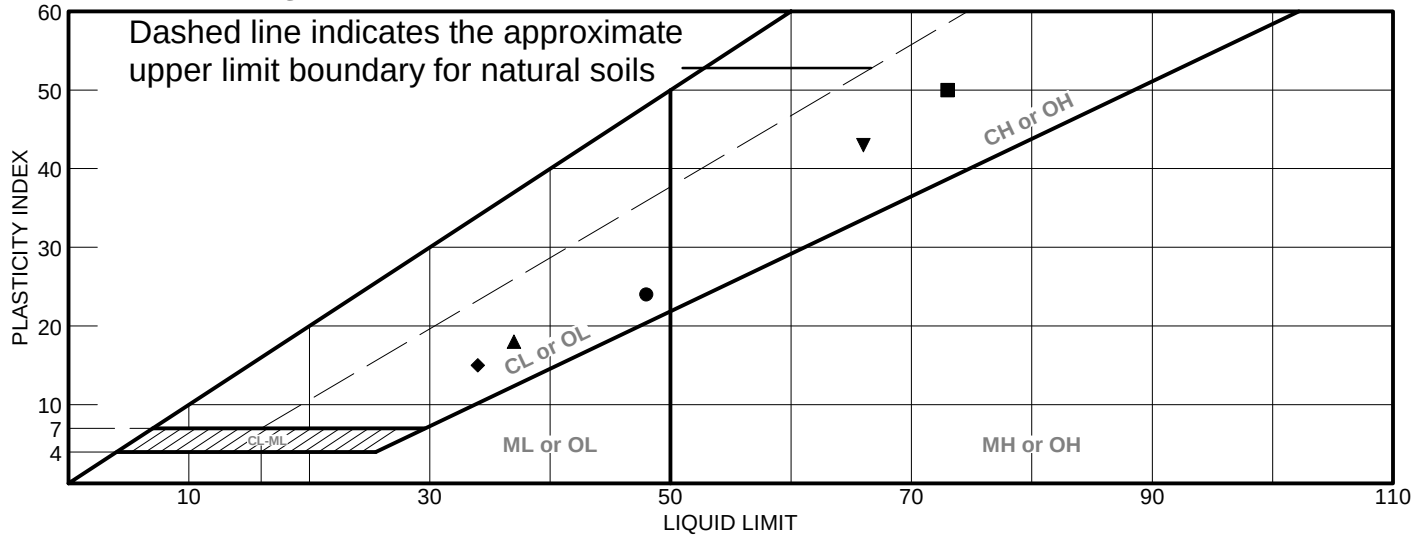
● ■ ▲ ◆ ▼

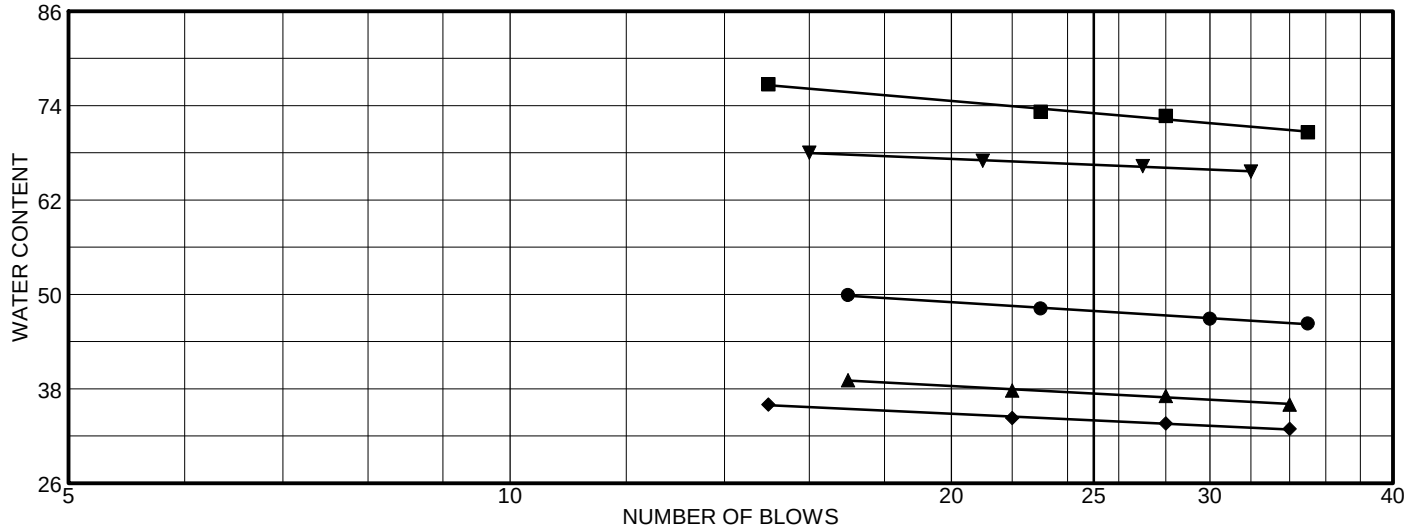
LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Sandy Lean CLAY	48	24	24	82.1	66.8	CL
■	Dark Brown Fat CLAY	73	23	50	98.3	93.9	CH
▲	Strong Brown Lean Clayey SAND	37	19	18	53.0	31.7	SC
◆	Strong Brown Lean Clayey SAND w/ Gravel	34	19	15	45.5	31.0	SC
▼	Dark Greenish Gray Fat CLAY	66	23	43	97.4	89.8	CH

Project No. 287-244 **Client:** Golder Associates

Project: Clayton Quarry - 1661332

●	**Source:** GB-1	**Elev./Depth:** 10-10.5'
■	**Source:** GB-2	**Elev./Depth:** 47.5-48'
▲	**Source:** GB-2	**Elev./Depth:** 57.5-58.0'
◆	**Source:** GB-3	**Elev./Depth:** 39.0-39.5'
▼	**Source:** GB-3	**Elev./Depth:** 62.5-63'

Remarks:

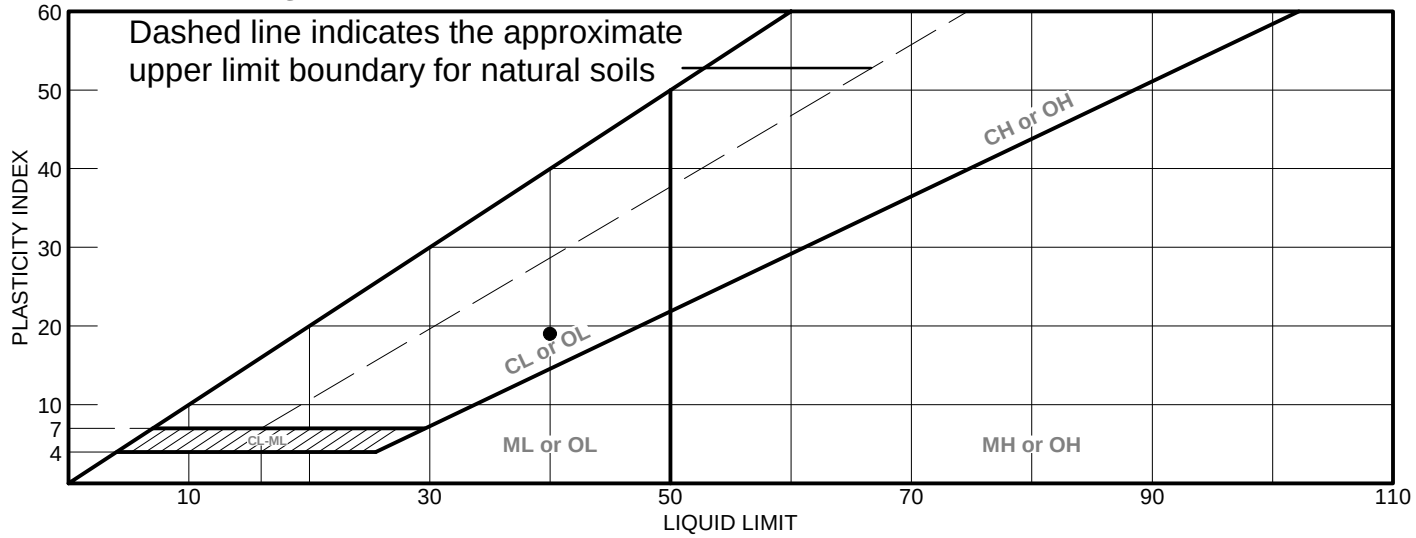
● ■ ▲ ◆ ▼

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Mottled Pale Brown Lean Clayey SAND w/ Claystone fragments	40	21	19	36.9	24.1	SC

Project No. 287-244 **Client:** Golder Associates

Project: Clayton Quarry - 1661332

● **Source:** GB-3 **Elev./Depth:** 64-64.5'

Remarks:

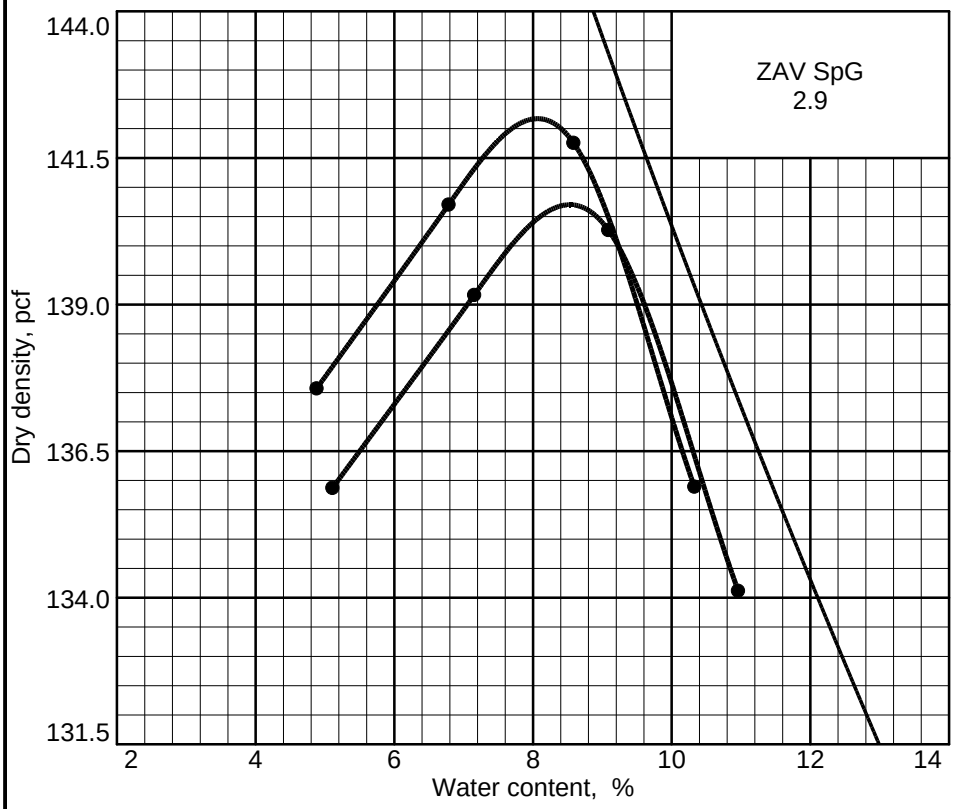
●

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-00 Method B Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** 2.7
LL _____ **PI** _____
%>3/8 in. 6.9 **%<#200** _____
USCS _____ **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	9.39	9.52	9.38	9.18		
WM	4.42	4.42	4.42	4.42		
WW + T #1	834.70	1027.20	978.70	842.80		
WD + T #1	798.60	968.70	914.30	817.30		
TARE #1	293.80	324.80	326.60	318.10		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.8	8.6	10.3	4.9		
DRY DENSITY	140.7	141.8	135.9	137.6		

ROCK CORRECTED TEST RESULTS	UNCORRECTED	Material Description
Maximum dry density = 142.2 pcf	140.7 pcf	Yellowish Brown Lean Clayey GRAVEL w/ Sand
Optimum moisture = 8.1 %	8.5 %	

Project No. 287-147 **Client:** Golder Associates, Inc.
Project: Clayton Quarry Slope Evaluation - 113-01127

● **Source:** X20+21 **Sample No.:** Composite **Elev./Depth:** Surface

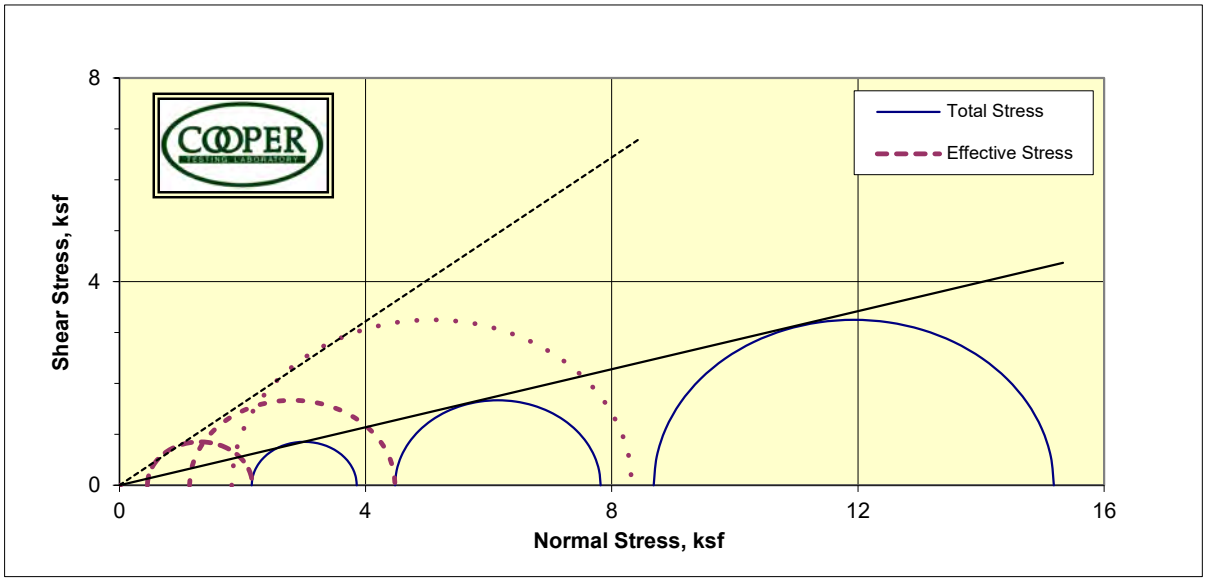
COMPACTION TEST REPORT

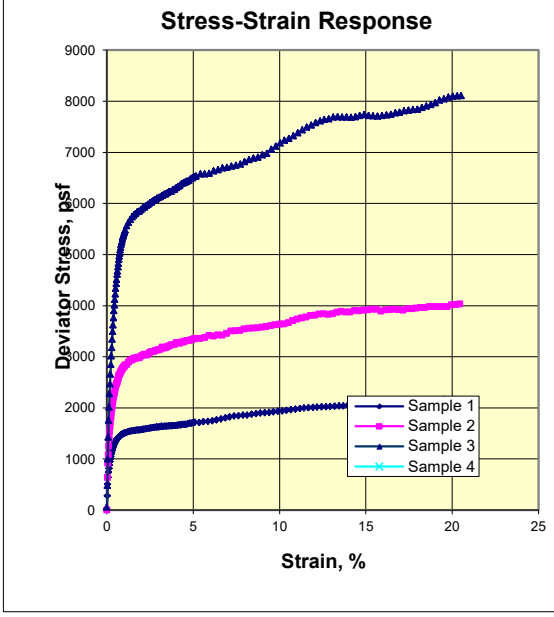
COOPER TESTING LABORATORY

Remarks:
Material scalped on the 1/2" sieve.

Figure

Triaxial Consolidated Undrained with Pore Pressure
ASTM D4767





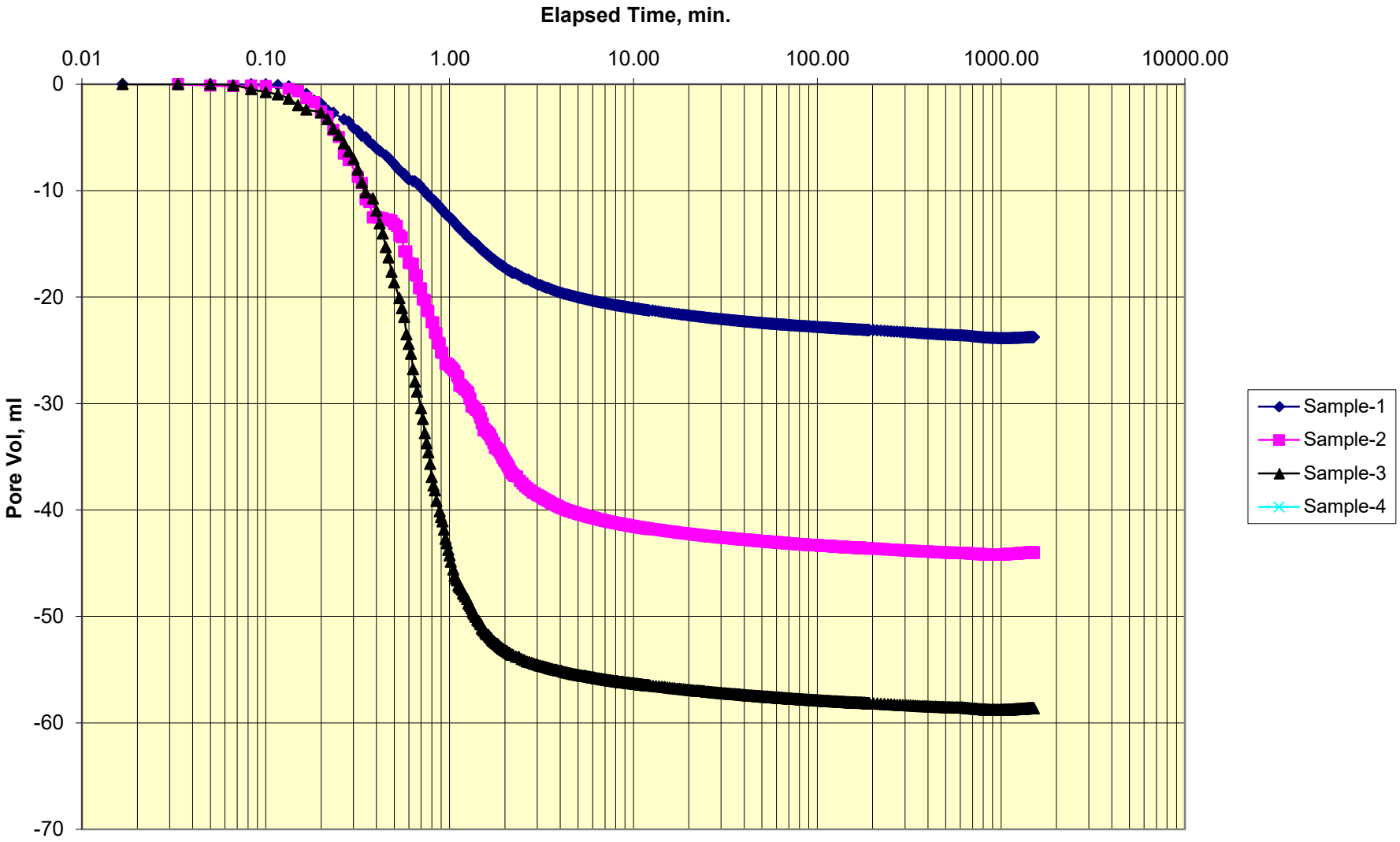
Sample:	1	2	3	4
MC, %	6.3	6.0	6.4	
DD, pcf	120.7	121.0	120.5	
Sat. %	42.8	41.4	43.7	
Void Ratio	0.396	0.393	0.399	
Diameter in	2.86	2.86	2.86	
Height, in	6.00	6.00	6.00	
	Final			
MC, %	13.1	11.1	12.0	
DD, pcf	124.4	129.7	127.1	
Sat. %	100.0	100.0	100.0	
Void Ratio	0.354	0.299	0.325	
Diameter, in	2.84	2.79	2.82	
Height, in	5.92	5.87	5.85	
Cell, psi	104.9	120.1	149.9	
BP, psi	90.0	89.0	89.6	
	Effective Stresses At:			
Strain, %	5.0	5.0	5.0	
Deviator ksf	1.706	3.340	6.501	
Excess PP	1.695	3.339	6.856	
Sigma 1	2.161	4.479	8.326	
Sigma 3	0.455	1.139	1.825	
P, ksf	1.308	2.809	5.075	
Q, ksf	0.853	1.670	3.250	
Stress Ratio	4.753	3.931	4.562	
Rate in/min	0.0005	0.0005	0.0005	

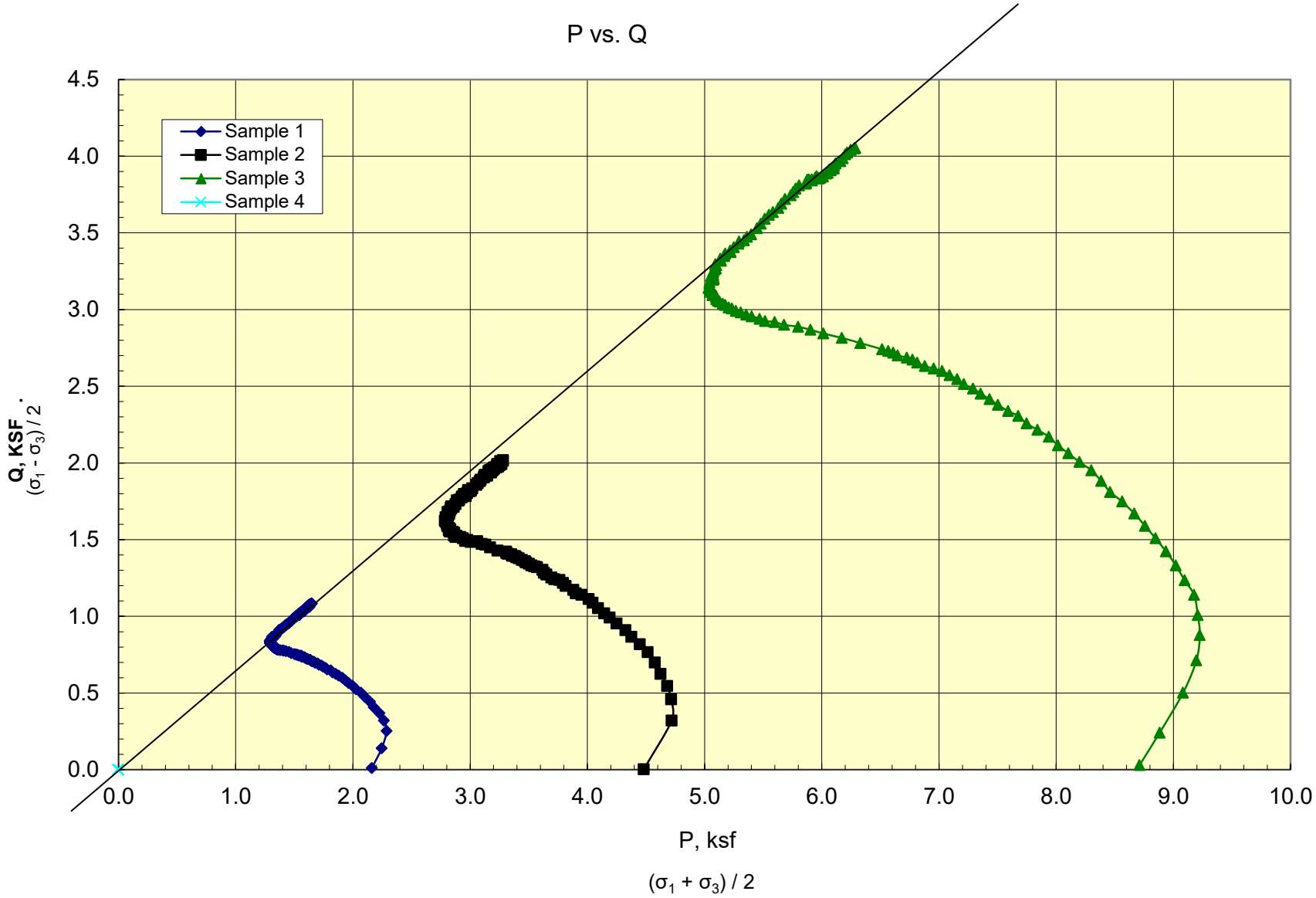
Total C	0.0	ksf
Total phi	15.9	degrees
Eff. C	0.0	ksf
Eff. Phi	38.8	degrees

Job No.:	287-147	Date: ########
Client:	Golder Associates	BY:DC
Project:	Clayton Quarry Slope Evaluation - 113-01127	
Sample 1)	X20+X21;Composite @ Surface	Yellowish Brown Lean Clayey GRAVEL w/ Sand
Sample 2)	X20+X21;Composite @ Surface	Yellowish Brown Lean Clayey GRAVEL w/ Sand
Sample 3)	X20+X21;Composite @ Surface	Yellowish Brown Lean Clayey GRAVEL w/ Sand
Sample 4)		

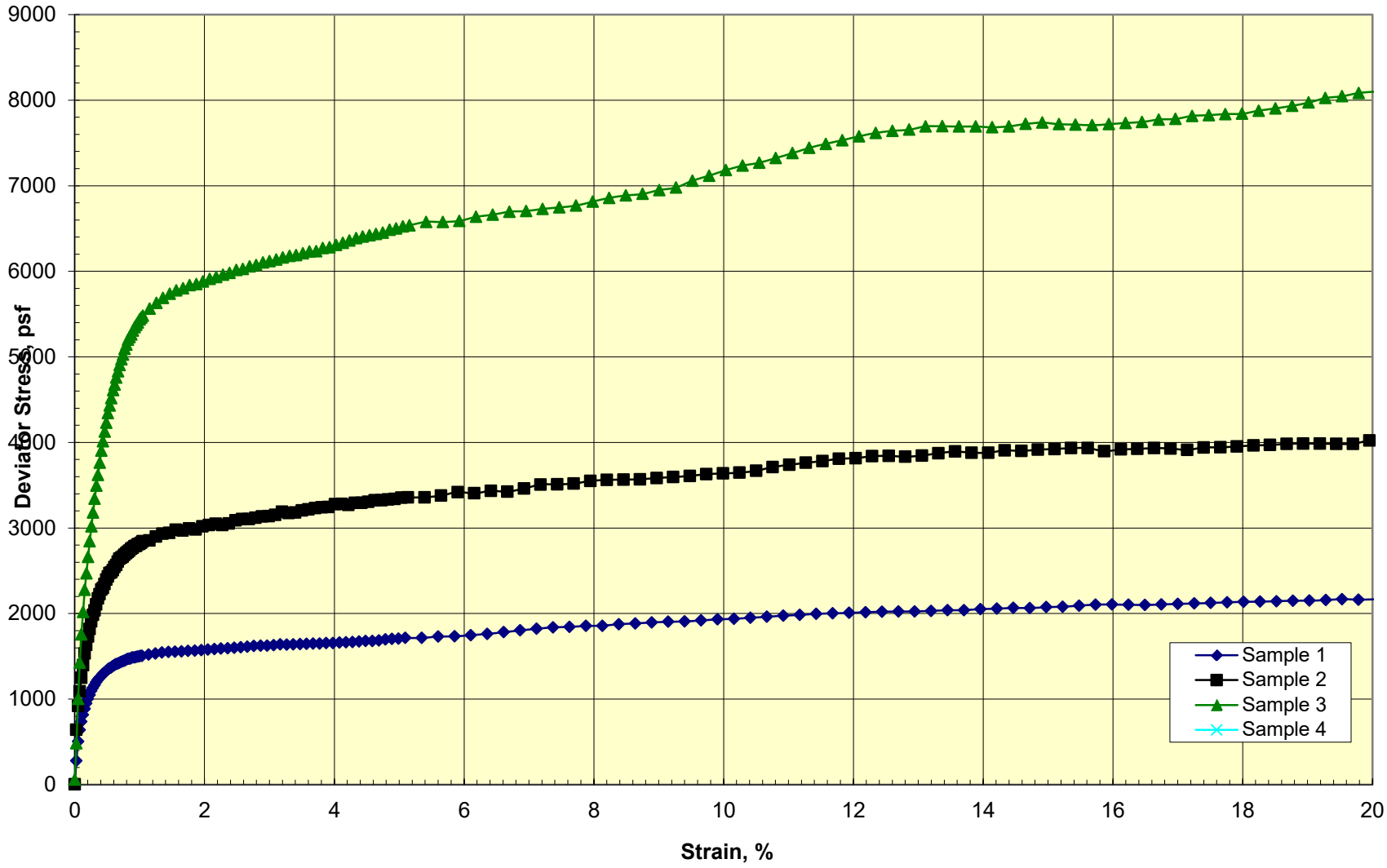
Remolded to 85% of 142.2 @ 5.7 (OPT-2.5%).

Consolidation Phase

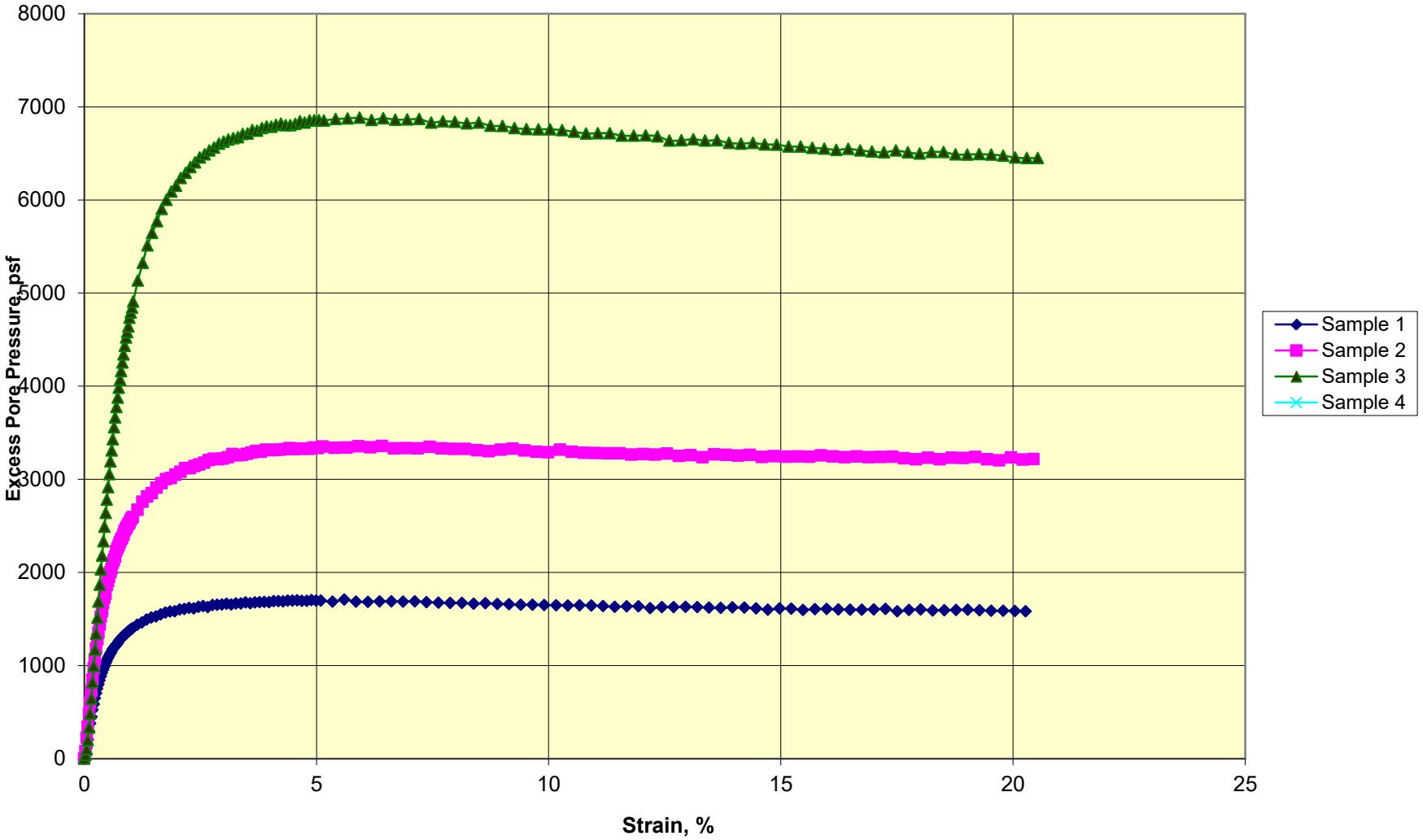


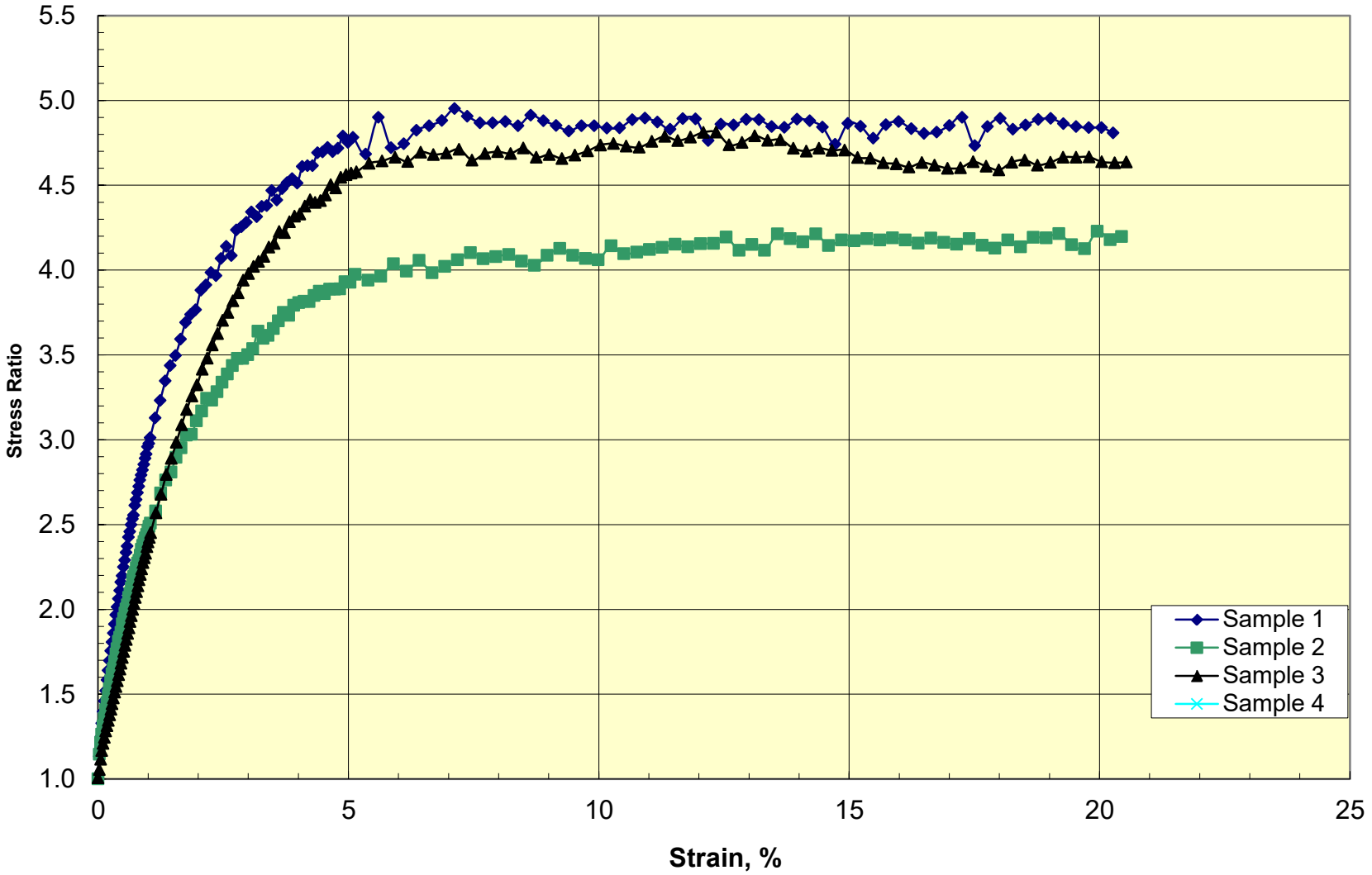

P vs. Q
Sample 1
Sample 2
Sample 3
Sample 4
Q, KSF
(σ1 - σ3) / 2
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
P, ksf
(σ1 + σ3) / 2

Stress-Strain Curves



Pore Pressure Response




Stress Ratio Sigma1/Sigma3
Stress Ratio
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0
5
10
15
20
25
Strain, %
Sample 1
Sample 2
Sample 3
Sample 4

Drained Residual Torsional Shear Strength (ASTM D6467)

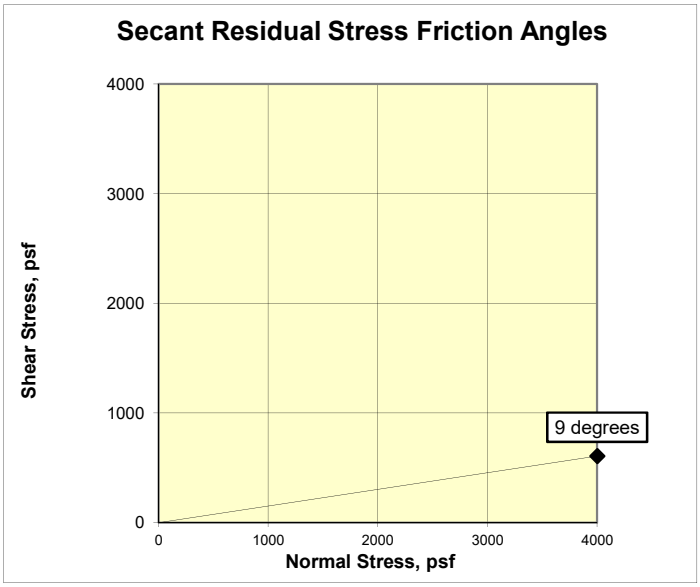
CTL Job No.:	287-244	**Boring:**	GB-2	**Date:**	9/1/2016	**Clay, %:**	66.1
Client:	Golder Associates	**Sample:**		**By:**	PJ	**LL:**	73
Project Name:	Clayton Quarry	**Depth (ft):**	47.5-48	**Checked:**	DC	**PL:**	23
Project Number:	1661332	**Test Type:**	Fully Softened Residual				

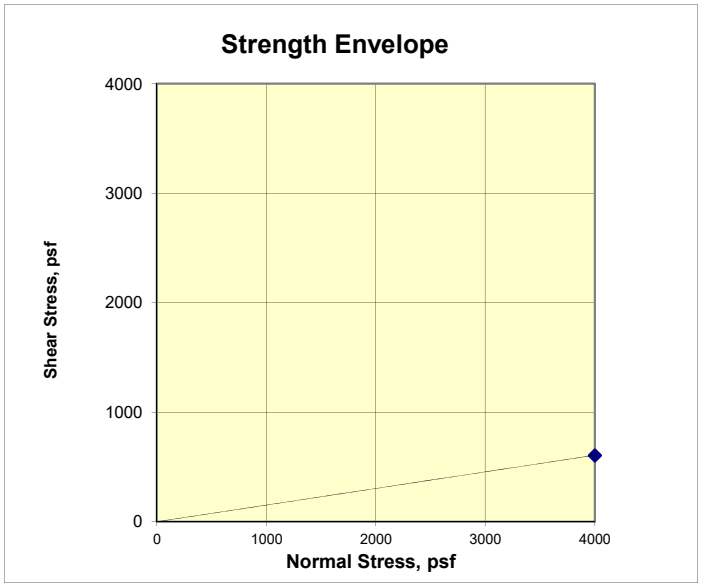
Soil Type: Dark Brown Fat CLAY

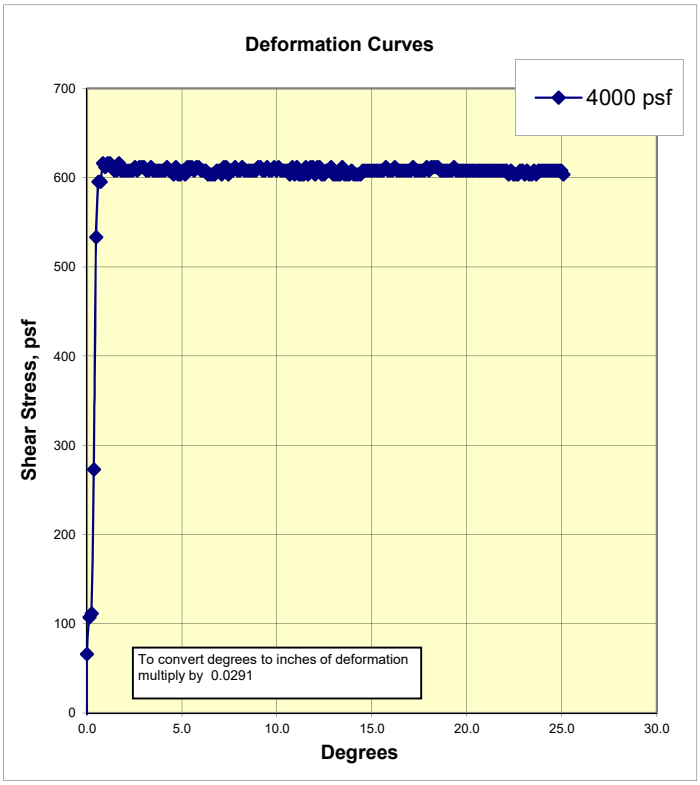
Normal Stress, psf: 4000

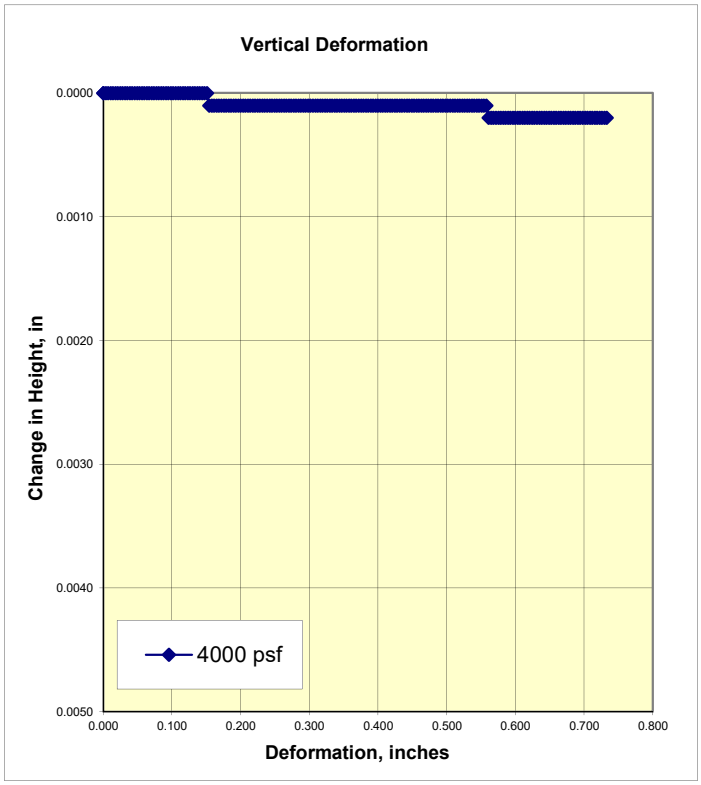
Secant Phi, deg.: 9

Remarks: A small friction correction was applied to the point.









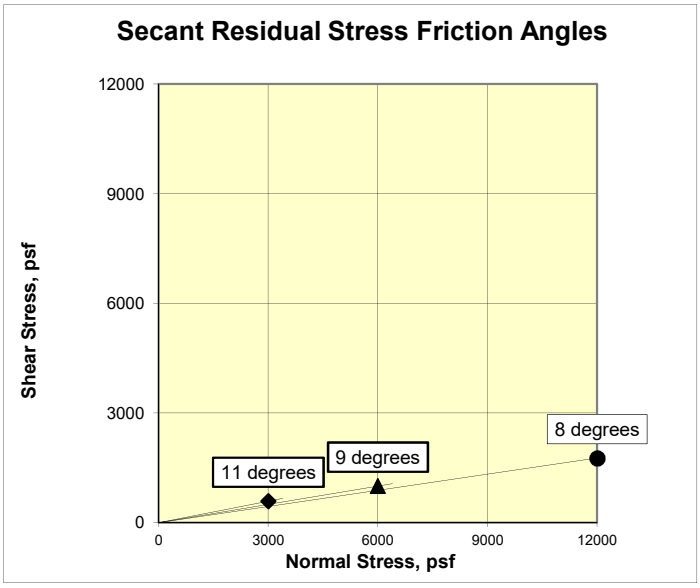
Drained Residual Torsional Shear Strength (ASTM D6467)

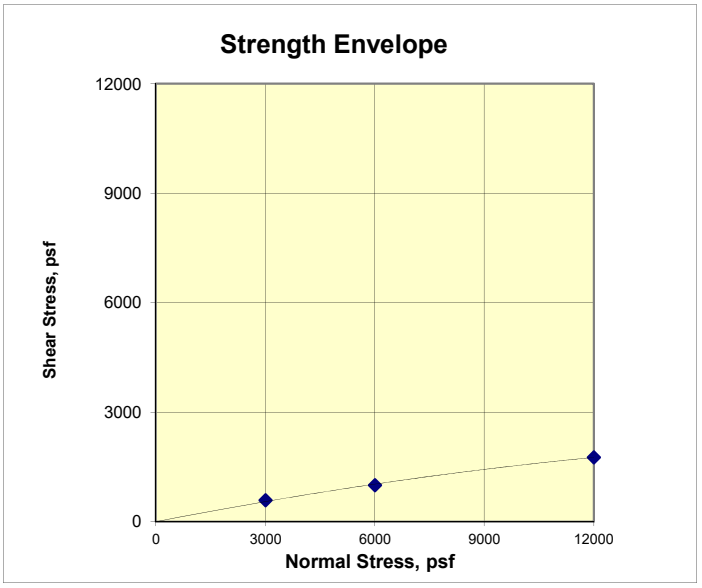
CTL Job No.:	287-244	**Boring:**	GB-3	**Date:**	9/12/2016	**Clay, %:**	
Client:	Golder Associates	**Sample:**		**By:**	PJ	**LL:**	66
Project Name:	Clayton Quarry	**Depth (ft):**	62.5-63	**Checked:**	DC	**PL:**	23
Project Number:	1661332	**Test Type:**	Fully Softened Residual				

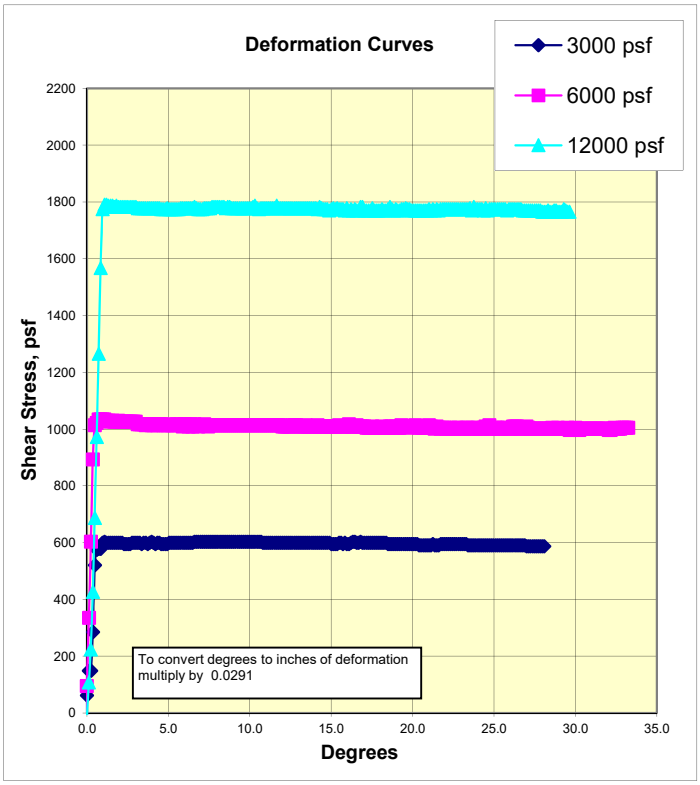
Soil Type: Dark Greenish Gray Fat CLAY

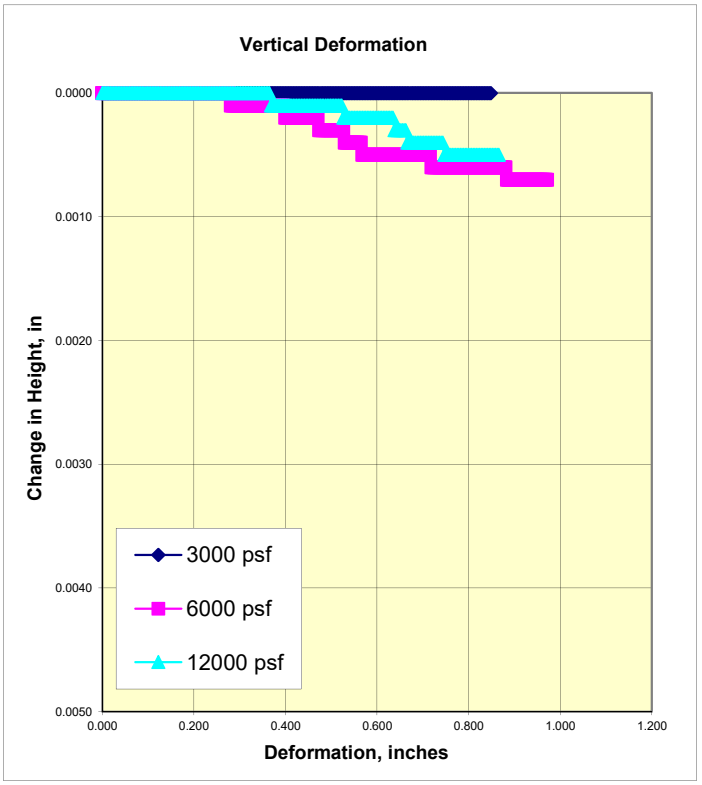
Normal Stress, psf:	3000	6000	12000
Secant Phi, deg.:	11	9	8

Remarks: A small friction correction was applied to each point.







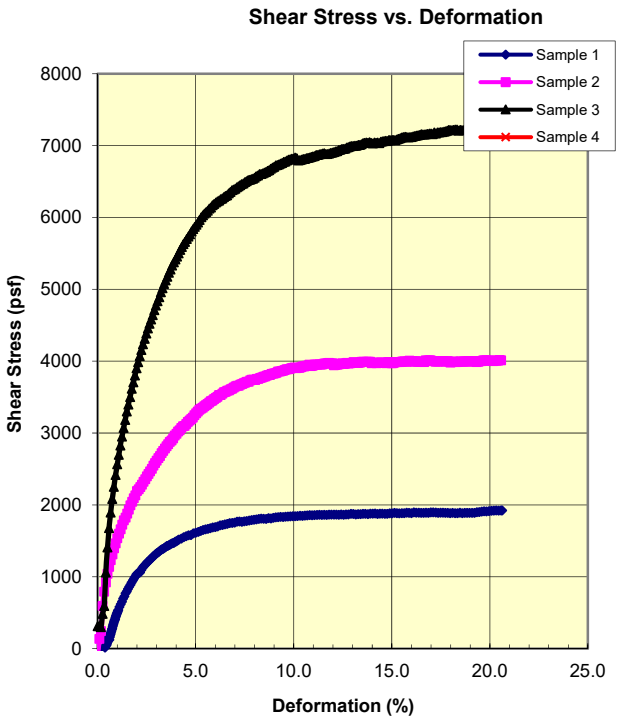


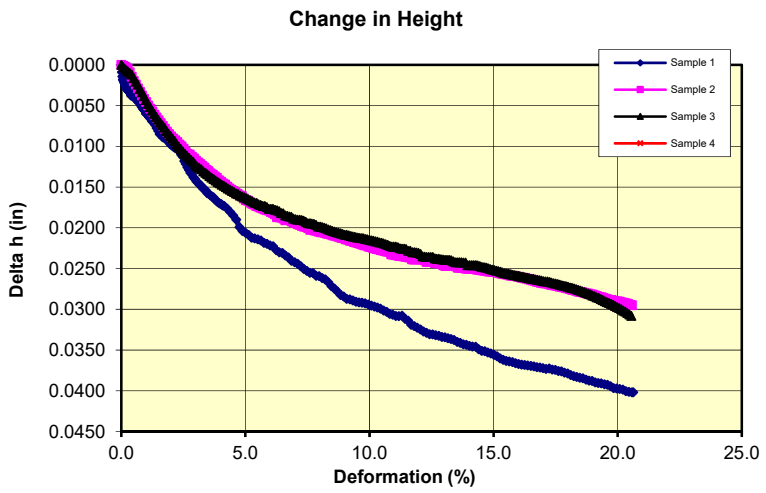
Consolidated Drained Direct Shear (ASTM D3080)

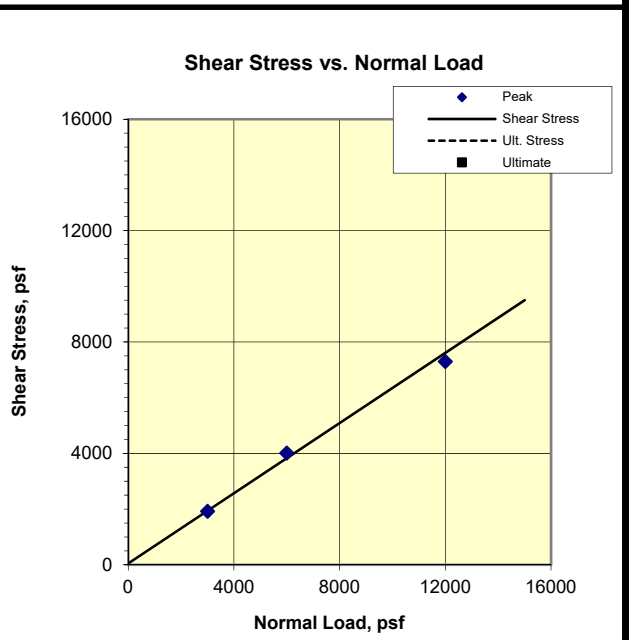
CTL Job #:	287-244	Project #:	1661332	By:	MD
Client:	Golder Associates	Date:	9/8/2016	Checked:	PJ
Project Name:	Clayton Quarry	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	GB-1	GB-1	GB-1	
Sample:				
Depth (ft):	10-10.5	10-10.5	10-10.5	
Visual Description:	Dark Brown Sandy Lean CLAY	Dark Brown Sandy Lean CLAY	Dark Brown Sandy Lean CLAY	
Normal Load (psf)	3000	6000	12000	
Dry Mass of Specimen (g)	118.2	118.3	121.1	
Initial Height (in)	0.99	1.00	1.00	
Initial Diameter (in)	2.42	2.42	2.42	
Initial Void Ratio	0.711	0.726	0.690	
Initial Moisture (%)	23.8	23.3	20.7	
Initial Wet Density (pcf)	122.0	120.4	120.4	
Initial Dry Density (pcf)	98.5	97.6	99.7	
Initial Saturation (%)	90.5	86.8	81.1	
ΔHeight Consol (in)	0.0266	0.0622	0.1008	
At Test Void Ratio	0.665	0.619	0.520	
At Test Moisture (%)	24.0	22.5	18.1	
At Test Wet Density (pcf)	125.6	127.6	131.0	
At Test Dry Density (pcf)	101.3	104.2	111.0	
At Test Saturation (%)	97.4	98.2	93.8	
Strain Rate (%/min)	0.004	0.004	0.004	
Strengths Picked at	Peak	Peak	Peak	
Shear Stress (psf)	1923	4016	7297	
ΔHeight (in) at Peak	0.0400	0.0295	0.0297	
Ultimate Stress (psf)				

Phi (deg)	32.2	Ult. Phi (deg)	
Cohesion (psf)	50	Ult. Cohesion (psf)	







Remarks: Due to small sample size the MD should be considered approximate.

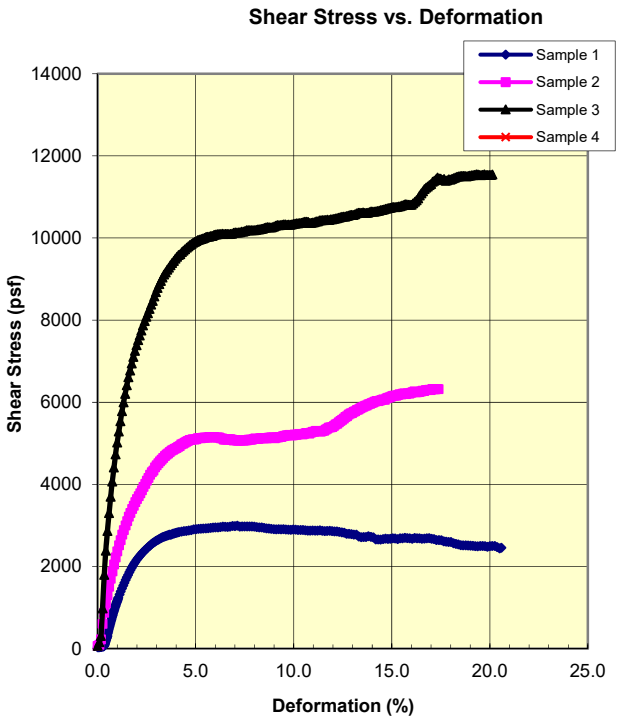
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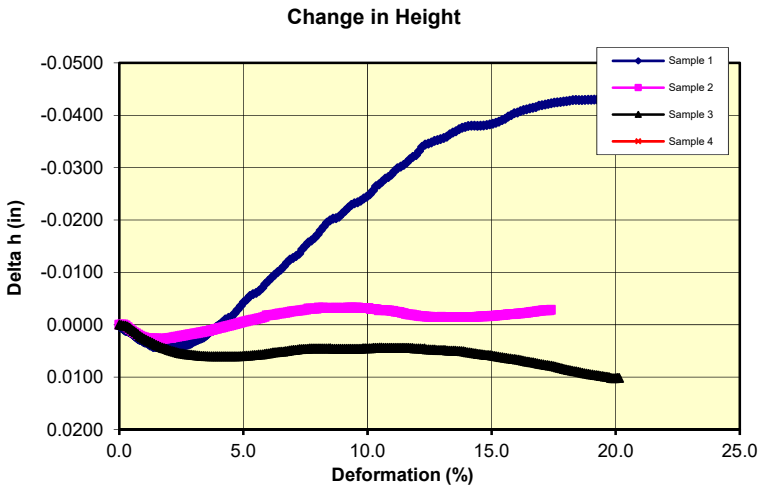
Consolidated Drained Direct Shear (ASTM D3080)

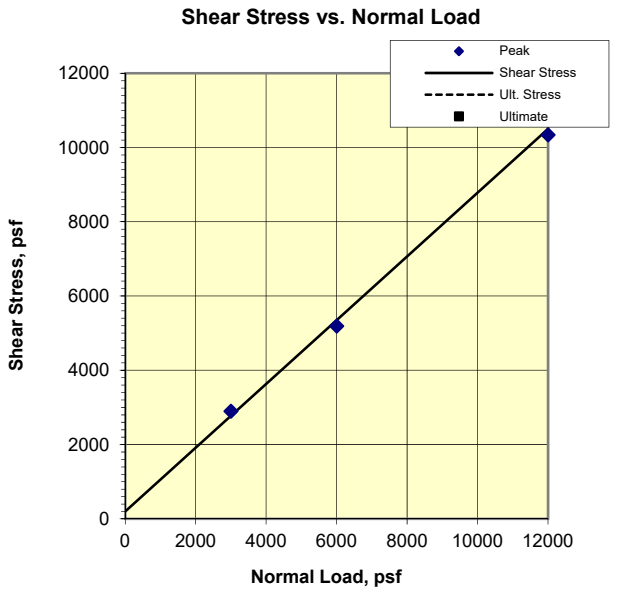
CTL Job #:	287-244	Project #:	1661332	By:	MD
Client:	Golder Associates	Date:	9/1/2016	Checked:	PJ
Project Name:	Clayton Quarry	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	GB-3	GB-3	GB-3	
Sample:				
Depth (ft):	64-64.5	64-64.5	64-64.5	
Visual Description:	Dark Brown Mottled Pale Brown Lean Clayey SAND w/ Claystone fragments	Dark Brown Mottled Pale Brown Lean Clayey SAND w/ Claystone fragments	Dark Brown Mottled Pale Brown Lean Clayey SAND w/ Claystone fragments	
Normal Load (psf)	3000	6000	12000	
Dry Mass of Specimen (g)	129.6	134.6	132.6	
Initial Height (in)	1.01	1.00	1.01	
Initial Diameter (in)	2.42	2.42	2.42	
Initial Void Ratio	0.649	0.576	0.609	
Initial Moisture (%)	19.2	15.8	17.5	
Initial Wet Density (pcf)	126.4	128.4	127.7	
Initial Dry Density (pcf)	106.0	110.9	108.6	
Initial Saturation (%)	83.0	76.9	80.6	
ΔHeight Consol (in)	0.0182	0.0299	0.0408	
At Test Void Ratio	0.619	0.529	0.544	
At Test Moisture (%)	21.7	17.7	18.3	
At Test Wet Density (pcf)	131.5	134.6	134.0	
At Test Dry Density (pcf)	108.0	114.4	113.3	
At Test Saturation (%)	98.2	93.5	94.1	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	10%	10%	10%	
Shear Stress (psf)	2899	5192	10338	
ΔHeight (in) at 10%	-0.0244	-0.0033	0.0045	
Ultimate Stress (psf)				

Phi (deg)	40.6	Ult. Phi (deg)	
Cohesion (psf)	200	Ult. Cohesion (psf)	







Remarks: Claystone fragment in or near shear plane on all 3 samples may influence results. Majot patching on all 3 samples dur to fragment.

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APPENDIX C

SEICHE ANALYSIS

TECHNICAL MEMORANDUM

Date:	March 11, 2016	**Project No.:**	1520962
To:	Bill Fowler	**Company:**	Golder Associates Inc.
From:	Kenneth J. Connell		
cc:	Phil Osborne Daley Clohan Enda Murphy	**Email:**	kconnell@golder.com

RE: GEOHAZARD ANALYSIS - SUBAERIAL LANDSLIDE GENERATED WAVE

Golder Associates Inc. (Golder) was contracted by CEMEX S.A.B. de C.V. (CEMEX) to perform a desktop analysis on the potential generation of a subaerial landslide generated wave (SLGW) due to a theoretical failure of the south highwall at Clayton Quarry and the potential consequences of a SLGW on wave run-up and overtopping of the spillway weir on the opposite side of the pit lake. This technical memorandum presents the results of Golder's desktop engineering study, and includes a summary of empirical methods derived from a review of the relevant literature, the inputs and assumptions applied to the analysis, the results obtained for SLGW generation, and conclusions on the potential for run-up and overtopping of the spillway weir resulting from a SLGW. The methodology employed as part of this desktop assessment and application of empirical models for the analysis of SLGW generation and consequences included the following:

- Review relevant science and engineering literature to determine appropriate analytical, empirical, and numerical approaches to estimating SLGW properties.
- Review characteristics of the sub-aerial pit-slope failure and topography of Clayton Quarry opposite the spillway weir to develop the basic dimensional parameters of a potential landslide scenario with wave generating potential.
- Use available empirical methods to estimate the characteristics of waves generated in the pit basin by the identified potential landslide scenario.
- Estimate wave run-up elevations and mean overtopping discharge rates at the spillway on the opposite side of the pit to the slope failure using empirical methods and calculation tools from the coastal engineering literature.
- Estimate the potential effects of a rock berm concept on mitigating mean overtopping discharges for the identified landslide scenario.

1.0 BACKGROUND ON SUBAERIAL LANDSLIDES AND WAVE GENERATION

Subaerial landslides are slope failures of an unstable rock or sediment mass on steep slopes that result in rocks or sediments cascading downslope until the falling mass reaches a stable position where down-slope movement ceases. In some cases a subaerial landslide may occur over a water body such as a lake or fjord with steep side slopes. Subaerial landslides occurring over water bodies have the potential to initiate a SLGW. A SLGW is an impulse wave that has the potential to travel long distances, trigger seiching of

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the water body, and transfer significant energy, which may result in high wave run-up on shorelines with the potential for overtopping discharges that could lead to flooding, infrastructure damage, loss of habitat, or human casualties (Panizzo et al. 2005). Figure 1 is a conceptual diagram of the four phases of SLGW generation (Panizzo et al. 2005):

1. Slope failure and initiation of landslide
2. Energy transfer and displacement volume transfer to water body
3. SLGW initiation, propagation, and transformation
4. SLGW interaction with shorelines, including run-up, overtopping, and reflection

During phase 1 the slope failure initiates and the rock mass accelerates downslope toward the water body. On near vertical slopes, this rock slide may take the form of a solid rigid mass falling directly to the water, but in most cases, where side slopes are not vertical, the rock mass is more likely to break up and slide as a mass of many rocks of variable sizes cascading downslope as an unconsolidated mass. As the rock slide reaches the water, the second phase (phase 2) results in displacement of water and transfer of energy to the body of water, which immediately initiates phase 3: SLGW generation. Phase 3 consists of the generation of the initial waves, the dispersion and propagation of the SLGWs (radiating longitudinally and directionally from the point of initiation), and the transformation of the SLGWs height, shape, and direction as the waves interact with bathymetric and topographic features (Panizzo et al. 2005). Phase 4 begins after the waves reach the shoreline or engineered structure (e.g., revetment, dam, weir, spillway, etc.) and begin to interact with the shoreline in the form of wave run-up and wave reflection. If wave run-up is greater than the minimum crest elevation of the shoreline constraint, wave overtopping will occur and water is discharged downstream during each wave crest that meets or exceeds the overtopping elevation. Wave reflection may also lead to additional complex wave-wave interaction and seiching within the body of water.

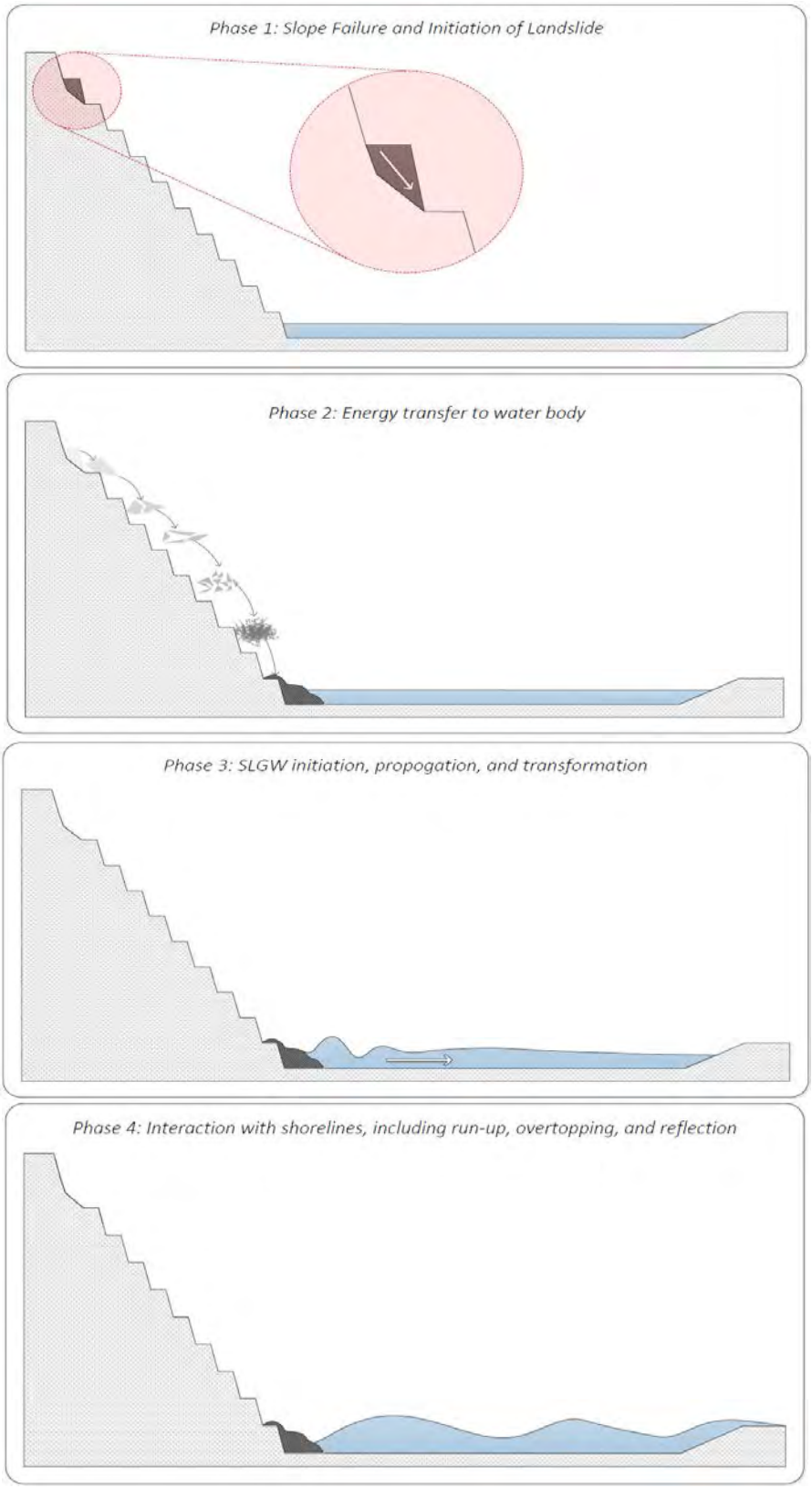


Figure 1. Principal phases of subaerial landslides and SLGWs

2.0 PIT-SLOPE LANDSLIDE PARAMETERS

A potential slope failure above the Clayton Quarry pit lake has the potential to cause a rock fall with sufficient mass and momentum to displace considerable volume of water and generate a SLGW. A zone of weathered diabase near the rim of the quarry on the southwest highwall opposite the lake spillway has been identified as having some potential for slope failure (Golder 2015a).

Following an investigation of the southwest pit-slope at Clayton Quarry, Golder's geotechnical team identified one potential, idealized landslide scenario with physical characteristics as presented in Table 1.

Table 1: Idealized Landslide Characteristics as Provided by Golder (2015b)

Characteristic	Value	Unit
Maximum Impact Length	10	[ft]
Maximum Impact Width	10	[ft]
Maximum Impact Thickness	8	[ft]
Approximate Volume	528	[ft3]
Approximate Mass[1]	43	[Tons]
Approximate Pit-slope Angle	54	[Degrees]
Latitude of Point of Initiation	37.9245 °N	[Decimal Degrees, North]
Longitude of Point of Initiation	121.9505 °W	[Decimal Degrees, West]
Vertical Point of Initiation at Toe of Slope Failure[2,3]	1280	[ft]
Assumed Still-water Elevation[2]	735	[ft]
Assumed Still-water Depth at Point of Impact[4]	85	[ft]
Assumed Velocity Range at Point of Impact[5]	110 – 120	[mph]

Notes:
1. Assumes mass density conversion of 2.2 tons/cubic yard
2. Vertical Datum referenced to National Geodetic Vertical Datum of 1929 (NGVD29)
3. Point of initiation assumed to be toe (lowest point) of slope failure
4. Assumes bed elevation at point of impact is on first bench at 650 ft NGVD29
5. Rock slide velocity range estimated following Wyllie (2015) eq. 3.13 with friction coefficients ranging from 0.15 to 0.35 (Table 3.1 of Wyllie 2015)

The idealized landslide physical characteristics provided in Table 1 are used as input values to the empirical methods described in Section 3.0. Each of the empirical methods requires specification of several dimensionless parameters as part of the physical characterization of the initiating landslide mass. These dimensionless parameters are presented in Table 2 and are calculated using the inputs listed in Table 1.

Table 2 also shows an alternative calculation of the impact speed as estimated by the method employed in Slingerland and Voight (1979). This impact speed falls within the middle of the range of impact speed presented in Table 1 (following Wyllie 2015). Wave height estimates calculated in Section 3.0 are not sensitive to the impact velocity within the range of 110 mph to 120 mph, and therefore Golder adopted the mean value of 115 mph for subsequent calculations.

Table 2: Calculated Slide Parameters from Idealized Landslide Inputs Provided in Table 1. These Parameters are Required for SLGW Calculation using Empirical Methods Described in Section 3.0.

Parameters	Value	Unit
Impact speed (Slingerland and Voight, 1979)	115	[mph]
Dimensionless Kinetic Energy (Slingerland and Voight, 1979)	0.012	dimensionless
Impact Froude Number (Heller and Hager, 2014)	3.24	dimensionless
Dimensionless Slide Mass (Heller and Hager, 2014)	0.019	dimensionless
Dimensionless Slide Volume (Ataie-Ashtiani and Nik-Khah, 2008)	0.007	dimensionless
Dimensionless 2D Slide Volume (Kamphuis and Bowering, 1970)	0.011	dimensionless

3.0 SUBAERIAL LANDSLIDE GENERATED WAVES

SLGWs are surface-gravity waves that are generated by a sudden disturbance or impulsive force in a body of water. As a landslide rapidly interacts with a body of water, a large volume of water is displaced, which then forms a large, fast-moving wave. The generated wave can then travel large distances with minimal attenuation until it collides with and runs-up a shoreline (Clohan, 2015). This phenomenon is complex and often difficult to predict or evaluate. However, the waves generated by subaerial landslides at the point of impact, as well as their propagation and transformation in the receiving body of water, can be approximated using a variety of simplified analytical and/or empirical models. It should be noted that the simplified empirical method of analysis employed here does not address the likelihood of such an occurrence nor does it address effects from discharge due to multiple waves (seiching effects), refraction due to bathymetry of the pit bottom, or non-linear effects due to wave-to-wave interactions. Including the effects of seiching, refraction and non-linear wave interactions requires the application of a two- or three- dimensional numerical model. Details regarding the approach to wave generation, propagation, and potential run-up calculations are discussed in the following sections.

3.1 Wave Generation

3.1.1 Background Information

A variety of empirical models have been developed for the prediction of the maximum wave height and associated period generated by a subaerial landslide impacting a body of water. This section provides a brief review of empirical models for SLGW prediction to evaluate their validity in the context of a slope failure above Clayton Quarry pit-lake. Many of the empirical methods are valid within a specific slide Froude number (Fr) range. The most relevant empirical models are as follows:

- Noda (1970)
- Kamphuis and Bowering (1970)
- Slingerland and Voight (1982)
- Huber and Hager (1997)

- Panizzo et al. (2005)
- Ataie-Ashtiani and Nik-Khah (2008)
- Heller and Hager (2014)
- Heller and Spinneken (2015)

Noda (1970) conducted experiments with a numerical model using large slides with Fr > 3. The linear wave theory in this model implemented with a vertically penetrating piston wave generating source was later determined to underestimate wave heights by about 20% due to over-estimating the trailing wave trough (Fritz et al. 2009). Noda (1970) also included a theoretical solution for a horizontally penetrating wave generating source. This solution was determined to overestimate wave crests by a factor of three (Fritz et al. 2009).

Kamphuis and Bowering (1970) developed an empirical method based on a limited set of laboratory cases. The dimensionless two-dimensional (2-D) slide volume parameter, *q*, must be between 0.1 and 10 (i.e., 0.1 < q < 10) (Kamphuis and Bowering 1970). According to Ataie-Ashtiani and Malek Mohammadi (2007), the Kamphuis and Bowering (1970) equation is better for slow and small landslides with Fr <0.5.

Slingerland and Voight's (1982) empirical method was developed for Fr > 1, for large volume landslides, and dimensionless kinetic energy (KE) of the landslide must be between 1 and 100 (i.e.,1 < KE < 100). This method was later found to overestimate wave heights by a factor of two (Fritz et al. 2009).

Huber and Hager (1997) developed an empirical method for estimating impulse waves in reservoirs. According to Ataie-Ashtiani and Malek Mohammadi (2007) this equation is not suitable for cases where volume dominates with respect to other parameters (i.e., it is not suitable for very large slides) and was developed for Fr < 0.5. The formula doesn't contain impact velocity which has been considered controversial – though it does include slope. The slide thickness data used in this paper were thinner than other studies (Fritz et al., 2004). The receiving water body must also be five times longer than it is deep (Huber &and Hager, 1997). Panizzo et al. (2005) found that the Huber and Hager (1997) formula overestimated observed experimental values by a factor of 2 to 3 times.

Panizzo et al. (2005) developed a method of forecasting impulse waves generated by subaerial landslides. This equation was based on broad range of empirical data and dimensional analysis and also includes consideration of underwater slide time and velocity as well as the angle of propagation from the point of impact (radial effects). Mohammad and Fritz (2012) found this method underestimates wave heights by a factor of two.

Ataie-Ashtiani and Nik-Khah (2008) developed a method for estimating impulsive waves caused by subaerial landslides that is valid for Fr<1.5. This method also requires that an estimate of underwater travel time of slide is known.

Heller and Hager (2014) developed a universal parameter to predict subaerial landslide waves. This method is valid for 0.86 < Fr < 6.83, 0.09 < Slope Angle < 1.64, and impulse product parameter, P between 0.17 and 8.13 (i.e., 0.17 < P < 8.13). This method has a wide range of applicability.

Heller and Spinneken (2015) evaluated the effect of the water body geometry on landslide–tsunamis to develop physical insight from laboratory tests and 2D to 3D wave parameter transformation. The method developed by Heller and Spinneken (2015) requires the slide dimensionless mass (M) to be 0.25 < M < 2.49 (Heller and Spinneken, 2015).

Of these models, the most relevant to the Clayton Quarry is Heller and Hager's (2014) "universal" impact parameter. The Fr values and other parameters assumed for the Clayton Quarry case fall outside the ranges that would make any of the other empirical methods valid. Heller and Hager's (2014) method was selected for the wave generation calculations in this application. This is considered a conservative estimate since this method estimates maximum generated wave height.

3.1.2 Maximum Generated Wave Height

Using the equations presented in Heller and Hager (2014) and the inputs listed in Tables 1 and 2, Golder estimated the maximum generated wave height to be approximately 9 ft. A sensitivity analysis of the governing parameters (Table 3) yields a potential maximum SLGW wave envelope of approximately 7 ft to 10 ft. Table 3 also shows that wave parameters predicted by Heller and Hager's (2014) empirical model are most sensitive to variation in the still-water depth and the maximum impact slide thickness. Because the still-water depth is controlled by water volume, the primary contributing source of uncertainty in this calculation is the maximum slide thickness. Golder conducted sensitivity tests to evaluate the effects of variations of each of the parameters listed in Table 3 within a range of +/- 25% on calculated maximum wave heights. The range of +/- 25% of the maximum impact slide thickness translates to a thickness of 6 ft to 10 ft and results in maximum wave heights in the range 7 ft to 10 ft. The more conservative 10 ft maximum wave height was used for application to the overtopping assessment for an additional factor of safety.

Table 3: Landslide Generated Wave Sensitivity Analysis

	Maximum Generated Wave Height			
	-25% of Initial Parameter		**+25% of Initial Parameter**	
Parameter	**[ft]**	**[%]**	**[ft]**	**[%]**
Maximum Impact Thickness of Slide	7	-20	10	18
Pit-slope Angle	9	1	8	-8
Still-water Depth	10	15	8	-10
Mass of Slide	8	-5	9	7

4.0 POTENTIAL WAVE RUN-UP AND OVERTOPPING

4.1 Wave Run-up Background

The fourth phase (phase 4) of SLGW processes is the interaction of the wave(s) with the boundaries or shorelines and shore structures of the water body. The Clayton Quarry is a pit-lake and therefore surrounded by relatively steep sides. A spillway with a proposed weir structure located along the east shoreline of the quarry is the lowest rim elevation of the quarry. This section was therefore selected as the point at which potential wave run-up is to be analyzed to evaluate the potential for wave overtopping from a SLGW. Wave run-up on a shoreline, spillway, or other engineered shoreline structure is defined as the maximum height above still-water level that the wave runs up when a wave impacts the structure. Figure 2 shows a definition sketch of wave run-up on a structure. In this figure H_i is the wave height, d_t is the depth at the toe of the structure, h_s is the crest height of the structure, and R is the wave run-up height.

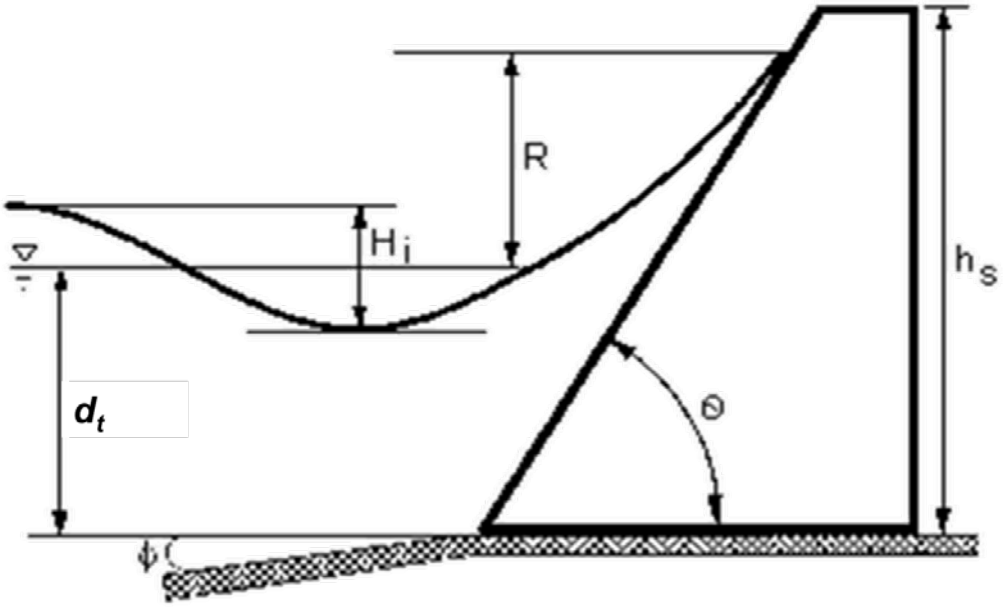


Figure 2. Wave Run-up Definition Sketch (Leenknecht et al. 1992).

SLGWs generally would be expected to generate a series of waves, or a wave train, rather than a single solitary wave. The wave train would be similar in concept to dropping a pebble in a puddle, which results in a series of waves propagating radially outward from the source point (where the pebble enters the water) to the boundaries of the puddle or water body. A series of waves will have a period (inverse of the frequency) associated with the time it takes for each wave crest to pass a fixed point in space.

Several empirical methods for estimating wave run-up were reviewed, including solitary wave run-up theory and random wave exceedance-based run-up theory. The solitary wave run-up methods reviewed included: Li and Raichlen (2001), Hughes (2004), Carrier et al. (2003), Kanoglu and Synolakis (1998), and Synolakis

(1986). Because these methods are for a single solitary wave and they resulted in significant range of variability of results, they were deemed inappropriate for application to this quarry SLGW case. Two different empirical methods based on random wave exceedance-based run-up theory were initially considered for the run-up analysis: Hughes (2005) and EurOtop (2007). The two methods use a 2% criterion based on random wave experiment for estimation of the run-up exceeded by no more than 2% of the waves at the toe of the slope, R2%. However, the EurOtop (2007) method was selected because it was developed to consider the effects of the pit-slope benches and variable slopes along the profile, while Hughes (2005) was developed for applications along a single slope profile with no berms or benches.

4.2 Wave Run-up Estimates

Inputs to the run-up methods include wave height, wave period, rubble mound run-up structure slope, and depth at toe of structure. Wave height is provided directly from the analysis conducted in Section 3.1.2. Depth was assumed to be the same depth as the still-water depth at point of impact (85 ft as shown in Table 1). Maximum wave period was calculated following Heller and Hager (2010; 2014). Five cases were selected to evaluate sensitivity to rubble mound structure slope (i.e. a ratio of vertical rise, V to horizontal run, H). Three different rubble mound structure slopes were evaluated for run-up sensitivity to rubble mound structure slopes, including V:H = 1:1.5, V:H = 1:2, and V:H = 1:4.

The conditions for prediction of the R2% are summarized in Table 4. The EurOtop (2007) method employs a roughness factor (γ_f) to account for influence of roughness elements along the run-up slope. A perfectly smooth slope has a roughness factor of $\gamma_f = 1$ (unity) and the factor is reduced as slope roughness increases. The rubble mound slope is understood to be composed of locally sourced rocks. For this assessment, the roughness factor was set to $\gamma_f = 0.55$ to represent a two-layer impermeable rock rubble mound surface (EurOtop 2007). This two-layer impermeable rock rubble mound surface is considered conservative since the rubble mound core rock constructed at this site would likely be permeable and would increase the frictional effects of the run-up and overtopping. The roughness factor for a two-layer rock rubble mound armored slope with a permeable core would reduce to $\gamma_f = 0.4$, and a maximum R2% would be limited to R2% = 1.97(H), where H is the wave height (EurOtop 2007). The berm factor (γ_b) is a coefficient that incorporates the influence of the berm on the profile. This ranges from $\gamma_b = 1$ for no berm to $\gamma_b = 0.6$ for the maximum berm influence (EurOtop 2007). Given the dimensions of the berm on these conceptual profiles (refer to Table 5), the profiles resulted in a $\gamma_b = 0.6$ following the methodology outlined in EurOtop (2007). For the purposes of this study, the angle of wave attack is assumed to be perpendicular and, therefore, the factor influencing wave attack (γ_β) is $\gamma_\beta = 1$.

Table 4 shows that under the wave conditions and structure parameters supplied as inputs for these run-up cases, the run-up increases as wave height, period, and structure slope increases. The highest run-up was calculated for a structure slope of V:H = 1:1.5. Although a detailed design is needed to evaluate stability

of the profile slope, coastal engineering judgment based on experience with large waves suggests that slopes less steep than V:H = 1:2 should be considered in this case.

Table 4: Wave Run-up Sensitivity Analysis

Description	Wave Height, H [ft]	Wave Period[1], T_{max} [sec]	Slope [V:H]	Depth, d [ft]	Berm Factor, γ_b [-]	Roughness Factor, γ_f [-]	Wave Angle Factor, γ_β [-]	R2%[2] [ft]
H = 7 ft; Slope = 1:1.5	7	7	1:1.5	85	0.6	0.55	1	10
H = 9 ft; Slope = 1:1.5	9	8	1:1.5	85	0.6	0.55	1	13
H = 10 ft; Slope = 1:1.5	10	9	1:1.5	85	0.6	0.55	1	14
H = 7 ft; Slope = 1:2	7	7	1:2	85	0.6	0.55	1	9
H = 9 ft; Slope = 1:2	9	8	1:2	85	0.6	0.55	1	11
H = 10 ft; Slope = 1:2	10	9	1:2	85	0.6	0.55	1	13
H = 7 ft; Slope = 1:4	7	7	1:4	85	0.6	0.55	1	6
H = 9 ft; Slope = 1:4	9	8	1:4	85	0.6	0.55	1	8
H = 10 ft; Slope = 1:4	10	9	1:4	85	0.6	0.55	1	9

Notes: 1. Assumes calculated T_{max} following Heller and Hager (2010; 2014)
2. Following Equation 6.2 of EurOtop (2007)

4.3 Wave Overtopping Criteria

Wave overtopping is the volumetric rate of discharged water that flows over the landward side of a structure crest when the limit of wave run-up exceeds the structure crest height. Overtopping discharge can cause damage to spillways, shoreline defense structures, infrastructure, or danger to pedestrians and vehicles. However, in many cases it is not practical to construct structures to completely prevent overtopping, and it is up to engineers and stakeholders to determine the acceptable rate of discharge given design wave conditions. Several studies (e.g., Tsuruta and Goda 1968; Goda 1970; Goda et al. 1975; Fukuda et al. 1974; Jensen 1984; De Gerloni et al. 1991; Smith et al. 1994; Franco et al. 1994). have attempted to relate quantitative discharge rates to qualitative indicative guidelines for damage thresholds for infrastructure, property, human safety. Therefore, wave overtopping calculations were performed to evaluate combinations of slopes, crest widths, and crest elevations geometry of a rubble mound structure which potentially could be used to mitigate overtopping on the spillway weir.

Three berm concepts were developed for the present analysis considering each of the following mean overtopping discharge criteria (EurOtop 2007):

- **Benchmark 1:** 0.5 gallons per minute (gpm) per linear foot (ft) for no damage to crest and rear face of embankment if not protected; aware pedestrians with clear view of incoming waves;
- **Benchmark 2:** 5-50 gpm/ft for no damage to crest and rear face of grass covered embankment of clay; and
- **Benchmark 3:** 240 – 480 gpm/ft for no damage if crest and rear slope are well protected.

Slopes, crest widths, and crest elevations were adjusted to meet these criteria (based on overtopping calculation methods discussed in Section 4.4). Figure 3 shows a conceptual profile at the northeast corner of the pit-lake from the lake bottom to the weir and spillway. The details of the conceptual profile combinations are shown in Figure 4 (the location of the detail conceptual profile is identified by the red inset in Figure 3). Both conceptual profiles have a run-up slope of V:H = 1:2 and a profile crest elevation of 750 ft, NGVD29 with a rubble mound structure extending the crest elevation to 755 ft., NGVD29. This translates to a freeboard of 20 ft above still-water level (735 ft, NGVD29) on the first profile shown in Case 1 (top frame of Figure 4). Case 1 also has a 2-layer rock revetment along the face of the run-up slope as wave armoring which would decrease run-up due to increased friction. Case 2 (bottom frame of Figure 4) is characterized by bare diabase rock along the majority of the slope face with a 5-ft high berm crest with a 2-layer armoring structure on the berm crest. With wave heights up to 10 ft, it is possible that a 20 ft freeboard will be overtopped without the armoring along the bare diabase run-up slope. Potential overtopping can be mitigated by elevating the crest height, increasing the crest width, and modifying the run-up slopes within the confines of the structure, rock, and slope constraints. Therefore, the Case 2 conceptual profile would require a larger freeboard to limit overtopping. In order to increase the freeboard, Case 2 limits the water level and lowers bench to an elevation of 715 ft, NGVD29. This doubles the freeboard to 40 ft.

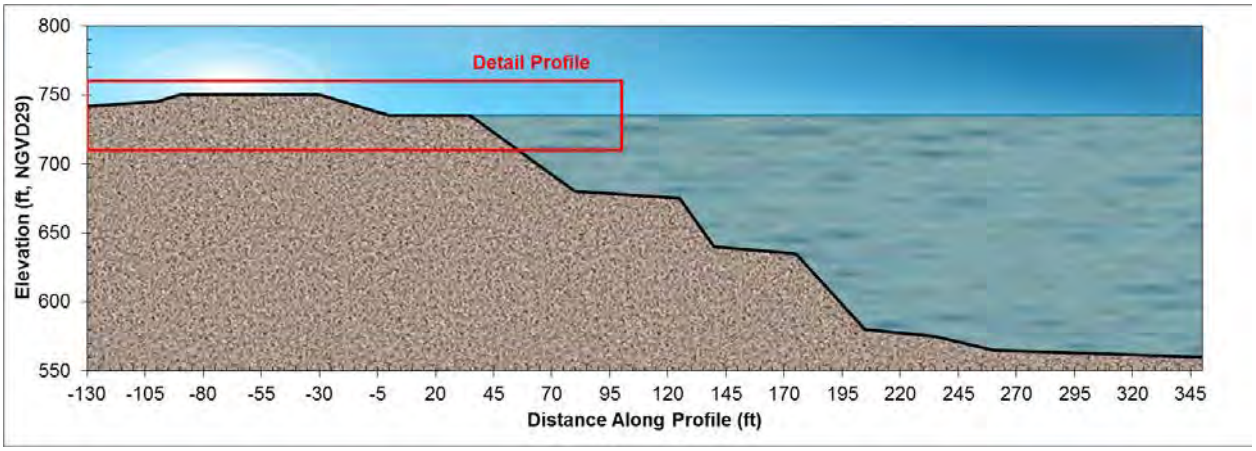
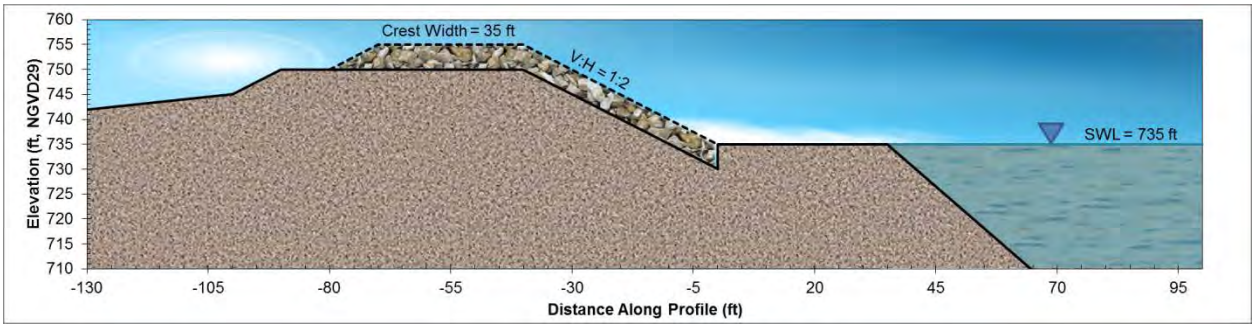
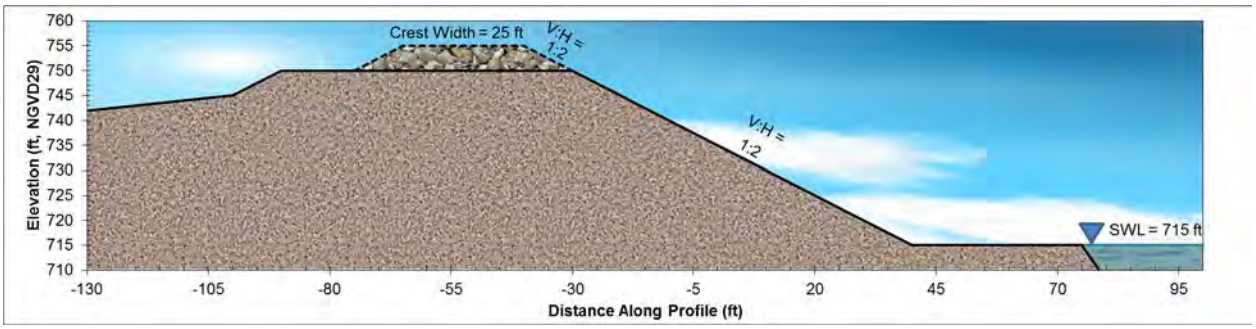


Figure 3. Conceptual pit-lake profile at the spillway weir. Detail profile identified by red inset box shown in Figure 4.



1.



2.

Figure 4. Detail of upland conceptual profiles: (1) 1:2 slope with 35-ft crest width, 20-ft freeboard, and rubble mound along entire slope; and (2) 1:2 slope with 25-ft crest width, 40-ft freeboard, and a rubble mound structure with a 1:2 slope on the crest of the berm.

4.4 Wave Overtopping Estimates

Wave overtopping was calculated using used Equation 6.5 combined with Equation 6.7 of EurOtop (2007) for simple profiles with berm crest armoring. The overtopping analysis returns the mean overtopping discharge for safety assessment for breaking or non-breaking waves. The profile definition sketch is shown in Figure 5 and the overtopping calculation inputs for each of the 5 cases shown in Figure 4 are listed in Table 5.

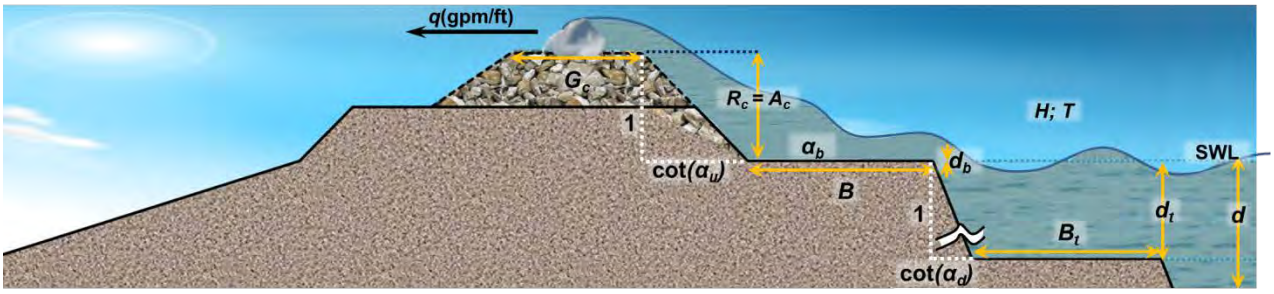


Figure 5. Definition sketch of overtopping profile components. Following Deltares (2015).

Table 5: Overtopping Inputs for Each Conceptual Profile Slope Case (Refer to Figure 4 for Cases)

Parameter	Symbol[1]	Unit	Case 1	Case 2
Angle of wave attack	β	[deg]	0	0
Depth in front of structure	d	[ft]	135	115
Wave height at toe of structure	H	[ft]	10	10
Wave period at toe of structure	T	[s]	9	9
Depth at toe of structure	d_t	[ft]	85	65
Width of the structure toe	B_t	[ft]	35	35
Roughness coefficient of upper slope	γ_f	[-]	0.55	0.90
Roughness coefficient of lower slope	γ_f	[-]	0.55	0.55
Effective Roughness coefficient	γ_f	[-]	0.55	0.79
Angle of the lower slope	cot α_d	[-]	0.8	0.8
Angle of the upper slope	cot α_u	[-]	2	2
Berm width	B	[ft]	35	35
Water depth on the berm	d_B	[ft]	0	0
Berm slope	tan α_B	[-]	0	0
Crest freeboard relative to SWL[2]	Rc	[ft]	20	40
Armor freeboard relative to SWL[2]	Ac	[ft]	20	40
Armor crest width	Gc	[ft]	35	25

Notes: 1. Refer to Figure 5 for definition sketch showing each of the symbols
2. Assumes crest freeboard is equal to armor freeboard for this profile ($Rc = Ac$)

The results of the overtopping evaluation are presented in Table 6. This table shows the mean discharge ranging from 0.0 to 0.1 gpm per linear foot of weir for each of the cases.

Table 6: Overtopping Results for Each Conceptual Profile Slope Case

Case No.	Benchmark No.	Slope [V:H]	Crest Height [ft]	Crest Width [ft]	Effective Roughness Coefficient [2]	Empirical Method[1] Discharge, q [gpm/ft]
1	1	1:2	20	35	0.55	0.1
2	1	1:2	40	25	0.79	0.0

Notes: 1. Following empirical method described in Equation 6.5 and Equation 6.7 of EurOtop (2007).
2. Effective roughness coefficient is a function of the weighted average of the lower slope roughness and the upper rubble mound slope roughness.

The total volume of overtopping for an actual SLGW event would depend on the number of waves that overtop the spillway as well as the run-up exceedance of each wave. The evaluation of wave trains is a complex process and would require a robust numerical model approach, which is beyond the scope of this technical memorandum. Also, this analytical approach does not directly consider the complex non-linear effects of wave reflection, wave-wave interaction, three-dimensional wave focusing, and lake seiching that could occur in a SLGW event in Clayton Quarry pit lake. These complex interactions have the potential to focus and amplify wave energy in the lake, which could potentially change the discharge rate.

However, given the discharge is less than 0.1 gpm per linear foot distributed over the weir section of the spillway (40 ft wide), and the duration of the overtopping would be limited, it is unlikely that the volume of overtopping discharge will exceed 20 gallons over the duration of a SLGW event of this scale.

5.0 ASSUMPTIONS AND LIMITATIONS

The various relationships for SLGW generation, wave run-up, and wave overtopping employed in this application are empirically derived from laboratory studies and a limited number of site-specific field locations with historical SLGW observations. The wave generation and propagation processes are complex fluid dynamics processes, which are simplified when attempting to characterize them in a one-dimensional sense. General assumptions applicable to the various expressions may be summarized as:

- Point of initiation of the landslide is assumed to be at the toe of slope failure
- Bed elevation at point of impact is assumed to be 650 ft NGVD29. The still-water level is assumed to be 735 ft NGVD29. This corresponds to a depth of 85 ft.
- The spillway structure and profile are considered conceptual to facilitate initial and conservative calculations of runup and overtopping for permitting and downstream impact assessment purposes. Structure design was not part of this scope of work.
- The minimum crest elevation of the spillway structure with the rubble mound crest armor is specified as 755 ft NGVD29. The still-water level is assumed to be 735 ft NGVD29 for Case 1 and 715 ft NGVD29 for Case 2. This assumption translates to a freeboard of 20 ft to 40 ft above still-water level, respectively. This study assumes that an additional rubble mound structure would be constructed on top of the spillway structure to a crest elevation of 755 ft NGVD29 to mitigate SLGW overtopping.
- Spillway and rubble mound profile slope was assumed to be covered by 2-layer rock armoring with an impermeable core. Armoring of the spillway around the still water level may be required to ensure berm integrity. Also, a geotechnical investigation may be needed to confirm stability of the spillway weir and rubble mound profile. .
- Waves are assumed to be normally incident to the spillway structure.
- Waves are specified at the point of generation. No wave transformation was conducted to evaluate the wave at the toe of the spillway. A more physically robust numerical model would be required to evaluate wave transformation, dispersion, and wave interactions.
- The height of the maximum wave and associated period are assumed to represent the characteristic properties of the SLGW wave train as a conservative approach to wave and associated run-up prediction.
- The 2% run-up methods employed in this report were originally developed for coastal engineering applications based on physical model tests which, in most experiments, considered wave height and period distributions corresponding to typical ocean sea states. Ocean sea states are not necessarily representative of the distribution of wave heights and periods associated with a relatively rare SLGW event, which introduces some uncertainty in the results.
- For overtopping estimates, two concepts have been developed to meet target mean overtopping discharge criteria. Wave run-up analysis is based on empirical analytical methods that provide coarse results for wave run-up on a specified conceptual profile with slopes ranging from 1:2 to 1:4. For the purposes of final design, and to better model the site hydrodynamics, a more physically robust two-dimensional model or three-dimensional numerical model should be considered. Physical model testing could also be considered to optimize the final design as recommended by Eurotop (2007).

6.0 CLOSURE

We trust that this information meets your current requirements. However, should you have any questions regarding the information presented in this technical memorandum, or if you require further information, please do not hesitate to contact our office.

7.0 REFERENCES

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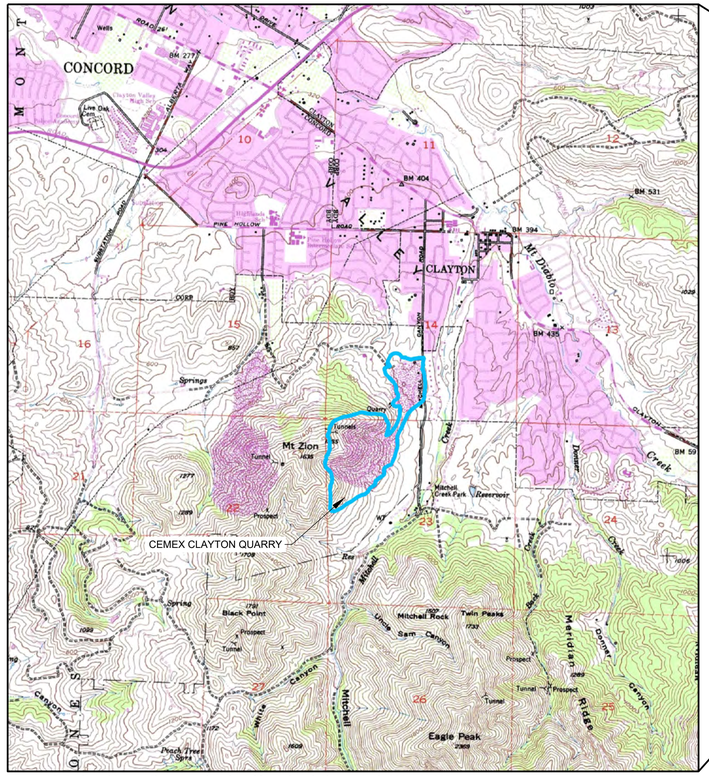
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APPENDIX D

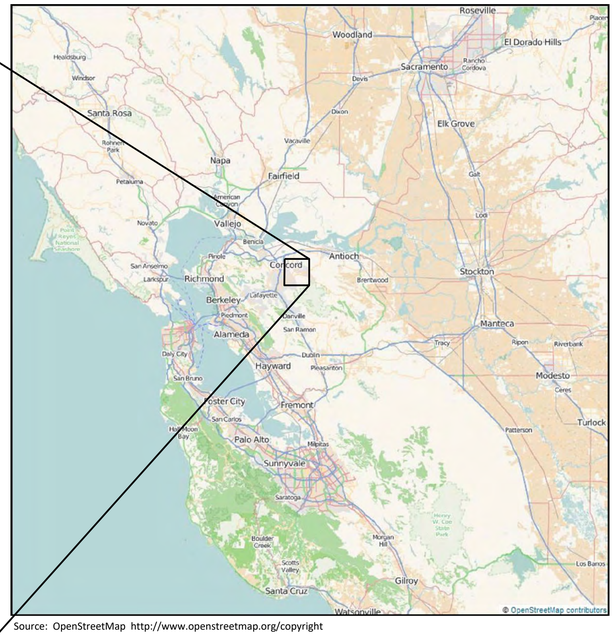
NORTH OVERBURDEN FILL AREA (OFA)
BUTTRESS DESIGN DRAWINGS

CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
OVERBURDEN FILL AREA IMPROVEMENTS

CLAYTON, CALIFORNIA



Source: U.S. Geological Survey. Clayton quadrangle, California [map]. Photorevised 1980. 1:24,000.
7.5 Minute Series. Reston, Va: United States Department of the Interior, USGS, 1953.



Source: OpenStreetMap http://www.openstreetmap.org/copyright

SITE VICINITY MAP
(NOT TO SCALE)

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
G1	TITLE SHEET
C1-1	ULTIMATE GRAVITY BUTTRESS DESIGN EXCAVATION PLAN
C1-2	ULTIMATE GRAVITY BUTTRESS DESIGN FILL PLAN
C1-3	ULTIMATE GRAVITY BUTTRESS DESIGN TYPICAL SECTION
C2-1	INTERIM GRAVITY BUTTRESS EXCAVATION PLAN
C2-2	INTERIM GRAVITY BUTTRESS FILL PLAN
C2-3	INTERIM GRAVITY BUTTRESS TYPICAL SECTION
C2-4	INTERIM EXCAVATION WATER POLLUTION CONTROL PLAN (NOTE 7)
C2-5	INTERIM FILL WATER POLLUTION CONTROL PLAN (NOTE 7)

NOTE(S)

1. ALL GRADING, SITE PREPARATION, PLACING AND COMPACTION OF FILL TO BE DONE IN ACCORDANCE WITH CONTRA COSTA COUNTY GRADING ORDINANCE NO. 99-46; ALSO UNDER THE DIRECT SUPERVISION OF THE SOIL ENGINEER. SUBSEQUENT TO COMPLETION OF THE WORK, THE SOIL ENGINEER SHALL SUBMIT TO THE COUNTY BUILDING INSPECTION DEPARTMENT A REPORT STATING THAT ALL WORK HAS BEEN DONE TO ITS SATISFACTION.
2. CONTRACTOR TO NOTIFY CONTRA COSTA COUNTY GRADING SECTION 48-HOURS PRIOR TO START OF WORK. (SCHEDULE A 600 PRE-CONSTRUCTION MEETING INSPECTION)
3. ANY DEVIATION FROM APPROVED PLAN REQUIRES APPROVAL OF THE CONTRA COSTA COUNTY SENIOR GRADING INSPECTOR, PRIOR TO ANY CHANGES OCCURRING ON THE PROJECT SITE.
4. ALL SLIDE REPAIR WORK, KEYWAYS, SUBDRAIN INSTALLATION, AND BUTTRESS FILLS WORK SHALL BE INSPECTED BY THE GRADING SECTION. REPORT FROM THE SOIL ENGINEER SHALL BE SUBMITTED TO THE GRADING SECTION REGARDING THE SLIDE REPAIR AND/OR SUBDRAIN INSTALLATION. NOTE: ALL KEYWAYS REQUIRE A 601 ROUGH GRADE INSPECTION APPROVAL PRIOR TO BACKFILLING.
5. DURING GRADING OPERATIONS, CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES ON SITE AND HAUL ROUTES, AND COMPLY TO ALL FEDERAL, STATE, AND LOCAL CLEAN WATER PROGRAM REQUIREMENTS.
6. SILT AND EROSION CONTROL PLANS REQUIRED FOR WORK DURING ALL SEASONS. COMPLIANCE TO STORM WATER POLLUTION PREVENTION REGULATIONS IS AT ALL TIMES, YEAR ROUND.
7. EROSION CONTROL PLAN INCLUDED IN THIS PLAN SET IS FOR INTERIM BUTTRESS CONSTRUCTION. EROSION CONTROL FOR ULTIMATE BUTTRESS CONSTRUCTION WILL BE PROVIDED FOLLOWING COMPLETION OF INTERIM CONSTRUCTION AND MONITORING AND WILL BE SUBMITTED, AND REVISED AS NECESSARY, PRIOR TO START OF CONSTRUCTION FOR THE ULTIMATE BUTTRESS.

EARTHWORK QUANTITIES TABLE	
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EXCAVATION (CY)	150,775
FILL (CY)	388,470
INTERIM GRAVITY BUTTRESS	
EXCAVATION (CY)	54,220
FILL (CY)	90,400

CLIENT
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-28
DESIGNED	MDB
PREPARED	EMC
REVIEWED	MLP
APPROVED	WF

PROJECT
GEOTECHNICAL ENGINEERING SUPPORT
CEMEX - CLAYTON QUARRY
OVERBURDEN FILL AREA IMPROVEMENTS

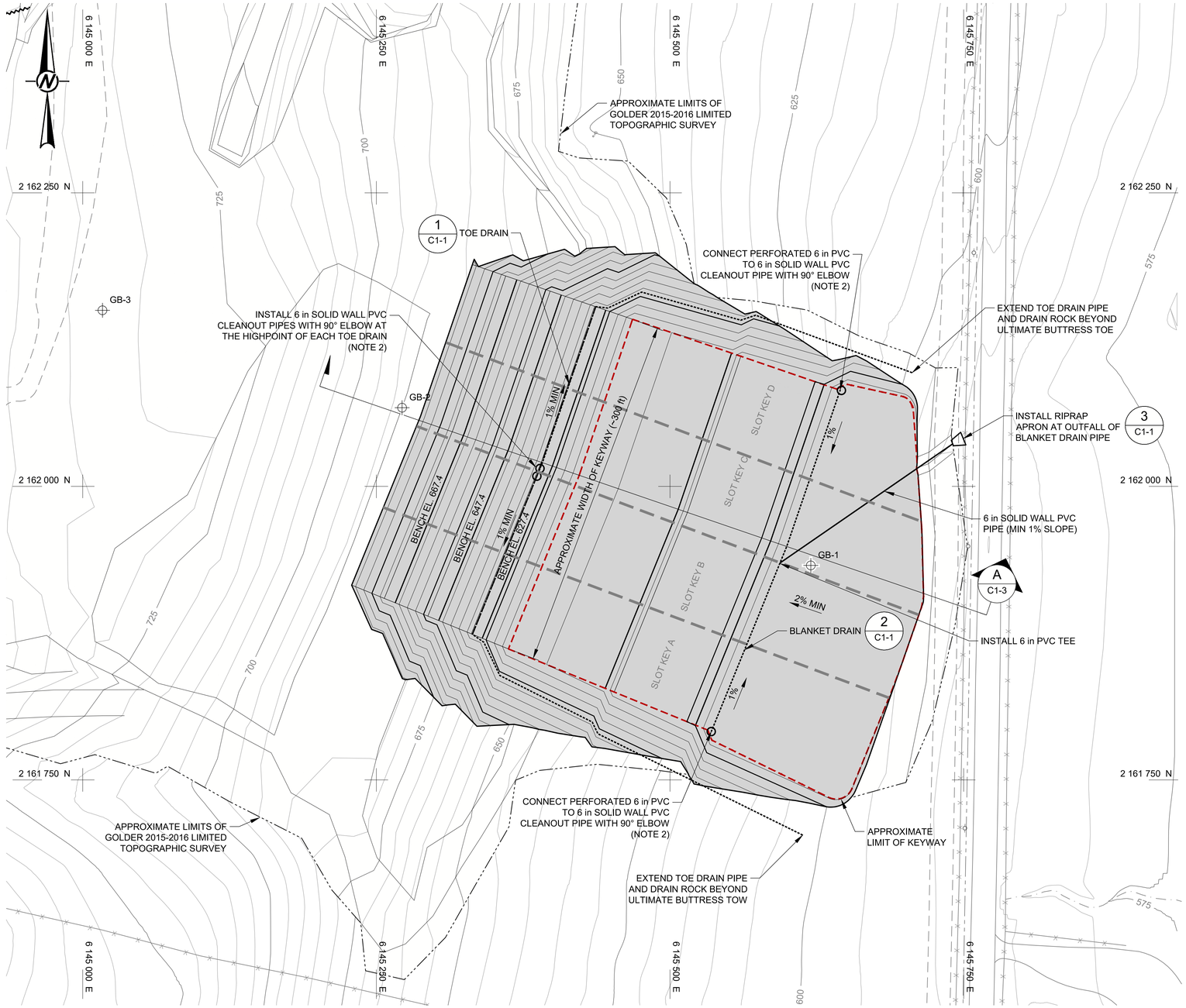
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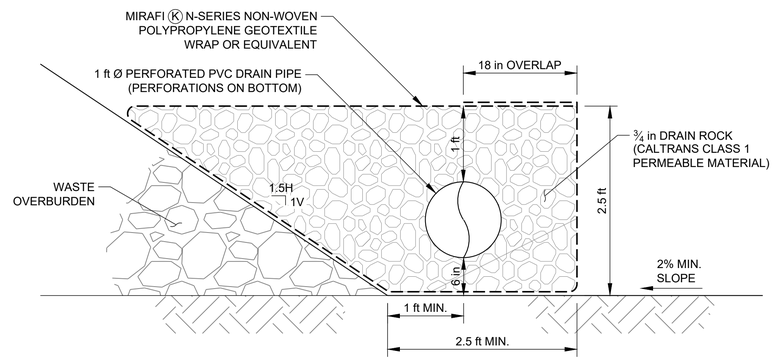
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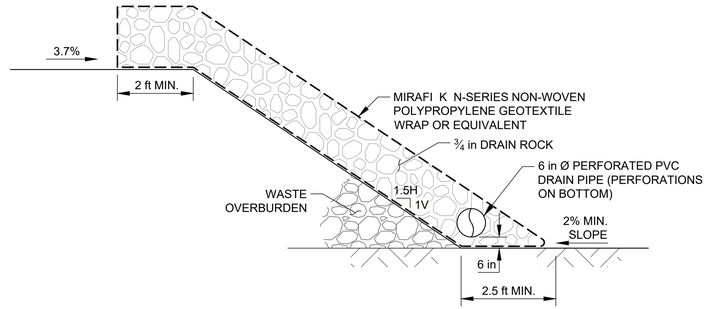
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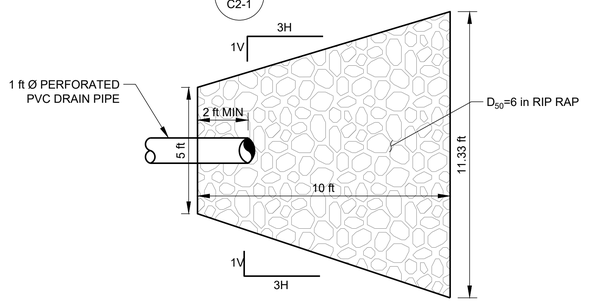
GRAVITY BUTTRESS EXCAVATION PLAN
SCALE 1" = 50'



SCALE 1" = 1' 1 C1-1 TOE DRAIN DETAIL



SCALE 1" = 2' 2 C2-1 BLANKET DRAIN DETAIL



NTS 3 C2-1 RIPRAP APRON DETAIL

0 1 2
1" = 1' FEET

0 2 4
1" = 2' FEET

0 50 100
1" = 50' FEET

LEGEND

- EXISTING GROUND CONTOURS
- 2015-2016 SURVEY LIMITS
- PROPERTY LINE
- FENCE
- ROAD
- DIRT ROAD

NOTE(S)

1. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET UNLESS OTHERWISE NOTED.
2. SOLID WAL PVC CLEANOUT PIPES TO BE EXTENDED IN 5-FOOT INCREMENTS AS FILL MATERIAL IS PLACED FOR CONSTRUCTION OF THE ULTIMATE BUTTRESS.

REFERENCE(S)

EXISTING SITE TOPOGRAPHY PROVIDED BY CEMEX ON JUNE 22, 2016.

CLIENT
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
CLAYTON QUARRY
CLAYTON, CALIFORNIA

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-28
DESIGNED	MDB
PREPARED	EMC
REVIEWED	MLP
APPROVED	WF

PROJECT
GEOTECHNICAL ENGINEERING SUPPORT
CEMEX - CLAYTON QUARRY
OVERBURDEN FILL AREA IMPROVEMENTS

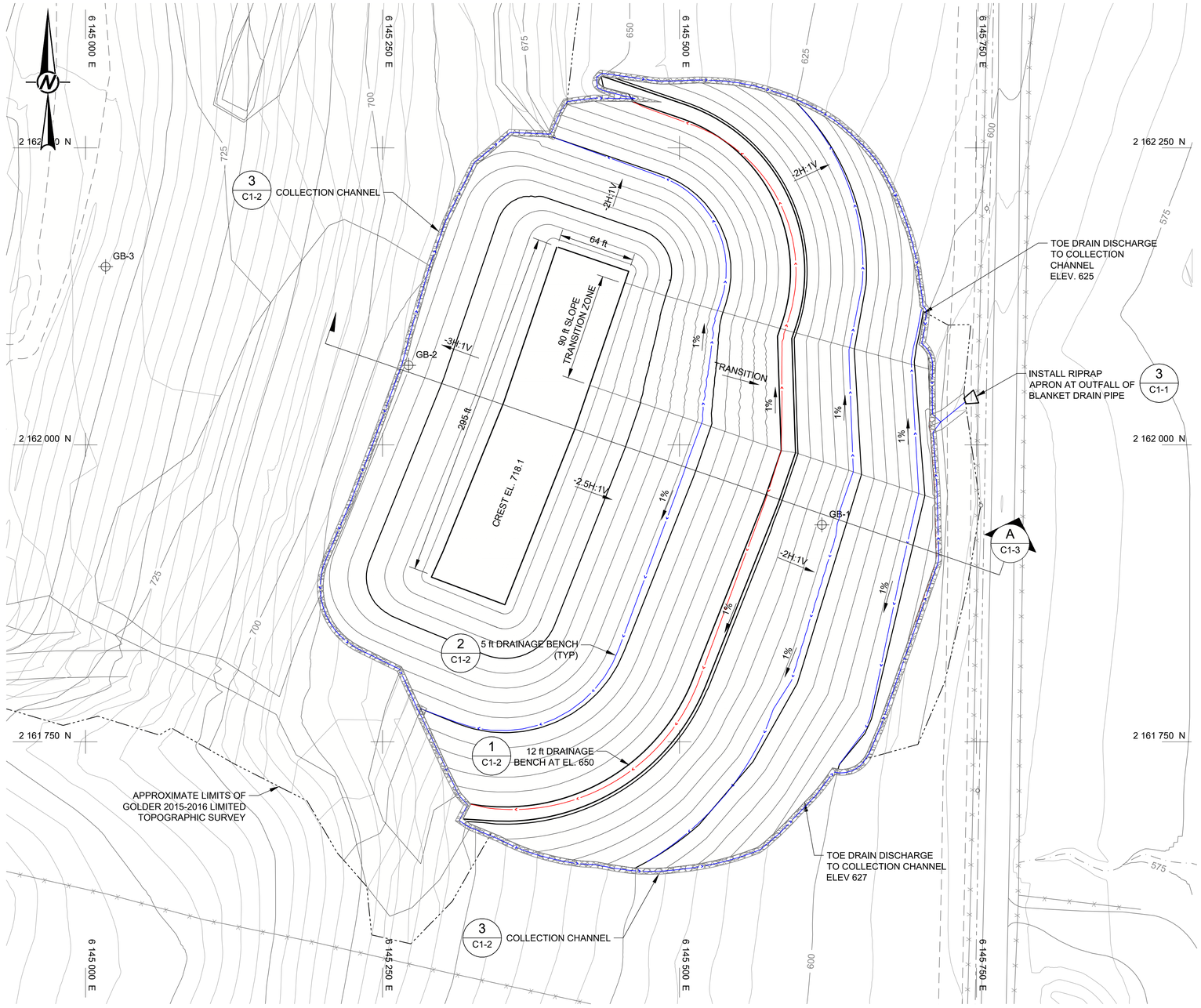
TITLE
ULTIMATE GRAVITY BUTTRESS DESIGN
EXCAVATION PLAN

PROJECT NO.	PHASE	REV.	FIGURE
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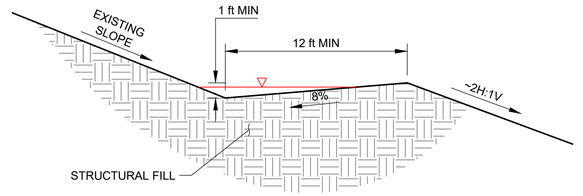
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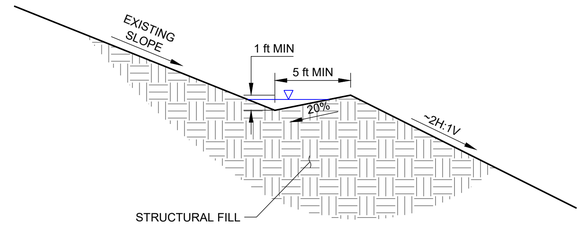
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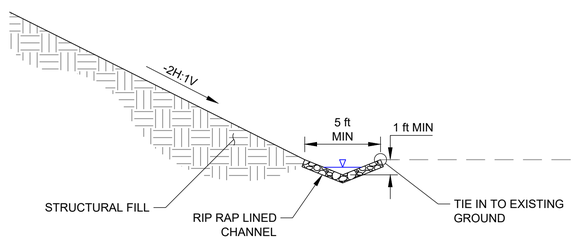
GRAVITY BUTTRESS FILL PLAN
SCALE 1" = 50'



SCALE 1"=5' 1 C1-2 TYPICAL 12 FOOT WIDE TYPICAL DRAINAGE BENCH



SCALE 1"=5' 2 C1-2 TYPICAL 5 FOOT WIDE TYPICAL DRAINAGE BENCH



SCALE 1"=5' 3 C1-2 TYPICAL COLLECTION CHANNEL

0 5 10
1" = 5' FEET

0 50 100
1" = 50' FEET

LEGEND

- EXISTING GROUND CONTOURS
- 2015-2016 SURVEY LIMITS
- PROPERTY LINE
- FENCE
- ROAD
- DIRT ROAD
- 12 FOOT BENCH DRAINAGE
- 5 FOOT BENCH AND CHANNEL DRAINAGE

NOTE(S)

1. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET UNLESS OTHERWISE NOTED.
2. SLOPES ABOVE ELEVATION 680 FT CONSTITUTE TEMPORARY WORKING SLOPES AND WILL BE REVISED DURING FINAL CLOSURE DESIGN.

REFERENCE(S)

EXISTING SITE TOPOGRAPHY PROVIDED BY CEMEX ON JUNE 22, 2016.

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CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC
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CLAYTON, CALIFORNIA

CONSULTANT

Golder Associates

YYYY-MM-DD	2016-11-28
DESIGNED	MDB
PREPARED	EMC
REVIEWED	MLP
APPROVED	WF

PROJECT
GEOTECHNICAL ENGINEERING SUPPORT
CEMEX - CLAYTON QUARRY
OVERBURDEN FILL AREA IMPROVEMENTS

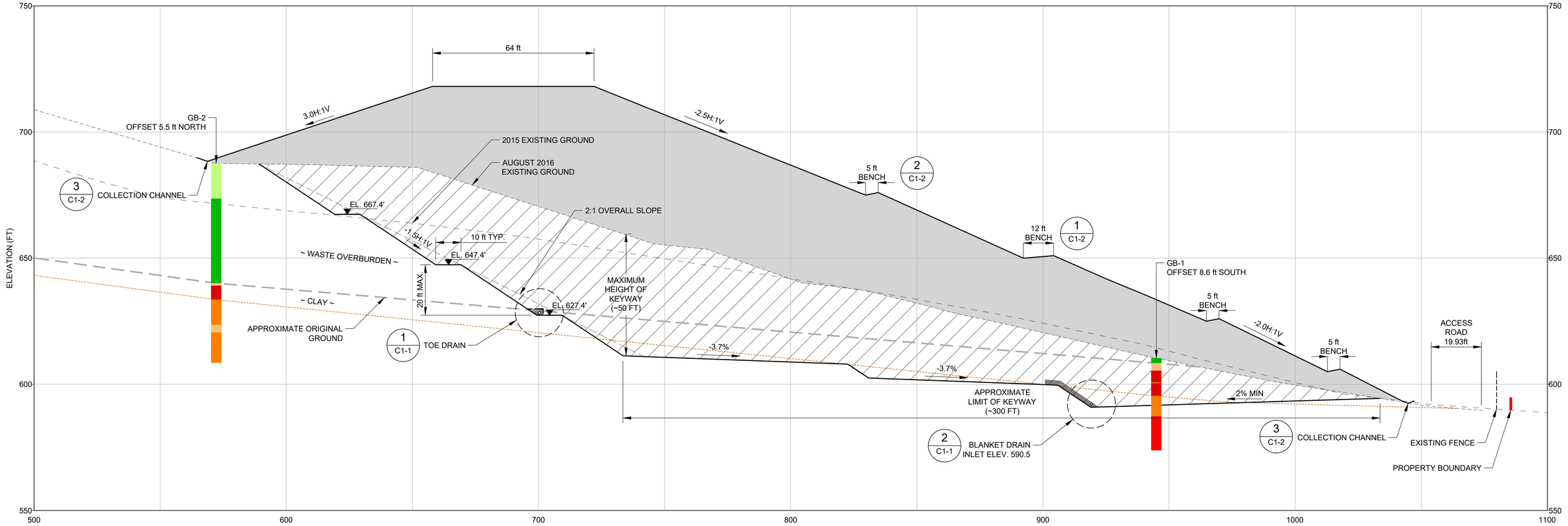
TITLE
ULTIMATE GRAVITY BUTTRESS DESIGN
FILL PLAN

PROJECT NO.	PHASE	REV.	FIGURE
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SCALE 1" = 20' A C1-2 TYPICAL CROSS-SECTION

0 20 40
1" = 20' FEET

LEGEND

CUT

FILL

NOTE(S)

1. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET UNLESS OTHERWISE NOTED.
2. SUBSURFACE CONTACTS ARE APPROXIMATED BASED ON OBSERVATIONS ENCOUNTERED DURING THE GEOTECHNICAL FIELD EXPLORATION PROGRAM.
3. SLOPES ABOVE ELEVATION 680 FT CONSTITUTE TEMPORARY WORKING SLOPES AND WILL BE REVISED DURING FINAL CLOSURE DESIGN.

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GEOTECHNICAL ENGINEERING SUPPORT
CEMEX - CLAYTON QUARRY
OVERBURDEN FILL AREA IMPROVEMENTS

TITLE
ULTIMATE GRAVITY BUTTRESS DESIGN
TYPICAL SECTION

PROJECT NO.	PHASE	REV.	FIGURE
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APPENDIX G

HYDROLOGY AND WATER QUALITY REPORTS

APPENDIX G-1

HYDROLOGY AND WATER QUALITY EVALUATION REPORT

HYDROLOGY AND WATER QUALITY EVALUATION REPORT
MAY 2020
CEMEX CLAYTON QUARRY
CLAYTON, CONTRA COSTA COUNTY, CALIFORNIA



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HYDROLOGY AND WATER QUALITY EVALUATION REPORT
MAY 2020
CEMEX CLAYTON QUARRY
CLAYTON, CONTRA COSTA COUNTY, CALIFORNIA

TABLE OF CONTENTS

EXECUTIVE SUMMARY **1**
1.0 INTRODUCTION **3**
2.0 BACKGROUND **3**
3.0 HYDROLOGY **6**
3.1 Approach **6**
3.2 Quarry Area Findings **10**
3.2.1 Existing Hydrologic Conditions at the Clayton Quarry 10
3.2.2 Hydrologic Conditions under the 1983 Reclamation Plan 12
3.2.3 Hydrologic Conditions under the Revised Reclamation Plan 14
3.2.4 Quarry Lake Water Budget 15
3.2.5 Stormwater Flows into Reclaimed Quarry 22
4.0 QUARRY LAKE HYDRAULICS **23**
4.1 Water Storage and Conveyance **23**
4.2 Wave Overtopping Analysis **27**
5.0 WATER QUALITY **28**
6.0 MOSQUITO CONTROL **32**
7.0 REFERENCES CITED **32**

LIST OF TABLES

Table 1. Estimated Rainfall Depths for Design Storm Events
Table 2. Peak Runoff for Design Storm Events - Quarry Perimeter Watersheds under Existing Conditions
Table 3. Peak Runoff for Design Storm Events – Eastern Watersheds under Existing Conditions

Table 4. Peak Runoff for Design Storm Events – 1983 Reclamation Plan
Table 5. Peak Runoff for Design Storm Events - Quarry Perimeter Watersheds under Revised Reclamation Plan
Table 6. Peak Runoff for Design Storm Events – Eastern Watersheds under Revised Reclamation Plan
Table 7 Existing Conditions: Quarry Watershed Areas and Water Volumes
Table 8. Revised Reclamation Plan: Reclaimed Quarry Watershed Areas and Water Volumes
Table 9. Existing Conditions: Incremental Water Budget for Existing Quarry
Table 10. Revised Reclamation Plan: Incremental Water Budget for Reclaimed Quarry
Table 11. Water Volumes and Outflow Rates from Reclaimed Quarry
Table 12. Laboratory Analytical Results for DI-WET Test of Diabase
Table 13. Laboratory Analytical Results for DI-WET Test of Knoxville Formation

LIST OF FIGURES

Figure 1. Vicinity Map
Figure 2. Watershed Area
Figure 3. Clayton Quarry Lake Hydrology
Figure 4. Drainage Area Boundaries
Figure 5. DA71A Storm Drains East of CEMEX Site
Figure 6. Provisions of Division 3 of the California Water Code Affecting Jurisdiction over Dams and Reservoirs

LIST OF DRAWING SHEETS

Sheet 1. CEMEX Clayton Quarry Reclamation Drainage Plan (Spinardi and Associates, 2020)

LIST OF APPENDICES

APPENDIX A. Hydrologic Design Documents and Calculations for Existing Conditions and Revised Reclamation Plan
APPENDIX B. Calculations for 1983 Reclamation Plan
APPENDIX C. Water Budget Spreadsheet
APPENDIX D. Conveyance Pipe Sizing Documents
APPENDIX E. Laboratory Analytical Report

HYDROLOGY AND WATER QUALITY EVALUATION REPORT
MAY 2020
CEMEX CLAYTON QUARRY
CLAYTON, CONTRA COSTA COUNTY, CALIFORNIA

Executive Summary

This technical report for the Clayton Quarry in Contra Costa County, California has been prepared on behalf of RMC Pacific Materials, LLC (CEMEX) in support of the Clayton Quarry Reclamation Plan Amendment Project to:

1. Evaluate the existing hydrologic conditions at the Clayton Quarry;
2. Identify the hydrologic conditions that are permitted to occur under the 1983 Reclamation Plan;
3. Develop a water budget that identifies sources of inflow and outflow for the quarry to determine the timeframe for the water level to reach the designated discharge elevation;
4. Evaluate design storm events to estimate the hydrologic impacts on water levels and discharge from the quarry lake, once the quarry fills with water;
5. Conduct a hydraulic assessment of runoff conveyance from the quarry lake; and
6. Evaluate post-reclamation water quality in storm water runoff.

The existing conditions Clayton quarry excavation has a smaller volume and surface area than that which would exist following implementation of the Revised Reclamation Plan. With the existing conditions quarry, water that would accumulate in the excavation (after mining is complete) from local rainfall and runoff could rise to a maximum elevation of 755 feet above mean sea level (ft msl) before overtopping the quarry rim. If the existing conditions quarry were allowed to fill, it would take approximately 39 years for the water surface to reach 755 ft msl. Once the water level reached that elevation, 45 acre-feet (AF) of water per year would flow from the quarry, primarily from January through March, in an average rainfall year. Under existing conditions, the water that would flow from the quarry would eventually discharge to Mitchell Canyon Road near Diablo Downs Drive within County Drainage Area (DA) 71A

Under conditions that would occur as part of the Revised Reclamation Plan, the maximum elevation to which water would be allowed to fill the quarry would be approximately 735 ft msl. The water balance reveals that there will be a positive net inflow into the quarry, which means the excavation would fill with water until reaching the outlet structure at 735 ft msl and form a quarry lake, which would occur in approximately 158 years after mining ceases. Once the water level in the quarry lake rises above an elevation of 735 ft msl, it would be conveyed from the quarry through an outlet structure that would direct the water to downstream storm drains. The quarry rim would have a minimum elevation of 750 ft

msl (at the location where the haul road enters the quarry). A five-foot high rip-rap berm would be placed across the low point in the quarry rim (raising it to 755 ft msl) to prevent any potential overflow from a seismically-induced wave within the quarry lake. As part of the outlet structure, a 24-inch pipe would be installed through the quarry rim at 735 ft msl.

Several different design storm frequencies and durations were considered based on various applicable regulations and guidelines. Under the Revised Reclamation Plan, once the quarry fills with water, there will be an average outflow of about 15 acre-feet per year, occurring primarily from January through March. To control the runoff from major storm events, the outlet structure would be designed to allow water to be discharged from the quarry at peak rates between 2.3 cfs and 5.5 cfs, depending on the storm event. The time needed for runoff from a design storm event to accumulate in the quarry lake and be released through the outlet structure would be longer than the timing of the peak runoff from the other watersheds around the quarry that discharge to DA71A and Mitchell Creek. Thus, the Revised Reclamation Plan would result in lower peak flows in the downstream County drainage areas than occurs under existing conditions. The runoff from design storm events that accumulates in the quarry would be released in less than four days. Water passing through the outlet structure will be conveyed by a series of pipes to a point near the east side of the property, where it will discharge to the storm drains within DA71A. The proposed conditions would result in less flow from the quarry and eastern watersheds to Mitchell Creek (DA71) and the storm drains in DA71A than occurs under existing baseline conditions or would have occurred under the 1983 Reclamation Plan. However, despite the Project's reduction in peak stormwater flows, CEMEX is proposing to enhance the capacity of the DA71A storm drains prior to the time that the reclaimed quarry would fill with water to address any existing deficiencies in system capacity.

For the Revised Reclamation Plan, the potential for a seismically-induced landslide from the highwall to generate waves in the future quarry lake that could overtop the quarry rim in the area of the outlet structure has been evaluated as requested by Contra Costa County (Golder Associates, 2016). The evaluation concluded that by placing a five-foot high rip-rap pile across the quarry rim above the outlet structure, seismically-induced waves would not overtop the rim at volumes that would cause erosion or affect downslope properties.

For the Revised Reclamation Plan, laboratory testing was conducted to assist in the evaluation of the quality of storm water runoff. Based on the laboratory results, the storm water runoff will meet applicable water quality standards. Evaluation of the future water quality in the reclaimed quarry lake is being prepared by others and will be submitted in a separate report.

The Revised Reclamation Plan will comply with Title 14 of the California Code of Regulations (14 CCR) Section 3706(b) regarding water quality and volumes, and with 14 CCR Section 3706(d) regarding storm water conveyance and erosion control.

1.0 Introduction

This technical report has been prepared to evaluate hydrologic conditions at the Clayton Quarry in Contra Costa County, California. CEMEX is proposing to amend its current Reclamation Plan through adoption of a Revised Reclamation Plan to retain a closed quarry after mining, which will provide for the quarry to slowly fill with stormwater and form a future quarry lake with a controlled outflow of water ("Revised Reclamation Plan"). In comparison, the current Reclamation Plan (approved in 1983 under Contra Costa County Land Use Permit 2054-81) calls for partial backfilling of the mining excavation after removal of the eastern quarry wall to allow for unmanaged runoff from the quarry area and surrounding highwalls and watershed ("1983 Reclamation Plan").

The objectives of this report are to:

1. Evaluate the existing hydrologic conditions at the Clayton Quarry;
2. Identify the hydrologic conditions that would have occurred under the 1983 Reclamation Plan;
3. Develop a water budget that identifies sources of inflow and outflow for the quarry to determine the timeframe for the water level to reach the designated discharge elevation;
4. Evaluate design storm events to estimate the hydrologic impacts on water levels and discharge from the quarry lake, once the quarry fills with water;
5. Conduct a hydraulic assessment of runoff conveyance from the quarry and potential effects on downslope neighborhoods; and
6. Evaluate post-reclamation water quality in conveyance structures.

Recommendations with respect to water management and flood control are also provided. This report has been prepared to provide the appropriate technical data to support the CEQA review of the proposed Revised Reclamation Plan, based on the thresholds of significance related to hydrology and water quality as defined in Appendix G of the CEQA Guidelines. In addition, this report addresses the reclamation performance standards identified in Sections 3706(b) and 3706(d) of SMARA regulations found in Title 14 of the California Code of Regulations (14 CCR). Post-reclamation water quality in the future quarry lake is being addressed by others.

2.0 Background

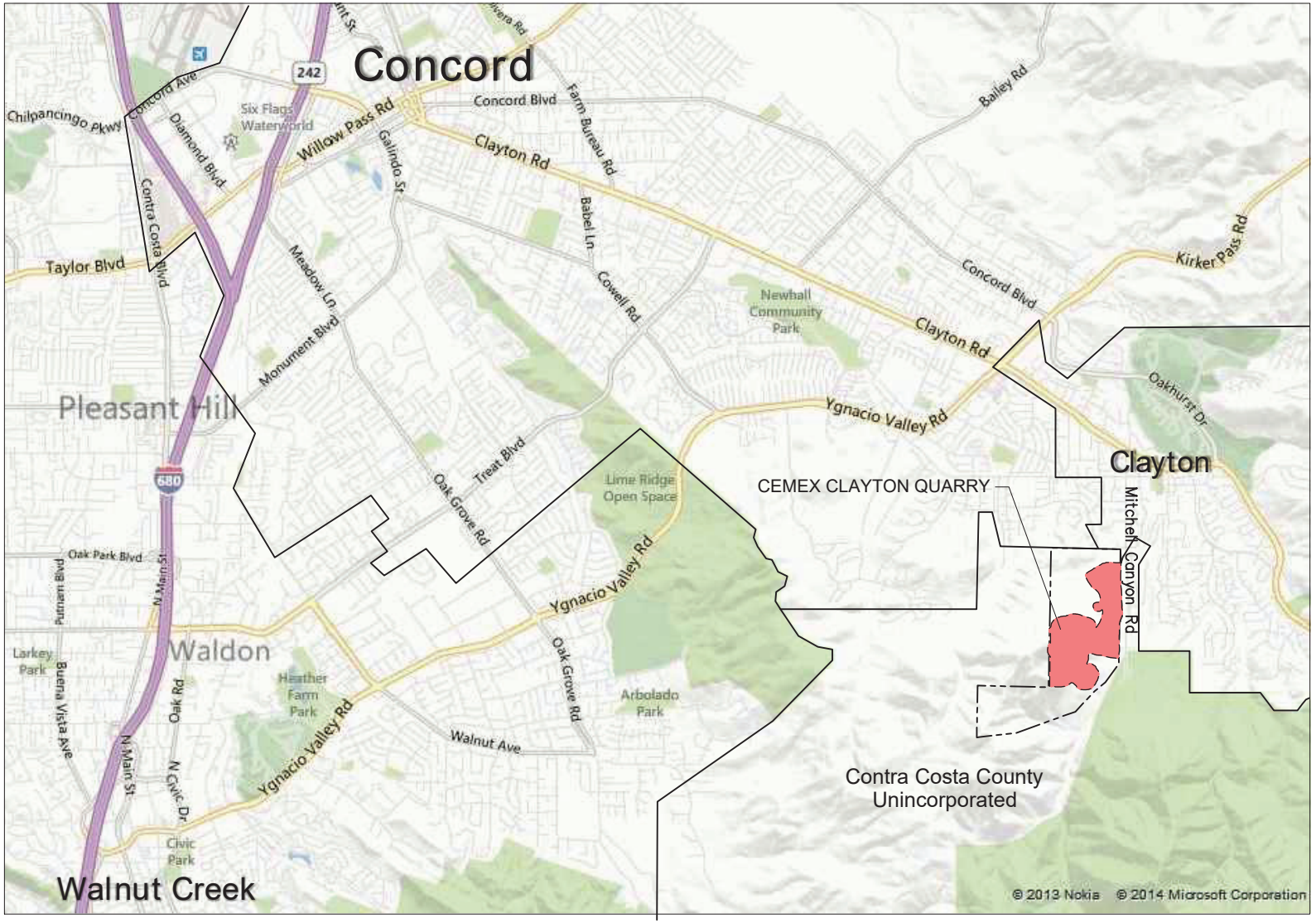
The CEMEX Clayton Quarry site is located in Contra Costa County, California south of the City of Clayton, to the north of Mount Diablo (Figure 1). The quarry is located on the eastern slope of a topographic high point referred to as Mt. Zion. Surface elevations vary substantially around the quarry site. The current floor of the quarry is at an elevation of approximately 520 feet above mean sea level (ft msl). Mining is planned to extend to an elevation of 110 ft msl. The rim of the existing quarry varies from a minimum elevation of 755 ft msl, where the haul road enters the east side of the quarry, to approximately 1500

ft msl at the top of the high wall on the west side of the quarry (see photograph on the cover page of this report). The peak elevation of the watershed along the ridge west of the quarry is 1635 ft msl. Under the Revised Reclamation Plan, the minimum elevation of the quarry rim will be 755 ft msl in the northeast corner of the quarry at the location of the haul road (including a 5-foot high mound of rip-rap) after mining and reclamation are complete. However, as discussed further below, an outlet structure will be installed at 735 ft msl to maintain the water surface of the reclaimed quarry lake at or below the elevation of the outlet structure.

Mining is primarily occurring within a dense igneous rock unit referred to as a diabase. The diabase has little or no primary porosity but is fractured. Observations made in the quarry indicate that the fractures are typically not continuous for more than a few feet to a few tens of feet. There are a few locations where more continuous fractures occur and small springs or seeps are observed in those locations, as discussed further below. On the east side of the quarry, the diabase is overlain by the Knoxville Formation, which consists of moderately indurated sedimentary rocks. The Knoxville Formation, where present in the mining area, is stripped from the diabase to allow mining of the diabase to proceed. The contact between the diabase and the Knoxville Formation is interpreted to be a fault that dips steeply toward the east, as indicated by Golder Associates (2017).

The watershed area for the existing conditions quarry is approximately 90 acres. As mining progresses, the east quarry rim excavation contour will move slightly to the east, such that the watershed area for the reclaimed quarry under the Revised Reclamation Plan will be approximately 98 acres. Under existing conditions, 19 acres of undisturbed and vegetated watershed are located above the quarry perimeter and 71 acres have been disturbed and are within the existing quarry perimeter. Under the Revised Reclamation Plan, 17 acres of the watershed above the quarry will remain undisturbed and 81 acres will be within the quarry perimeter (Figure 2). After reclamation is completed, the watershed area and quarry will comprise a closed drainage with an outlet at an elevation of 735 ft msl. The total volume of the quarry between 110 ft msl and 735 ft msl after mining is completed will be approximately 8,520 acre-feet (AF). In comparison, the volume of the existing quarry below an elevation of 755 ft msl is 2,556 AF.

Overburden and rock that does not meet construction material specifications will either be sold as a fill product or placed in designated Overburden Fill Areas. Hydrologic assessment of the Overburden Fill Areas is presented in EMKO 2017a. A similar technical memorandum has been prepared to evaluate the hydrology of the perimeter access roads around the reclaimed quarry (EMKO 2017b), which will be relocated approximately 200 feet to the east as the quarry progresses under existing mining approvals. The Overburden Fill Areas and the perimeter access roads are existing conditions relative to the Revised Reclamation Plan.



LEGEND

Property Boundary

Quarry & Plant Site

Source: Nokia/Microsoft Corporation

VICINITY MAP

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

MAY 2017 (REV. MAY 2020)

Spinardi Associates
265 Sea View Ave., Piedmont, CA 94610

Figure 1

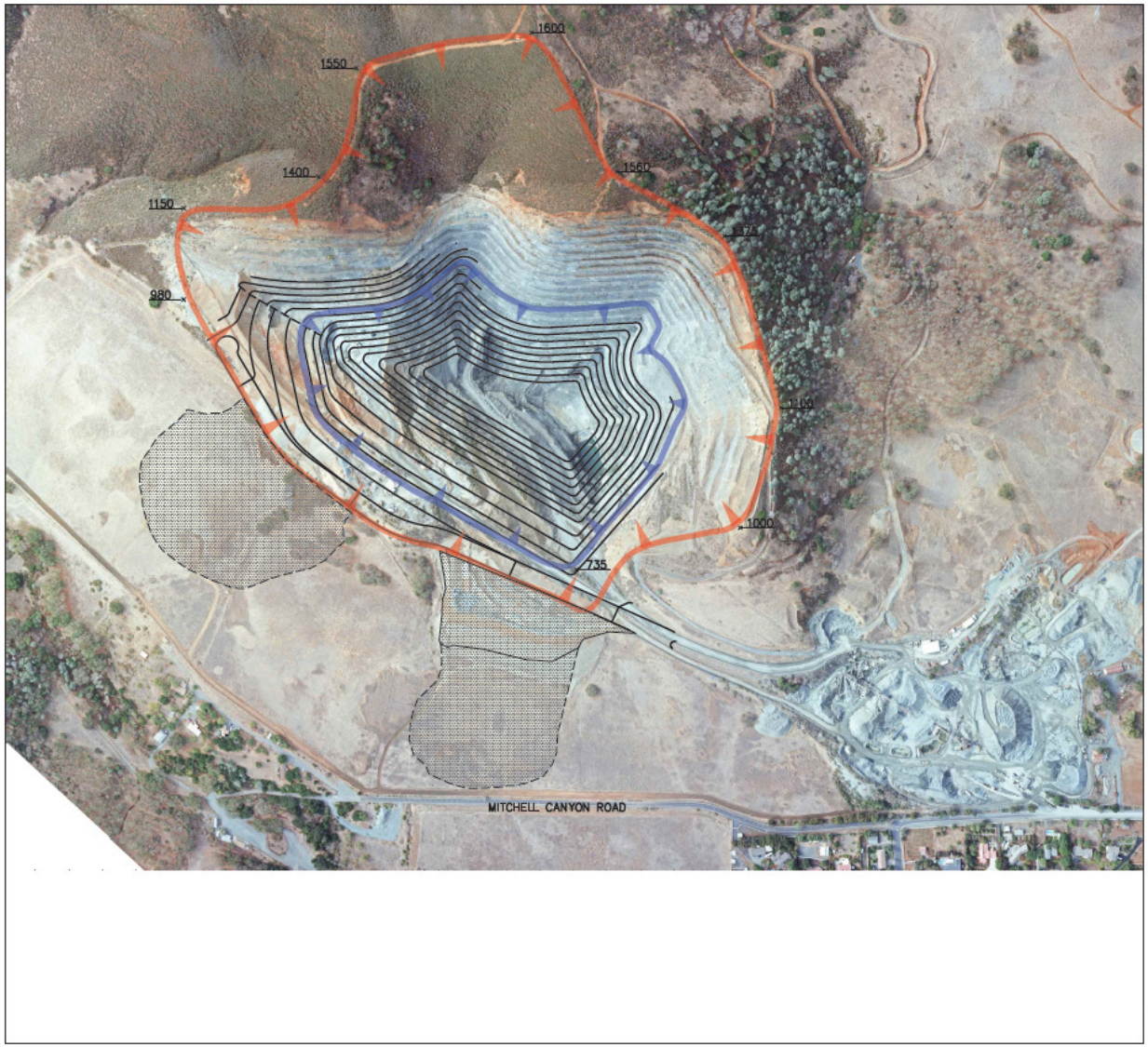
3.0 Hydrology

The hydrology evaluation of the Clayton quarry presented below is based on publicly-available climatic data and site-specific field observations. Under existing conditions, water enters the quarry from direct precipitation, runoff from the watershed above and to the west of the quarry, and springs that are present in the lower part of the quarry. CEMEX pumps rainfall and spring seepage that accumulates in the bottom of the quarry for use in dust control and aggregate processing.

3.1 Approach

Contra Costa County Flood Control and Water Conservation District (CCCFCD) has compiled and prepared a substantial amount of information related to rainfall amounts and intensities, runoff coefficients, and flood parameters. This information is readily available on the CCCFCD website at https://www.contracosta.ca.gov/5747/Hydrology-Standards and https://www.contracosta.ca.gov/5745/Documents-and-Standards. Additional information regarding rainfall and evaporation are available from various California Department of Water Resources (DWR) publications and other sources, as cited in this report.

The average rainfall at the site is based on the "CCCFCD Mean Seasonal Isohyets Compiled From Precipitation Records 1879-1973" map (Drawing B-166, 1977, updated January 2010) available at https://www.contracosta.ca.gov/DocumentCenter/View/770. According to the CCCFCD Hydrology Standards (https://www.contracosta.ca.gov/5747/Hydrology-Standards), Drawing B-166 is the valid standard for estimating mean seasonal precipitation for projects in Contra Costa County. For this evaluation, an average annual rainfall of 19.00 inches is used. A copy of map B-166 indicating the location of the Clayton Quarry, along with other hydrologic design documents, is provided in Appendix A. As discussed further below, this study uses monthly estimates of water inflows and outflows but the CCCFCD isohyetal map only provides annual rainfall. Monthly rainfall data were obtained for the City of Clayton and then the project site annual rainfall was apportioned to each month based on the monthly proportions for Clayton. It should be noted that the annual rainfall in Clayton is appreciably less than the annual rainfall at the quarry due to the elevation difference between the City and the quarry, and the orographic influence of Mount Diablo on local rainfall amounts.



LEGEND

BOUNDARY

WATERSHED BDRY.

FUTURE PIT LAKE AT ELEV. 735

1100 SPOT ELEVATION

FILL AREA

FILL (OPTIONAL)AREA

0 600'

Photo/Survey by: AeroTech Mapping
Photo Date: Nov. 5, 2015
Horizontal Datum: Cal Coord Zone III, NAD83
Vertical Datum: NAVD88

WATERSHED AREA

CEMEX CLAYTON QUARRY
CONTRA COSTA COUNTY, CA

MARCH 2017

Spinardi Associates
2265 Sea View Ave., Piedmont, CA 94610

Figure 2

The annual Class A pan evaporation at the site is approximately 63 inches per year (DWR, 1975, 1979). DWR (1975, 1979) recommends applying a factor of 0.7 to the Class A pan evaporation rate to estimate evaporation from an open water body such as a lake. Thus, for this study, a lake evaporation rate of 44.1 inches per year is used. As with rainfall data, monthly evaporation rates are not available for the quarry location. Therefore, the annual evaporation rate for the site was apportioned based on monthly data for Antioch, California (DWR, 1979), which is the closest station identified for this study with readily available monthly evaporation data and a record of appropriate duration.

Runoff volumes and peak flow rates during storm events were estimated using TR-55 (U.S. Department of Agriculture, 1986) methodology and the CCCFCD Rational Method (as described on the CCCFCD Hydrology Rational Formula webpage https://www.contracosta.ca.gov/DocumentCenter/View/765, which is included in Appendix A of this report). Based on the CCCFCD standard runoff coefficients, undisturbed open space areas were assigned a runoff coefficient of 0.40 while the disturbed industrial areas of the site were assigned a runoff coefficient of 0.90. To estimate peak discharge from the reclaimed mining excavation, the pond water surface was assigned a runoff coefficient of 1.00 (i.e. all rainfall on the pond surface would contribute to runoff from the excavation once the water elevation reaches the outlet structure elevation).

Due to the relatively small individual watershed areas and steep slopes, the calculated time of concentration was very short for all areas, typically ranging from less than one to about eight minutes. To provide a consistent basis for comparison and to avoid extreme over-estimates of the hourly rainfall intensity for short times of concentration, a minimum time of concentration of 10 minutes was used throughout this analysis, consistent with procedures described by the United States Department of Agriculture, Natural Resources Conservation Service (1986). The rainfall intensity value used in the Rational Method calculations, in inches per hour, is calculated by multiplying the rainfall depth at the time of concentration by the ratio of 60 minutes divided by the time of concentration. For example, for a time of concentration of 10 minutes, the rainfall depth at that time would be multiplied by 6 (60 divided by 10) to yield the rainfall intensity value for the Rational Method calculations. This is the approach specified by CCCFCD (https://www.contracosta.ca.gov/DocumentCenter/View/765).

For watersheds less than one square mile (640 acres), the CCCFCD Detention Basin Guidelines (https://www.contracosta.ca.gov/DocumentCenter/View/764) specify that the design storm event should have a 10-year frequency. For larger watersheds, a design storm event with a frequency of 25 years is specified for watersheds with an area of one to four square miles and a design storm with a frequency of 100 years is specified for watersheds with areas greater than four square miles. To provide a conservative evaluation of potential peak runoff rates, the analyses conducted for this study present the results for both the 10-year and 100-year events. In addition, to meet the requirements of 14 CCR Section 3706(d), the peak runoff from a 20-year, 1-hour storm event has also been estimated. Table 1 provides a summary of the estimated rainfall depths for the design storm events, based on the mean annual precipitation of 19 inches

and the CCCFCD methods described above. Duration-frequency-depth curves and probability plots are provided in Appendix A that depict the derivation of the values shown in Table 1 and the estimation of the values for the 20-year, 1-hour storm event.

TABLE 1. Estimated Rainfall Depths for Design Storm Events

Storm Frequency	24-hour Duration	1-hour Duration	Tc = 10 minutes
100-year	5.6	1.25	0.48
10-year	3.6	0.85	0.33
20-year, 1-hour	NA	0.92	0.37

All values in inches
NA = Not Applicable

To evaluate conditions within the quarry, a general water budget approach is used to compare the volume of water that is expected to enter the quarry after mining is completed with the amount of water that is anticipated to leave the quarry. Water will enter the quarry from direct rainfall on the quarry lake surface, runoff from the disturbed watershed area within the mining perimeter, runoff from the vegetated watershed area that will remain undisturbed, and spring flow. Water will leave the quarry by evaporation, percolation into fractures in the bedrock, and runoff when the water level of the quarry lake reaches the outlet structure elevation of 735 ft msl. Due to the occurrence of bedrock, the vegetated watershed area above the highwalls is assumed to belong to Soil Group D with a Curve Number of 81 based on Table 2-2d of TR-55. A wide range of storm events (but less than a 100-year storm), identified from CCCFCD and DWR Bulletin 195, was evaluated and it was estimated that approximately 40 percent of the average monthly precipitation would, in general, run off of the vegetated watershed area.

The disturbed watershed area within the quarry perimeter consists of exposed bedrock and Knoxville Formation. For this evaluation, the exposed diabase bedrock highwalls were assigned a Curve Number of 98. With this curve number, 98 percent of the average monthly precipitation would, in general, run off of the quarry walls and into the quarry lake. The reclaimed Knoxville Formation sloping into the east side of the quarry was assumed to belong to Soil Group D and a Curve Number of 81 was selected based on revegetation of native grasses, per Table 2-2d of TR-55. A wide range of storm events (but less than a 100-year storm), identified from CCCFCD and DWR Bulletin 195, was evaluated and it was estimated that approximately 60 percent of the average monthly precipitation would, in general, runoff of the reclaimed Knoxville Formation slopes.

Several small springs discharging from fractures in the quarry were observed during a field reconnaissance on May 24, 2012. The springs were primarily located in a fracture zone on the north side of the quarry, with some minor springs also located in a fracture zone on the west side of the quarry. The springs were restricted to elevations below about 600 ft msl. Flow from individual springs was very small, resulting in wet surfaces

on the rock face adjacent to the springs but no specific channel development emanating from the fractured areas. The entire quarry watershed area is located topographically higher than the surrounding land. As indicated on Figure 2, all areas outside of the watershed boundary slope away from the quarry. Because there is no upslope area outside of the quarry watershed that could act as a recharge source for the springs, it is likely that the water discharging from the springs is sourced from percolation of local rainfall into the fractured bedrock within the quarry watershed area. Some portion of the percolation that reaches fractures that intersect the bottom of the quarry will, therefore, discharge into the existing quarry. The spring flows do not represent water entering the quarry from outside of the watershed. The springs are just an additional mechanism by which local rainfall may enter the current dewatered quarry.

3.2 Quarry Area Findings

This section describes the existing hydrologic conditions at the quarry, the hydrologic conditions that would occur under the 1983 Reclamation Plan, the quarry lake water budget, and evaluation of changes in water levels in the quarry due to design storm events. For this evaluation, the runoff calculations specifically relate to sheet flow runoff from the watershed areas around the quarry. The stormwater flow evaluation addresses the volume of water that may accumulate in the quarry from individual storm events and the conveyance of that water. Appendix A includes hydrologic design documents and calculation sheets for existing conditions and the Revised Reclamation Plan. Appendix B provides calculations sheets for the 1983 Reclamation Plan. Appendix C provides a detailed spreadsheet showing the water budget calculations. Appendix D provides conveyance pipe sizing information.

3.2.1 Existing Hydrologic Conditions at the Clayton Quarry

There are several watershed areas on CEMEX property, as shown on Sheet 1. As described in Section 2.0, above, the current quarry is within a 90-acre closed watershed. Approximately 19 acres of undisturbed watershed to the west and topographically above the quarry drains into the 71-acre quarry, which currently consists of 55 acres of exposed diabase, nine acres of exposed Knoxville Formation, and a water surface area of seven acres. All runoff from this 90-acre area is contained within the existing quarry. The quarry is designated as watershed P1, the exposed highwalls are designated as watershed P2, and the undisturbed area to the west is designated as watershed P3, as shown on Sheet 1.

To the east of the quarry, vegetated slopes drain toward Mitchell Creek through several small natural drainages which pass under Mitchell Canyon Road through corrugated metal culverts. The southern part of this area is designated as watershed M1, which encompasses approximately 81 acres. At the north end of this area, as shown on Sheet 1, the 11-acre watershed M2 drains to Mitchell Canyon Road, where the flow is then routed through storm drains that follow Diablo Downs Drive to Mitchell Creek. These storm drains are part of County Drainage Area 71A (DA71A). The DA71A storm drains are discussed in more detail in Section 4.1, below. Along the east rim of the existing quarry is a transitional watershed labeled watershed T on Sheet 1. Watershed T consists of eight acres that currently drains toward the east. However, as the quarry excavation

progresses under existing quarrying entitlements, this transitional watershed will drain into the quarry under reclaimed conditions. Thus, for evaluation of existing hydrologic conditions, the runoff from watershed T is included as part of the cumulative total runoff from watershed M1 (i.e. 89 acres total).

A larger watershed drains the area north of the quarry, including the current aggregate processing plant located to the north of the existing quarry access road and site entrance. The drainage from this area flows northward through small, existing swales and eventually reaches storm drains within County Drainage Area 96 (DA96). As part of the Revised Reclamation Plan, there will be no changes to this northern watershed area, other than to reclaim the existing aggregate processing plant site. Reclamation of the plant site would involve equipment removal followed by limited grading and revegetation of the current industrial site. The revegetation would reduce the runoff coefficient of the plant site area from 0.90 to 0.40, based on the approach discussed in Section 3.1, above. The reclamation would reduce both the peak flow rate and the total runoff from the plant site compared to that which occurs under existing conditions. Since the proposed reclaimed conditions would result in less runoff than current conditions, there is no need for further quantitative analysis of the northern watershed area to support the CEQA review of the Revised Reclamation Plan.

For the quarry excavation, Mitchell Creek, and transitional watershed areas described above, peak runoff rates were calculated using the CCCFCD Rational Method approach and runoff coefficients described in Section 3.1.

The CCCFCD Rational Method approach is based on the equation:

$$Q = C * f * i * A$$

Where Q is the peak flow rate in cubic feet per second (cfs), C is a weighted runoff coefficient based on topography and land use, f is an adjustment factor based on storm frequency, i is peak rainfall intensity in inches per hour, and A is the watershed area in acres. For this evaluation, C and f were obtained from the CCCFCD document available at the link cited above. For vegetated slopes, a runoff coefficient of 0.40 is used. For steep highwall slopes with exposed bedrock in the quarry, a runoff coefficient of 0.90 is used. The adjustment factor ranges from 1.0 to 1.25, depending on the percent chance of occurrence for a design storm event. Peak rainfall intensities were determined as described in Section 3.1, above, and shown in Table 1. Rational Method calculation spreadsheets are provided in Appendix A.

Table 2 shows the peak runoff from each of the areas within the current quarry excavation watershed for the 10-year, 20-year, and 100-year storm events. In Table 2 and subsequent tables in this report, the calculated peak runoff values are rounded to the nearest whole number for values below 50 cfs and to the nearest five cfs for values above 50 cfs.

TABLE 2. Peak Runoff for Design Storm Events - Quarry Perimeter Watersheds under Existing Conditions					
Storm Frequency	Peak Runoff (cubic feet per second)				
	Upper (19 Ac)	Diabase (55 Ac)	Knoxville (9 Ac)	Water Surface (7 Ac)	Combined (90 Ac)
10-year	15	100	13	14	140
20-year	19	120	15	17	170
100-year	27	180	23	20	250

Table 3 shows the peak runoff from the eastern watershed areas that currently discharge to Mitchell Creek. The runoff for the southern part includes the eight-acre transitional watershed T plus watershed M1.

TABLE 3. Peak Runoff for Design Storm Events – Eastern Watersheds under Existing Conditions		
Storm Frequency	Peak Runoff (cubic feet per second)	
	To Mitchell Creek (M1 +T) (89 Ac)	To DA71A (M2) (11 Ac)
10-year	70	9
20-year	85	11
100-year	130	16

3.2.2 Hydrologic Conditions under the 1983 Reclamation Plan

Under the 1983 Reclamation Plan, the east rim of the quarry was to be excavated and non-marketable materials pushed into the quarry excavation such that a relatively flat reclaimed area with a slight slope toward the east would exist. All runoff from the upper 19-acre vegetated watershed, the remaining diabase high walls, the reclaimed sloping backfill, and the remaining undisturbed area would flow to the east toward Mitchell Creek. The runoff that would occur from the quarry area toward Mitchell Canyon Road was calculated using the same methods and storm events discussed above. A copy of the May 15, 1984 Final Drainage Plan for the 1983 Reclamation Plan is included as Appendix B of this report.

As indicated by the markings on the drainage plan in Appendix B, four distinct sub-watershed areas were identified for the reclaimed condition. These sub-watersheds are labeled i through iv on the drainage plan. Watershed i is relatively small, at approximately 12 acres, and includes part of the reclaimed surface and the native slope to the east. It would have drained to Mitchell Creek through an existing natural drainage and culvert under the road. Watershed ii would have included approximately 19 acres of reclaimed surface and native slope to the east. It also would have drained to Mitchell Creek through a natural drainage with an existing culvert under Mitchell Canyon Road. Watershed iii would have been 54 acres, including one acre of the upper vegetated watershed, about 10 acres of diabase highwall, and 43 acres of reclaimed surface and native slope to the east. It would have drained to Mitchell Creek through a natural drainage with an existing culvert under a private road located just outside the boundary of Mt. Diablo State Park. Watershed iv would have been approximately 135 acres, consisting of 18 acres of the upper vegetated watershed, 43 acres of diabase highwall, and 74 acres of reclaimed surface and native slope to the east. It would have drained to Mitchell Creek through the DA71A stormwater drains on Mitchell Canyon Road and Diablo Downs Drive.

The peak runoff from each of the four sub-watersheds that would have been created under the 1983 Reclamation Plan was estimated using the CCCFCD Rational Method approach, based on the same parameters described in Section 3.2.1, above. Rational Method calculation spreadsheets are provided in Appendix B. Table 4 shows the peak runoff from each of the sub-watershed areas that would have been created under the 1983 Reclamation Plan for the 10-year, 20-year, and 100-year storm events. The cumulative discharge directly to Mitchell Creek from sub-watersheds i through iii through natural drainages is also shown in Table 4.

TABLE 4. Peak Runoff for Design Storm Events – 1983 Reclamation Plan

Storm Frequency	Peak Runoff (cubic feet per second)				
	i (12 Ac)	**ii** (19 Ac)	**iii** (54 Ac)	Cumulative to Mitchell Creek (85 Ac)	**iv** (DA71A) (135 Ac)
10-year	10	15	50	75	150
20-year	12	19	65	95	185
100-year	17	27	95	140	270

3.2.3 Hydrologic Conditions under the Revised Reclamation Plan

At the end of mining, the watershed for the quarry excavation area will have increased by approximately eight acres due to inclusion of the transitional watershed T, discussed in Section 3.2.1, above. Full build-out of the quarry will have reduced the upper vegetated watershed area P3 from 19 acres to 17 acres. The water surface (P1) will eventually increase to an elevation of 735 ft (see Section 3.2.4, below) and encompass an area of 32 acres. The highwalls around the quarry lake will consist of approximately 41 acres of diabase and eight acres of Knoxville Formation slopes. Table 5 shows the peak runoff from each of the areas within the quarry excavation watershed under the Revised Reclamation Plan for the 10-year, 20-year, and 100-year storm events. In accordance with the CCCFCD Rational Formula Method, the peak runoff is calculated at the time of concentration (see discussion in Section 3.1). The hourly rainfall intensity based on the time of concentration is higher than the intensity of a one-hour storm event for the purposes of the Rational Method calculation following the CCCFCD procedures. Therefore, the peak runoff for the 20-yr storm event shown in Tables 5 and 6 exceeds that required to be evaluated under 14 CCR Section 3706(d). Rational Method calculation sheets are provided in Appendix A.

TABLE 5. Peak Runoff for Design Storm Events - Quarry Perimeter Watersheds under Revised Reclamation Plan

Storm Frequency	Peak Runoff (cubic feet per second) At Time of Concentration				
	Upper (17 Ac)	Diabase (41 Ac)	Knoxville (8 Ac)	Water Surface (32 Ac)	Combined (98 Ac)
10-year	14	73	11	65	160
20-year	17	90	14	80	200
100-year	25	135	20	90	270

Table 6 shows the peak runoff from the eastern watershed areas that will discharge to Mitchell Creek under the Revised Reclamation Plan. As discussed in Section 3.2.1, the runoff for the southern part only includes watershed M1 and not the eight-acre transitional watershed T (see Sheet 1). Watershed T drains into the reclaimed mining excavation in the Revised Reclamation Plan. Rational Method calculation sheets are provided in Appendix A.

To meet the requirements of 14 CCR Section 3706(d), any stormwater structures constructed within the quarry perimeter would need to be able to convey the peak runoff from the 20-year, 1-hour storm event. However, since CCCFCD may treat the final reclaimed quarry excavation as a detention basin, the water management structures should meet the Detention Basin Guidelines

(https://www.contracosta.ca.gov/DocumentCenter/View/764), as discussed in Section 3.1, above.

TABLE 6. Peak Runoff for Design Storm Events – Eastern Watersheds under Revised Reclamation Plan		
Storm Frequency	Peak Runoff (cubic feet per second) At Time of Concentration	
	To Mitchell Creek (M1) (81 Ac)	To DA71A (M2) (11 Ac)
10-year	65	9
20-year	80	11
100-year	115	16

3.2.4 Quarry Lake Water Budget

Water budgets for both the existing and the reclaimed quarry were developed to describe and quantify the various water inflows and outflows that will contribute to the formation of a quarry lake. The discussion in this section refers exclusively to the quarry and its surrounding watershed. Therefore, other areas of the Project site, such as the surrounding watersheds discussed in Section 3.2.1, are not included in this evaluation.

A water budget, also sometimes referred to as a water balance, for a specific hydrologic system is based on the hydrologic equation:

$$I - O = \Delta S$$

Where I is the inflow into the system, O is the outflow from the system, and ΔS is the change in water storage within the system over a specific time period (Viessman, et al., 1977). For this evaluation, a positive ΔS value means that more water is entering the quarry than leaving it, while a negative ΔS means that more water is leaving the quarry than entering it. When ΔS is equal to zero, the inflows and outflows are the same and a water balance is considered to have been achieved.

TABLE 7. Existing Conditions: Quarry Watershed Areas and Water Volumes					
Pit Lake Water Elevation (ft msl)	Undisturbed Vegetated Area (acres)	Diabase High Walls Above Water Surface (acres)	Knoxville Formation Slopes Above Water Surface (acres)	Pit Lake Water Surface Area (acres)	Pit Lake Water Volume (acre-feet)
520	19	62	9	0.35	0
530	19	62	9	0.35	1.8
540	19	59	9	3	18.5
590	19	55	9	7	275
755	19	45	6	20	2556

The 90-acre watershed area for the existing quarry consists of 19 acres of vegetated and undisturbed land above the quarry, steep highwalls comprised of diabase, slopes on the east side of the quarry consisting of Knoxville Formation, and the quarry lake water surface (which would slowly rise after mining is complete). The area of each component of the watershed and the quarry lake water volume at different water surface elevations is shown in Table 7.

Under the Revised Reclamation Plan, the 98-acre watershed area for the reclaimed quarry will consist of 17 acres of vegetated and undisturbed land above the quarry, steep highwalls comprised of diabase, slopes on the east side of the quarry consisting of Knoxville Formation, and the quarry lake water surface (which would slowly rise after mining is complete). The area of each component of the watershed and the quarry lake water volume at different water surface elevations is shown in Table 8.

The following discussion addresses conditions that would occur if mining in the existing quarry were to cease now, and conditions that would occur if the Revised Reclamation Plan were fully implemented. In both cases, once mining ceases the quarry will begin to fill with water from direct precipitation on the quarry floor and runoff from the surrounding quarry slopes and the upper watershed. As water accumulates in the quarry, the area of the quarry lake water surface will increase over time. As the area of the quarry lake increases, the area of exposed diabase highwall that acts as a watershed to the quarry lake will decrease as the lower parts of the highwall become inundated by the lake. The lowest elevation of exposed Knoxville Formation within the quarry lake is anticipated to be at approximately 625 ft msl to 630 ft msl. Therefore, the area of Knoxville Formation that acts as a watershed to the quarry lake will not begin to decrease until the water level in the lake reaches at least 625 ft msl.

TABLE 8. Revised Reclamation Plan: Reclaimed Quarry Watershed Areas and Water Volumes					
Pit Lake Water Elevation (ft msl)	Undisturbed Vegetated Area (acres)	Diabase High Walls Above Water Surface (acres)	Knoxville Formation Slopes Above Water Surface (acres)	Pit Lake Water Surface Area (acres)	Pit Lake Water Volume (acre-feet)
110	17	68	9	4	0
410	17	61	9	11	2220
530	17	56	9	16	3810
630	17	50	9	22	5690
735	17	41	8	32	8520

Water outflows from the quarry will consist almost exclusively of evaporation until the quarry fills completely. Under existing conditions, once the quarry fills to 755 ft msl, water would flow uncontrolled from the quarry lake, eventually entering the DA71A storm drains along Mitchell Canyon Road. Under the Revised Reclamation Plan, once the quarry fills to the elevation of the outlet structure at 735 ft msl, water flows from the quarry will be controlled as further described in Section 4.1. As discussed in Section 3.1, the evaporative loss from water surfaces in the quarry is estimated to be 44.1 inches per year. Almost 85 percent of the evaporative loss occurs during the warmer and drier months from April through October.

As discussed in Section 3.1, several small springs have been observed discharging water into the quarry through individual fractures or fracture zones. Due to the topographic nature of the watershed, and the occurrence of the groundwater within fractured bedrock as opposed to regionally extensive alluvial aquifers, the water that has been observed entering the quarry through fractures is most likely present due to the percolation of rainfall from within the watershed for the quarry. Once mining is completed and water begins to fill the excavation, the hydraulic pressure in the quarry lake will equilibrate with the head in the fractures at and below the elevation of the water surface. At that point, over 90 percent of the inflow to the quarry will be from rain that falls directly onto the quarry lake surface and runoff from the disturbed slopes around the quarry. The upper vegetated watershed will provide less than 10 percent of the inflow to the quarry. As a result, the relative contribution from the springs will diminish over time and spring flow will eventually cease due to increasing hydraulic pressure as the quarry fills. Therefore, for this water budget analysis, any inflow from the springs is considered to be de minimis.

Tables 9 and 10 present an incremental water budget for the quarry lake based on the existing condition quarry dimensions and on the reclaimed quarry dimensions under the Revised Reclamation Plan, respectively, for various water surface elevations. A detailed water budget spreadsheet is presented in Appendix C. The water budget is based on average annual climatic conditions and is presented in terms of a water year. A water year typically extends from October 1 of one calendar year to September 30 of the subsequent calendar year in this region of California. A water year better represents the seasonal variations in rainfall that occur in California than a calendar year does. The values presented in Tables 9 and 10 have been rounded to the nearest whole number. Due to rounding, the values may not always add up to the totals indicated.

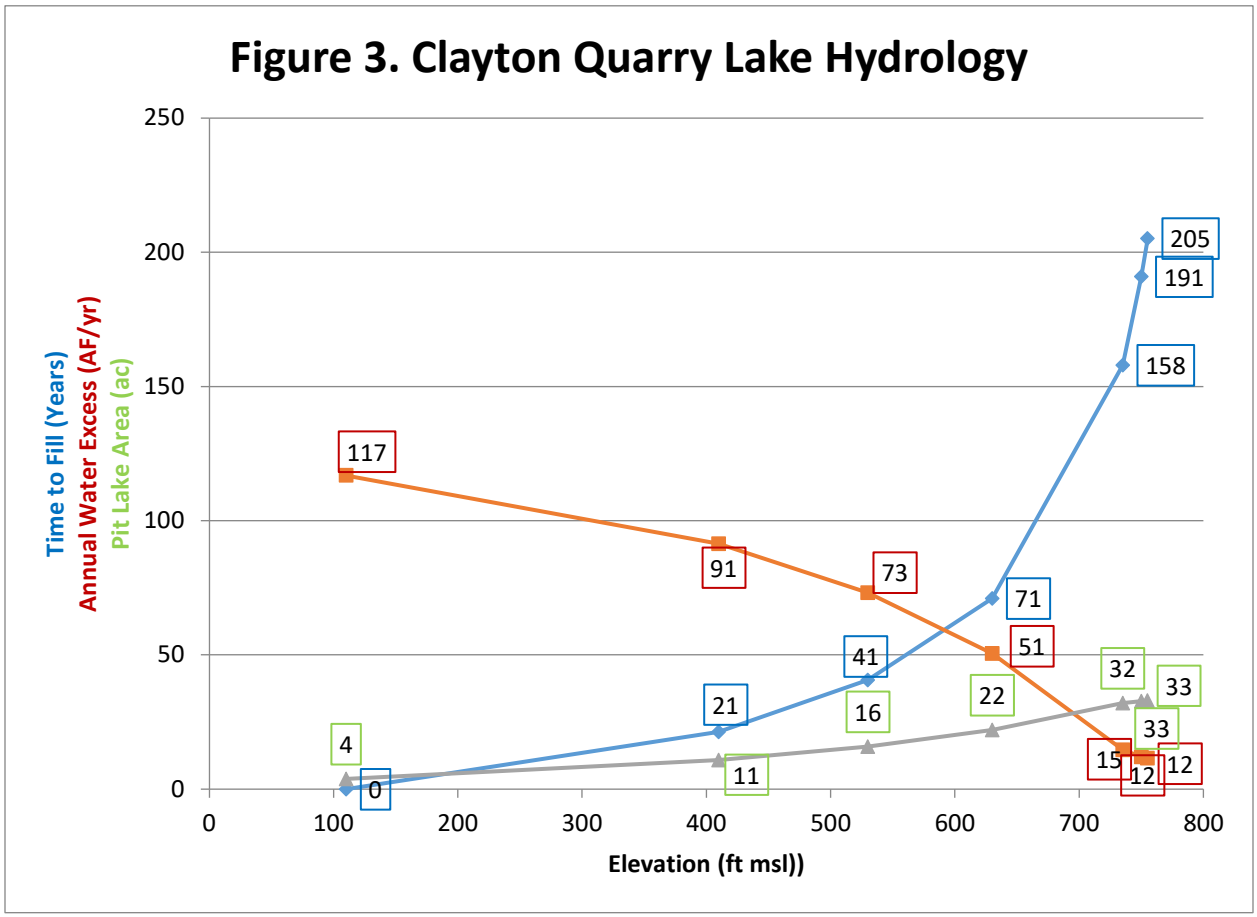
Under the Revised Reclamation Plan, as the reclaimed quarry fills with water, the surface area of the quarry lake becomes greater due to the sloping sides of the quarry. The greater water surface area results in a greater amount of evaporative loss, which reduces the net amount of water filling the quarry lake over time. For example, as indicated in Table 10, it will take approximately 21 years for the first 300 feet of the reclaimed quarry (from 110 ft msl to 410 ft msl) to fill, whereas the final 105 feet of the reclaimed quarry (from 630 ft msl to 735 ft msl) will require 87 years to fill. The total time for the reclaimed quarry lake to fill to an elevation of 735 ft msl is estimated to be 158 years. In contrast, the existing quarry would fill with water to an elevation of 755 ft msl in 39 years (see Table 9). Figure 3 shows the relationship between the increasing lake surface area and the resulting reduction in the net annual water available to fill the reclaimed quarry, along with the cumulative time for the water surface to reach various elevations and eventually fill to 735 ft msl.

If the excavation were to be partially backfilled with overburden, the reclaimed quarry would still fill to 735 ft msl but the time to reach that elevation would be less.

TABLE 9. Existing Conditions: Incremental Water Budget for Existing Quarry								
Elevation (ft msl)	Inflows (AF/yr)				Outflow-Evaporation (AF/yr)	Net Inflow Minus Outlfow (AF/yr)	Time to Fill (years)	
	Runoff from 19-Acre Undisturbed Vegetated Area	Runoff from Diabase Highwalls	Runoff from Knoxville Formation Slopes	Direct Rainfall on Lake Surface			Incremental	Total
530	12	962	9	1	1	116	--	--
590	12	85	9	11	26	91	3	3
755	12	70	6	32	74	45	36	39

TABLE 10. Revised Reclamation Plan: Incremental Water Budget for Reclaimed Quarry								
Elevation (ft msl)	Inflows (AF/yr)				Outflow-Evaporation (AF/yr)	Net Inflow Minus Outlfow (AF/yr)	Time to Fill (years)	
	Runoff from 17-Acre Undisturbed Vegetated Area	Runoff from Diabase Highwalls	Runoff from Knoxville Formation Slopes	Direct Rainfall on Lake Surface			Incremental	Total
110	11	106	9	6	14	117	--	--
410	11	95	9	17	40	91	21	21
530	11	87	9	25	58	73	19	41
630	11	77	9	35	81	51	30	71
735	11	71	8	51	118	15	87	158
750	11	63	7	52	120	12	33	191
755	11	41	7	52	121	11	14	205

NOTE: Evaluation of conditions and time for the lake surface to reach 750 ft msl and 755 ft msl included at request of CCCFCD staff to identify timeframes available for corrective measures if the outlet structure at 735 ft msl becomes blocked or the discharge pipe requires repair.



If mining were to cease now in the existing quarry, the water surface would reach the lowest elevation of the quarry rim, at 755 ft msl, in approximately 39 years. Once the water level reaches the quarry rim, an average of 45 acre-feet per year would flow from the existing quarry.

As indicated in Table 10 and on Figure 3, within the reclaimed quarry lake under the Revised Reclamation Plan the water surface will continue to rise until it reaches the outlet elevation of 735 ft msl. At that elevation, there is still a net annual excess of inflow from rainfall versus outflow from evaporation of 15 acre-feet per year. Thus, once the water level reaches an elevation of 735 ft msl, an outlet structure that will allow, on average, 15 acre-feet of water per year to flow from the quarry will be needed to prevent the water level from continuing to increase. In terms of the water budget, the outflow of 15 acre-feet per year combined with the evaporative loss, will then balance the annual average inflow, resulting in a ΔS of zero, which means a water balance will be achieved in the reclaimed quarry lake.

To assess the urgency of conditions that might occur if the outlet structure became obstructed or the discharge pipe were not adequately maintained, CCCFCD staff requested that CEMEX evaluate the time that it would take for the quarry lake to fill from 735 ft msl to the spill point elevation if water was unable to flow through the outlet structure

once the quarry lake had filled 735 ft msl. Table 10 and Figure 3 show the incremental time for the quarry to fill from 735 ft msl to 750 ft msl and from 750 ft msl to 755 ft msl. The lowest elevation of the native geologic material around the rim of the reclaimed quarry would be at 750 ft msl. A five-foot high rip-rap berm to prevent wave overtopping (see Section 4.2, below) is proposed as part of the Revised Reclamation Plan, which would have a maximum elevation of 755 ft msl. As indicated on Table 10 and Figure 3, it would take 33 years for the water in the reclaimed quarry lake to rise from 735 ft msl to 750 ft msl if the outlet structure became obstructed. It would take an additional 14 years for the water to rise from 750 ft msl to 755 ft msl. The estimation of the time for the water to rise from 735 ft msl to these two higher elevations was conducted to assess the timeframes available to conduct maintenance and repairs on the outlet structure or discharge pipe if either became damaged or blocked. This assessment demonstrates that there would be several decades available to conduct maintenance or implement repairs if necessary in the future, before the risk of an overflow would occur.

3.2.5 Stormwater Flows into Reclaimed Quarry

As described in Section 3.2.3, under the Revised Reclamation Plan a water balance will be achieved in the reclaimed quarry lake by allowing an average of 15 acre-feet per year of water to flow from the lake once the water level reaches 735 ft msl. However, during an individual year, large storm events could cause appreciable short-term fluctuations in water levels and potential outflow rates from the lake once it reaches 735 ft msl. To assess the potential peak stormwater outflows from the reclaimed quarry lake, several different design storm frequencies and durations have been considered, based on various applicable regulations and guidelines. 14 CCR Section 3706(d) states that stormwater conveyance and erosion control systems are to be designed to address the runoff from a 20-yr, 1-hr storm event. CCCFCD (1991) provides recommendations for design storm selection for detention basin sizing. CCCFCD recommends that for watersheds under one square mile (640 acres) a 10-year storm should be used, for watersheds between one square mile and four square miles that a 25-year storm should be used, and for watersheds larger than four square miles that a 100-year storm should be used and that two feet of freeboard should be provided.

Although the total area of the watershed for the quarry and of the surrounding watersheds discussed in Section 3.2.1 are substantially less than one square mile, evaluation of a 100-year storm was also conducted to provide a very conservative, or overly protective, analysis due to the steepness of the watershed area and the location of the quarry upstream from residential areas. As a result, for this evaluation the runoff volumes and rates from a 10-year, 24-hour storm event, a 20-yr, 1-hr storm event, and a 100-yr, 24-hr storm event are identified. As indicated on the probability chart in Appendix A, a 20-yr, 1-hr storm will produce 0.92 inches of rainfall (see Table 1). Using CCCFCD precipitation duration-frequency-depth curves (see Appendix A), the rainfall from a 10-yr, 24-hr storm is 3.6 inches and that from a 100-yr, 24-hr storm is 5.6 inches (see Table 1).

Using the approach and runoff parameters discussed in Sections 3.1 and 3.2.1, above, the total runoff into the quarry lake, including direct rainfall onto the lake surface, from a 20-yr, 1-hr storm event is 6.7 acre-feet (Appendix A). Over the 32-acre quarry lake

surface, the total runoff from a 20-yr, 1-hr storm would cause the lake surface to rise by 0.21 feet, or 2.5 inches.

Using the approach and runoff parameters discussed in Sections 3.1 and 3.2.1, above, the total runoff into the quarry, including direct rainfall onto the quarry lake surface from a 10-yr, 24-hr storm would be 25 acre-feet and from a 100-yr, 24-hr storm event would be 42 acre-feet (Appendix A). Over the 32-acre quarry lake surface, the total runoff from a 10-yr, 24-hr storm event would cause the lake surface to rise by 0.78 feet, or about nine inches. A 100-yr, 24-hr storm would cause the lake surface to rise by 1.3 feet or 16 inches. These values are summarized in Table 11.

If the quarry were to be partially backfilled with overburden, the total runoff volume and runoff rate into the quarry lake from the design storm events would not change from those described above.

4.0 Quarry Lake Hydraulics

As described in Section 3.2.3, under the Revised Reclamation Plan the reclaimed quarry will eventually fill with water to form a lake with a design outflow elevation of 735 ft msl. The following sections describe the approach for stormwater storage and conveyance from the quarry lake and the measures to ensure that a seismically generated wave will not result in a major or uncontrolled release of water from the lake.

4.1 Water Storage and Conveyance

For the purpose of managing stormwater drainage, Contra Costa County is divided into numerous Drainage Areas (DAs). The quarry and part of the plant site are located in DA71. The neighborhood immediately to the east of the quarry entrance and the plant site is within a small subdivision of DA71 designated as DA71A. The north side of Mt. Zion, the northwestern part of the plant site, and the open field north of the plant site are located within DA96. The DA boundaries are shown on Figure 4. A map showing the existing storm drains within DA71A was obtained from CCCFCD and is shown on Figure 5.

Runoff from areas along Mitchell Canyon Road, including watershed M2 east of the quarry, as discussed in Section 3.2.1, is directed to DA71A through a series of drop inlets into a 15-inch reinforced concrete pipe (RCP) that connects to an 18-inch RCP that drains to Mitchell Creek (Figure 5). Mitchell Creek is a tributary of Mt. Diablo Creek. Drawings showing invert elevations could not be located through CCCFCD. Therefore, slope gradients were determined from field reconnaissance and measurements made using Google™ Earth Pro®. Based on these slopes and roughness coefficients defined in CCCFCD documents, the capacity of the 15-inch RCP storm drain is approximately 18 cubic feet per second (cfs). Based on the watershed area and CCCFCD (1991) guidance, as discussed in Section 3.2.4, the storm drains within DA71A should be designed to convey the runoff from a 10-year storm event. As shown in Table 3, the peak runoff from watershed M2 due to a 10-year storm event is nine cfs. This value does not include runoff from Mitchell Canyon Road itself.

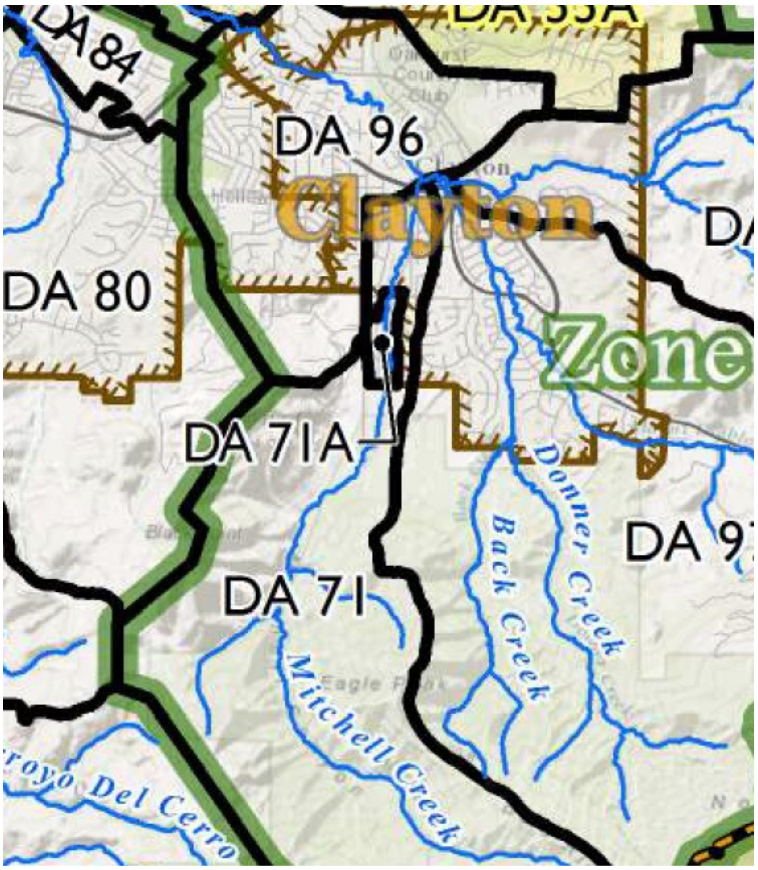


Figure 4. Drainage Area Boundaries

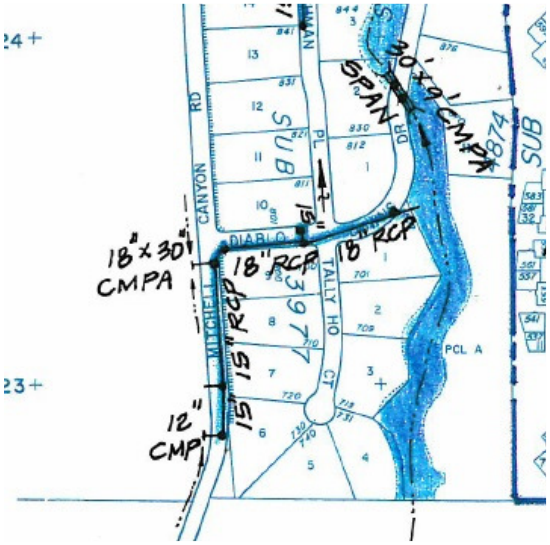


Figure 5. DA71A Storm Drains East of CEMEX Site

As discussed in Section 3.2.4, once the quarry lake fills to 735 ft msl, there will be an annual average discharge of approximately 15 acre-feet. Based on average monthly

rainfall patterns, this discharge will typically occur from January through March, with average monthly discharge rates being less than 0.1 cfs in January, to 0.4 cfs in February, to 0.25 cfs in March. As discussed in Section 3.2.4, however, uncontrolled runoff from individual storm events would be much higher. Assuming that the water level in the reclaimed quarry lake was at an elevation of 735 ft msl at the time a storm event began, Table 5 indicates that the peak uncontrolled outflow from the lake would be as high as 160 cfs for a 10-yr storm, 200 cfs for a 20-yr storm, and 270 cfs for a 100-yr storm.

As discussed in this section, above, these unrestricted flows would exceed the capacity of the downstream storm drainage facilities in DA71A. Therefore, the Revised Reclamation Plan provides for flows from the reclaimed quarry lake to be controlled using an outlet structure, as discussed further below.

The outlet structure from the reclaimed quarry lake would consist of a bulkhead containing a steel plate coated to prevent corrosion. The steel plate would include a notch or hole with an invert elevation of 735 ft msl. The notch would allow water to flow through the outlet structure at the rates identified in Table 11 for the design storm events. A 12-inch high-density polyethylene (HDPE) pipe would be sufficient to convey these flows from the outlet structure to the DA71A storm drain facilities along Mitchell Canyon Road (see Appendix D). However, to provide greater access for maintenance, a 24-inch HDPE pipe will be used. The 24-inch pipe would be installed in a larger diameter casing pipe through the quarry rim using the bore and jack method.

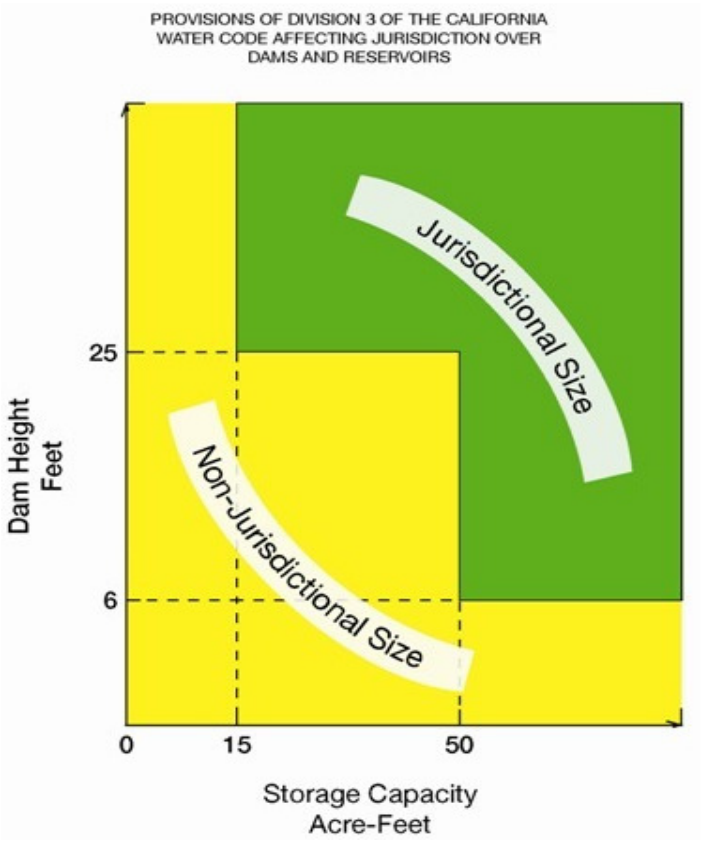
TABLE 11. Water Volumes and Outflow Rates from Reclaimed Quarry

Storm Event	Runoff into Quarry (ac-ft)	Increase in Water Depth (ft)	Flow Rate through Outlet Structure (cfs)
10-yr, 24-hr	25	0.78	4.2
20-yr, 1-hr	7	0.21	2.3
100-yr, 24-hr	42	1.32	5.5

Water present in the quarry lake below an elevation of 735 ft msl would be contained completely within native geologic formations in the subsurface excavation. As shown in Table 11, the water level in the reclaimed quarry lake would increase by 0.78 feet due to a 10-yr, 24-hr storm, by 0.23 ft due to a 20-yr, 1-hr storm, and by 1.32 ft due to a 100-yr, 24-hr storm. At the design outflow rates shown in Table 11, the water that would enter the quarry lake from a 10-yr, 24-hr storm would drain through the outlet structure in three days, the volume of water that would enter the lake from a 20-yr, 1-hr storm would drain through the outlet structure in approximately 1.5 days, and the water that would enter the lake from a 100-yr, 24-hr storm would drain through the outlet structure in approximately 3.9 days.

As discussed further in Section 4.2, the lowest elevation of native unmined material along the quarry perimeter will be 750 ft msl. Unless multiple 100-yr, 24-hr storms occur within three days of each other, the quarry lake would contain less than 50 acre-feet of water above the elevation of the invert elevation of the outlet structure, and the depth of the water above that elevation would be less than 1.3 feet. Figure 6, below, shows the jurisdictional dam sizes that are regulated by the California Department of Water Resources Division of Safety of Dams (DSoD). The outlet structure and pipe would be constructed completely within undisturbed native geologic materials, there would be less than 50 acre-feet of water above the outlet structure, and the depth of the water above the outlet structure would be less than six feet. Therefore, the reclaimed quarry lake and outlet structure do not fall under the jurisdiction of DSoD, as confirmed in correspondence from DSoD to CEMEX dated February 7, 2019.

Figure 6.



Source: http://www.water.ca.gov/damsafety/images/JurisChart5.jpg (accessed 4-30-2015).

At the east end of the jack-and-bore pipe section, the natural surface slope steepens to 12 percent. A 24-inch HDPE pipe will continue down this slope for approximately 1700 feet. As discussed above, a 12-inch HDPE pipe will accommodate over 20 cfs at a grade of 12 percent and would be sufficient to convey the discharge. However, to address maintenance concerns expressed by CCCFCD, a 24-inch pipe will be used.

Formation of a quarry lake under the Revised Reclamation Plan would prevent runoff from the mined area until the quarry fills with water to 755 ft msl. At that point, without some other action, runoff from storm events would leave the quarry uncontrolled and could potentially exceed the capacity of existing stormwater management systems. In contrast, the outlet structure at 735 ft msl and conveyance system proposed under the Revised Reclamation Plan will reduce the overall runoff from the mined area, including the high walls, by retaining the runoff in the quarry lake and, once full, slowly releasing runoff after a storm event. The reclaimed quarry will be capable of completely retaining the runoff from both a 100-yr, 24-hr storm event and a 20-yr, 1-hr storm event, with more than 18 feet of freeboard. The release rate of 5.5 cfs or less is much lower than the rate of uncontrolled runoff that would occur from the 100-yr, 24-hr storm or the 20-yr, 1-hr storm. Outflow from the reclaimed quarry lake will be constrained within a series of pipes to convey the water to existing drainage courses in DA71A at flow velocities that will not create erosion and siltation.

The Revised Reclamation Plan would not change the location of the discharge from the quarry lake area to a different drainage area. All facilities would have sufficient capacity available to accept the discharge from the 20-yr, 1-hr storm event. Thus, the Revised Reclamation Plan is consistent with 14 CCR Section 3706(d).

4.2 Wave Overtopping Analysis

In support of the Revised Reclamation Plan, and at the request of Contra Costa County, CEMEX directed Golder Associates to perform an evaluation of the potential for a seismically-induced landslide from the quarry highwall to generate waves that could overtop the pit rim in the area of the outlet structure (Golder Associates, 2016). The findings of the wave evaluation are summarized in this section.

The analysis performed by Golder Associates (2016) considered two different scenarios. Assumptions for both scenarios are listed below.

Scenario 1:

- Outlet structure at 735 ft msl, with a quarry bench added at the location of the outlet;
- 2:1 (H:V) slope above the outlet structure;
- 2:1 slope above outlet structure covered with rip rap or other material to provide a high level of roughness;
- Top of native material at 750 ft msl in area of outlet structure;
- Five-foot high rip rap pile, 35 feet in width (east to west), added to top of quarry rim above outlet structure.

Scenario 2:

- Outlet structure at 715 ft msl, at the elevation of an existing quarry bench;
- 2:1 (H:V) slope above the outlet structure;
- 2:1 slope above outlet structure consisting of smooth native material;

- Top of native material at 750 ft msl in area of outlet structure;
- Five-foot high rip rap pile, 25 feet in width (east to west), added to top of quarry rim above outlet structure.

The east side of the rip rap pile would be covered with soil and vegetated to visually screen the rip rap and blend with the surrounding slopes.

The wave analysis concludes that under scenario 1, the maximum total volume of water that could potentially overtop the quarry rim would be approximately 20 gallons. This small volume of water would be easily absorbed by the top soil and vegetation on the east side of the rip rap pile, such that there would not be any erosion of downslope soils or effects to other downslope properties. Under scenario 2, the analysis concludes that there would not be any overtopping of the quarry rim.

5.0 Water Quality

This section evaluates the potential water quality of storm water runoff from disturbed and reclaimed surfaces that will be formed as part of the Revised Reclamation Plan. Water quality in the future reclaimed quarry lake will be addressed by others.

To evaluate the potential for minerals within the diabase and the Knoxville Formation to leach into rain water that runs off of reclaimed surfaces and enters storm water conveyances, leaching tests were conducted on samples collected at the Clayton Quarry. Samples of crushed diabase material from the product piles in the processing plant area and samples of native Knoxville Formation from the east rim of the quarry were obtained on March 12, 2014 and submitted to California Laboratory Services in Rancho Cordova, California. The samples were leached using deionized water following the Waste Extraction Test protocols. This type of test is commonly referred to as a DI-WET test.

The DI-WET analytical protocol uses a 10-fold dilution of the solid sample to the deionized water leaching fluid and a 48-hour contact time. These parameters are generally applicable to evaluation of the potential for normal rainfall to leach minerals and metals from soils. The test typically involves crushing the sample to a two-millimeter grain size, which would be consistent with soil particle sizes. However, for exposed bedrock areas such as those that would occur on the walls of the reclaimed quarry, the DI-WET test may actually provide a much greater surface area for leaching than would occur under field conditions where the storm water is running over the surface of the bedrock. Overall, the results from the DI-WET test are considered to be indicative of the effects geologic materials may have on the quality of transient waters such as rainfall runoff.

The leachate samples generated from the DI-WET extraction of the diabase and the Knoxville Formation were analyzed for general minerals and metals. The results for the diabase are shown in Table 12 and the results for the Knoxville Formation are shown in Table 13. The laboratory analytical results are provided in Appendix E.

The DI-WET analytical results for the diabase show equilibrium concentrations of total dissolved solids of 44 milligrams per liter (mg/L), and levels of general mineral salts such as sodium, potassium, calcium, magnesium, chloride, and sulfate all less than 10 mg/L.

The total alkalinity was 24 mg/L and the pH was 8.78. The alkaline pH indicates that there will not be an issue with potential acid rock drainage in the runoff. Heavy metals such as iron, manganese, arsenic, chromium, and lead were not detected in the DI-WET leachate. The only metal detected was aluminum at a concentration of 220 micrograms per liter (μg/L). All of the constituents detected in the DI-WET leachate from the diabase meet applicable Regional Water Quality Control Board discharge standards (RWQCB, 2015). The detected concentrations are below drinking water standards, with the exception of aluminum, which slightly exceeds the secondary maximum contaminant level (MCL) of 200 μg/L. It should be noted, however, that MCLs apply only to drinking water and may not be applicable to water quality in storm water runoff.

The DI-WET analytical results for the Knoxville Formation show equilibrium concentrations of total dissolved solids of 63 milligrams per liter (mg/L), and levels of general mineral salts such as sodium, potassium, calcium, magnesium, chloride, and sulfate all less than 10 mg/L. The total alkalinity was 35 mg/L and the pH was 8.16. The alkaline pH indicates that there will not be an issue with potential acid rock drainage in the runoff. Several metals were detected in the leachate sample from the Knoxville Formation, including aluminum at 150 μg/L, barium at 43 μg/L, iron at 220 μg/L, and zinc at 31 μg/L. All of the constituents detected in the DI-WET leachate from the Knoxville Formation meet applicable Regional Water Quality Control Board discharge standards (RWQCB, 2015). The concentrations of TDS and detected metals are also less than the respective drinking water MCLs.

TABLE 12

Laboratory Analytical Results for DI-WET Test of Diabase
CEMEX Clayton Quarry
Contra Costa County, California

General Minerals and Salts			General Minerals and Salts		
Constituent	Result	Units	Constituent	Result	Units
Total Alkalinity	24	mg/L	Mercury	<1.0	µg/L
Bicarbonate as $CaCO_3$	19	mg/L	Antimony	<50	µg/L
Carbonate as $CaCO_3$	5.6	mg/L	Barium	<20	µg/L
Hydroxide as $CaCO_3$	<5.0	mg/L	Beryllium	<10	µg/L
Chloride	1.6	mg/L	Cadmium	<10	µg/L
Fluoride	<0.10	mg/L	Cobalt	<20	µg/L
Nitrate as NO_3	<0.50	mg/L	Chromium	<20	µg/L
Sulfate	7.7	mg/L	Molybdenum	<20	µg/L
Specific Conductance	69	µmhos/cm	Nickel	<20	µg/L
MBAS	0.16	mg/L	Vanadium	<20	µg/L
Calcium	6.0	mg/L	Zinc	<20	µg/L
Magnesium	2.2	mg/L	Aluminum	220	µg/L
Potassium	<1.0	mg/L	Boron	<50	µg/L
Sodium	4.6	mg/L	Iron	<100	µg/L
Hardness as $CaCO_3$	24	mg/L	Manganese	<20	µg/L
Nitrite as N	<0.40	mg/L	Arsenic	<5.0	µg/L
pH	8.78	std units	Lead	<5.0	µg/L
Total Dissolved Solids	44	mg/L	Selenium	<5.0	µg/L
			Thallium	<5.0	µg/L
			Copper	<20	µg/L
			Silver	<10	µg/L

As runoff and rainfall accumulate within the quarry after mining is completed, the water will begin to equilibrate with the diabase in the quarry walls. Once the water level exceeds approximately 630 ft msl, the water in the quarry lake will also begin to equilibrate with the Knoxville Formation. During the dry season, some of the water in the lake will evaporate, which could result in increased concentrations of the salts and other dissolved solids. However, the volume of rainfall and runoff that enters the quarry each year is greater than the volume of water that evaporates.

TABLE 13

Laboratory Analytical Results for DI-WET Test of Knoxville Formation
CEMEX Clayton Quarry
Contra Costa County, California

General Minerals and Salts			General Minerals and Salts		
Constituent	Result	Units	Constituent	Result	Units
Total Alkalinity	35	mg/L	Mercury	<1.0	µg/L
Bicarbonate as $CaCO_3$	35	mg/L	Antimony	<50	µg/L
Carbonate as $CaCO_3$	<5.0	mg/L	Barium	43	µg/L
Hydroxide as $CaCO_3$	<5.0	mg/L	Beryllium	<10	µg/L
Chloride	<0.50	mg/L	Cadmium	<10	µg/L
Fluoride	0.17	mg/L	Cobalt	<20	µg/L
Nitrate as NO_3	0.56	mg/L	Chromium	<20	µg/L
Sulfate	1.9	mg/L	Molybdenum	<20	µg/L
Specific Conductance	70	µmhos/cm	Nickel	<20	µg/L
MBAS	0.65	mg/L	Vanadium	<20	µg/L
Calcium	7.5	mg/L	Zinc	31	µg/L
Magnesium	2.7	mg/L	Aluminum	150	µg/L
Potassium	<1.0	mg/L	Boron	<50	µg/L
Sodium	2.6	mg/L	Iron	220	µg/L
Hardness as $CaCO_3$	30	mg/L	Manganese	<20	µg/L
Nitrite as N	<0.40	mg/L	Arsenic	<5.0	µg/L
pH	8.16	std units	Lead	<5.0	µg/L
Total Dissolved Solids	63	mg/L	Selenium	<5.0	µg/L
			Thallium	<5.0	µg/L
			Copper	<20	µg/L
			Silver	<10	µg/L

The laboratory testing results demonstrate that the diabase bedrock and Knoxville Formation do not leach heavy metals or high concentrations of salts, and do not have the potential to generate acid rock drainage. Evaluation of the equilibrium water quality in the future reclaimed quarry lake is being addressed by others and will be submitted to the County in a separate report. It is anticipated that a Report of Waste Discharge (RoWD) will need to be submitted to RWQCB once mining is completed. Based on the information in the RoWD, RWQCB staff will determine whether Waste Discharge Requirements and related monitoring will be appropriate for the quarry lake and the discharge through the outlet structure. It is worth noting that under existing conditions (an existing open excavation), if the project proponent did not complete mining and implement reclamation as allowed under the 1983 Reclamation Plan then a RoWD would likely still be required

because the open excavation would slowly fill with water and eventually discharge to downstream drainage courses. Compliance with any Waste Discharge Requirements that may be issued once mining is completed will maintain compliance with applicable water quality standards and prevent degradation of surface water and groundwater quality.

The Clayton Quarry is not being mined in geologic materials that form aquifers that are the source of water for domestic, agricultural, or other uses. As such, the Revised Reclamation Plan does not have the potential to affect the quality of water, recharge potential, and storage capacity of ground water aquifers. Therefore, the Revised Reclamation Plan is consistent with 14 CCR Section 3706(b).

6.0 Mosquito Control

Based on information published by the Contra Costa County Mosquito and Vector Control District (http://www.contracostamosquito.com/PDF/CCMVCD-BMP-2012.pdf), the quarry lake will have minimal potential to encourage breeding of mosquitos. According to the District, conditions that encourage mosquito breeding in standing water bodies are shallow depths, fluctuations in water levels that discourage natural predators, and the presence of emergent vegetation. Due to the steep sidewalls on the quarry, there will be few, if any, areas of shallow water in the quarry lake. The anticipated annual fluctuation of water elevation of approximately 2.5 feet, as described above, is very small in comparison with the overall depth of the lake. The steep side slopes around the lake, in most cases consisting of vertical rock walls, will minimize the potential for emergent vegetation to form. However, if circumstances develop that could allow the development of mosquitos under certain hydrologic conditions, management practices consistent with those recommended by the District would be implemented. An example would be the introduction of mosquito fish to the lake.

7.0 References Cited

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DRAWING SHEETS

CEMEX CLAYTON QUARRY RECLAMATION DRAINAGE PLAN (SPINARDI AND ASSOCIATES, 2020)

CEMEX CLAYTON QUARRY

DRAINAGE PLAN

EXISTING vs RECLAIMED CONDITIONS

Existing Drainage Conditions: Existing drainage conditions consist of runoff from three primary watershed areas. The Quarry Pit watershed areas (labeled P1, P2, and P3 on the Drainage Plan map) drain into the existing quarry. The Mitchell Creek watershed areas (M1 and M2) drain the area east of the existing quarry and discharge either directly to Mitchell Creek DA71 through local natural drainages (M1) or to the DA71A storm drain system near and along Diablo Downs Drive (M2) that convey the runoff to Mitchell Creek. Runoff from the area north of the quarry and the plant site area north of the haul road and site entrance drains to the north. There is also a small (8-acre) transitional watershed area (T) that currently drains toward Mitchell Creek but that will be captured by the Quarry Pit as mining progresses.

Reclamation Drainage Conditions: Once mining ceases, the runoff from the Quarry Pit watersheds (P1, P2, and P3) and from the transitional water shed (T) will accumulate in the quarry excavation, eventually forming a lake. Once the water level in the pit lake reaches an elevation of 735 ft msl, it would be discharged through an outlet structure that would control the rate of flow. The outlet structure would consist of a 4" X 9" slot in a concrete and steel bulkhead that would allow the water to flow into a 24-inch diameter discharge pipe. While a 12-inch pipe would be more than adequate for the projected discharge rates, the pipe has been over-sized to facilitate maintenance. The discharge pipe would connect to a drop inlet near Mitchell Canyon Road and Diablo Downs Drive, where the DA71A storm drain system would convey the water to Mitchell Creek.

Under the Revised Reclamation Plan, runoff from the north watershed and plant site area will remain unchanged, other than an anticipated small reduction in flows due to the reclamation and revegetation of the current industrial plant site area. Thus, runoff to the north would be reduced under the proposed conditions.

The outlet structure at the north end of the quarry basin will limit the peak outflow rate from the quarry to 4.2 cfs during a 10-year storm event and 5.5 cfs during a 100-year storm event. In addition, the peak storm flows from the quarry would likely not occur until after the peak flows from the lower sub-watersheds had begun to recede due to the time it would take water in the quarry basin to accumulate and rise above the outlet structure opening. As a result, the flow from the quarry would not reach the DA71A storm drains until after the peak storm flows from the more downslope watershed area (M2) had begun to subside.

Under the Revised Reclamation Plan, the 4.2 cfs (for a 10-year event) or 5.5 cfs (for a 100-year event) runoff from the quarry basin into Mitchell Creek and downstream areas would be more than offset by the change in discharge of the transitional watershed T from Mitchell Creek under existing conditions to the quarry pit under reclaimed conditions, as summarized in Table 1. This change is due to the east edge of the mining area being moved approximately 200 feet to the east under existing entitlements. Under existing conditions, the 10-yr storm runoff from transitional watershed T to Mitchell Creek is 6.3 cfs. Under project reclamation conditions, the 10-yr storm runoff from the quarry will be 4.2 cfs. Therefore, for the 10-yr storm the project runoff would be less than the existing runoff by about 2.1 cfs. For the 100-year storm event, runoff under existing conditions from transitional watershed T to Mitchell Creek is 11.5 cfs whereas under reclaimed conditions the peak discharge from the quarry basin would be 5.5 cfs. Therefore, for the 100-yr storm the project runoff would be less than the existing runoff by 6 cfs. Table 1 shows the reduction in runoff to Mitchell Creek due to the project reclamation conditions.

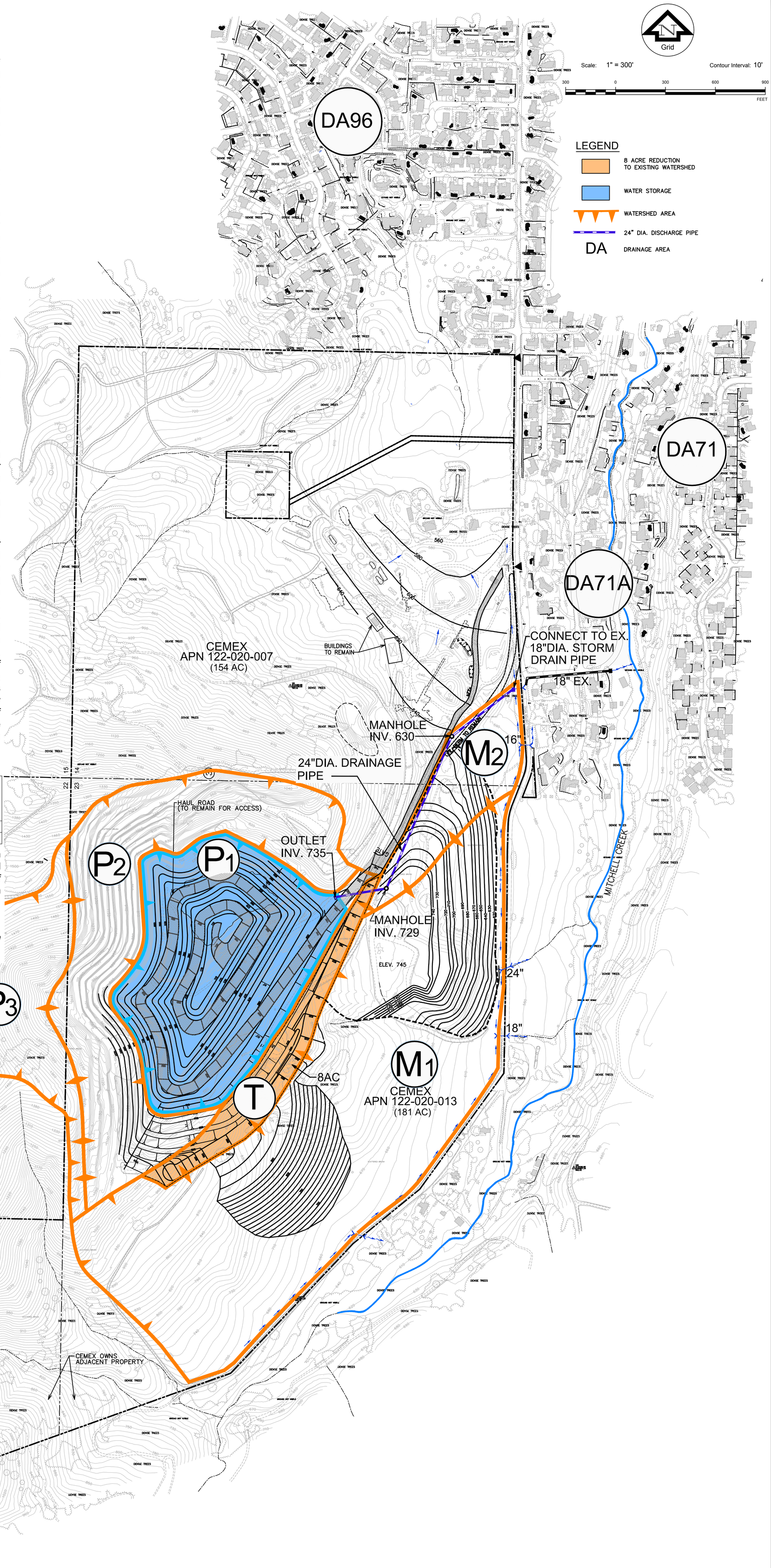
TABLE 1- EXISTING VS RECLAIMED RUNOFF CONDITIONS

Storm Event	Existing Runoff from Watershed T (8 acres)	Controlled Discharge from Reclaimed Quarry	Δ in Runoff to Mitchell Creek
10-year	6.3 cfs	4.2 cfs	- 2.1 cfs
100-year	11.5 cfs	5.5 cfs	- 6.0 cfs

The DA71A storm drain system from the intersection of Mitchell Canyon Road and Diablo Downs Drive to the discharge point in Mitchell Creek will be reevaluated for capacity and functionality and upgraded by CEMEX if deemed inadequate, prior to the time that the quarry pit lake would reach an elevation of 735 ft msl.

References

1. *EMKO Environmental, Inc., Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry*



SHEET NUMBER 1 OF 1 SHEETS				SCALE: 1"=300'
JOB NUMBER -				DATE: MAY, 2020
				DESIGN BY: KDS
				DRAWN BY: MLWH
	REV.	DATE	DESCRIPTION / BY	CHECKED BY: KDS

CEMEX CLAYTON QUARRY

RECLAMATION DRAINAGE PLAN

CONTRA COSTA COUNTY — CALIFORNIA

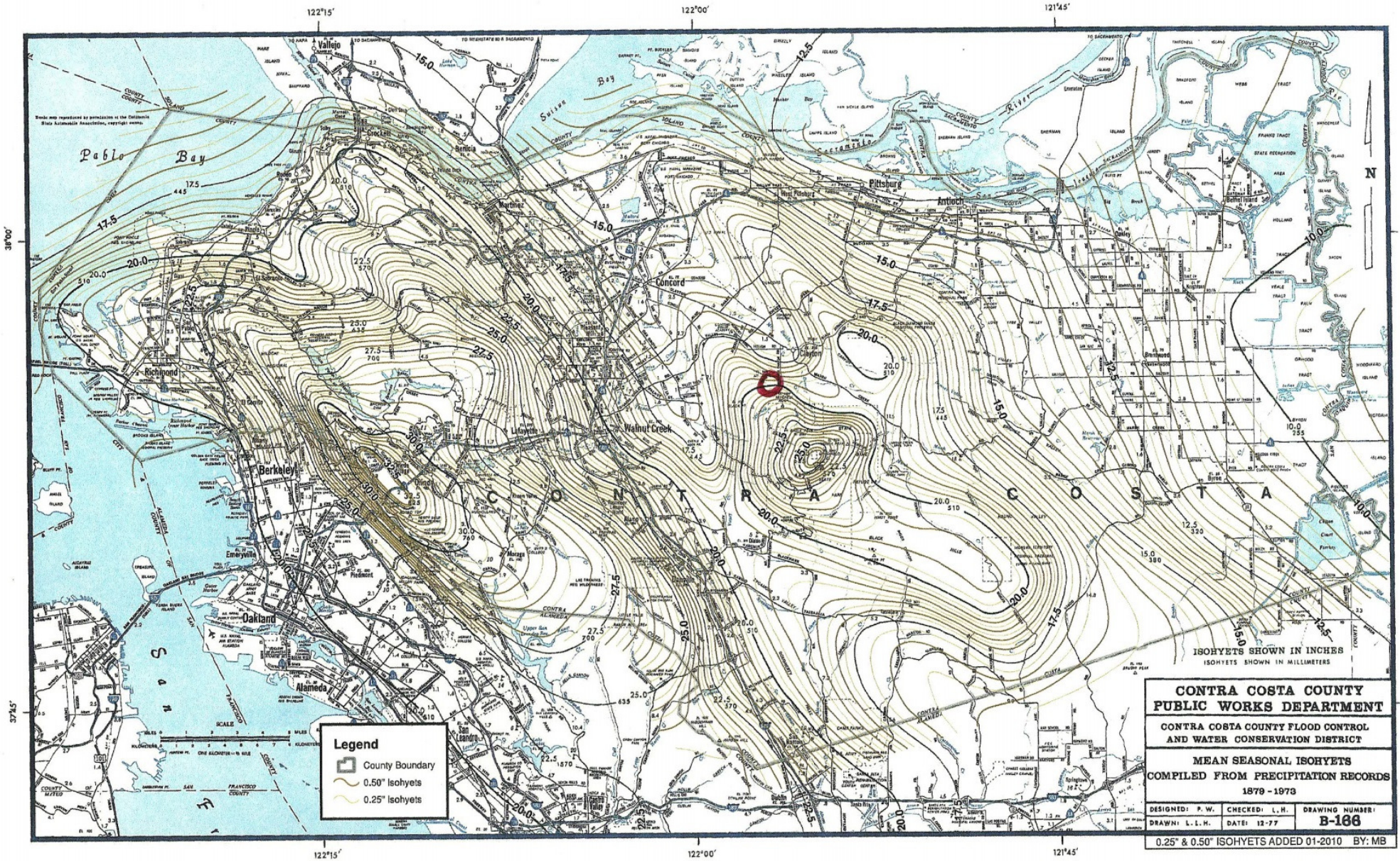
Spinardi Associates — Civil and Environmental Engineering
265 Sea View Ave., Piedmont, CA 94610

CEMEX\2019 ISABEL URS\19-2917_RecDrainagePlan

APPENDICES

APPENDIX A

HYDROLOGIC DESIGN DOCUMENTS AND CALCULATIONS FOR EXISTING CONDITIONS AND REVISED RECLAMATION PLAN


122°15'
122°00'
121°45'
38°00'
37°45'
Pablo Bay
Suisun Bay
Sacramento River
Vallejo
Crockett
Benicia
Martinez
Pittsburg
West Pittsburg
Antioch
Bethel Island
Oakley
Concord
Clayton
Brentwood
Byron
Richmond
El Cerrito
Berkeley
Albany
Emeryville
Piedmont
Oakland
Alameda
Lafayette
Walnut Creek
Orinda
Moraga
Danville
San Leandro
Castro Valley
Dublin
Livermore
CONTRA COSTA
SAN FRANCISCO BAY
N
Legend
County Boundary
0.50" Isohyets
0.25" Isohyets
ISOHYETS SHOWN IN INCHES
ISOHYETS SHOWN IN MILLIMETERS
CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT
CONTRA COSTA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
MEAN SEASONAL ISOHYETS
COMPILED FROM PRECIPITATION RECORDS
1879 - 1973
DESIGNED: P. W.
CHECKED: L. H.
DRAWING NUMBER:
B-166
DRAWN: L. I. H.
DATE: 12-77
0.25" & 0.50" ISOHYETS ADDED 01-2010 BY: MB

Rational Formula Calculations
Contra Costa County Flood Control District
Hydrology Class Presentation

Formula: $Q=C_fiA$

Where Q = Peak Flow-rate in Cubic-Feet/Second (cfs)
C = Runoff Coefficient
f = Adjusting factor for 25, 50 and 100-year storms[1]
i = Rainfall intensity in inches/hour
A = Watershed area in acres

1. Adjusting Factors (f) for 25, 50 and 100-year storms (Modified Rational Formula):
   Q_{10} = 1.00
   Q_{25} = 1.10
   Q_{50} = 1.20
   Q_{100} = 1.25
   Note: The product Cf obviously must be less than 1.0

Assumptions:

1. The rainfall intensity is uniformly distributed over the entire watershed.
2. The runoff rate resulting from any rainfall intensity is a maximum when this rainfall intensity lasts as long or longer than t_c.
3. The maximum runoff resulting from a rainfall intensity is a simple fraction of such rainfall intensity.
4. The frequency of peak runoff is the same as that of the rainfall intensity for a given t_c.
5. The runoff coefficient is the same for various storm frequencies and durations.

It should be clear that the above assumptions might hold for a small paved area!

Time of Concentration:

Kirpich Equation:

$$t_c = 0.0078\ L^{1.155}/H^{0.385}$$

Where: t_c = Time of concentration in minutes
L = Length of main watercourse in feet
H = Fall between ridge and outlet in feet

Composite Approach:

Kerby Equation: Overland flow (See Nomograph)

$$tc^{2.14} = 2Ln/3S^{1/2}$$

Where: tc = Time of concentration in minutes
L = Length in feet
n = Surface retardant factor
S = Slope in feet/feet

Roof to Gutter Time: See attached Table
Gutter Flow: Drawing B-120

Pipe Velocity:
Manning's Formula or
Estimation

To Calculate the intensity in inches/hour, 1. use the time of concentration as the duration, 2. determine the depth of rain for the duration based on the mean seasonal precipitation from the frequency-depth-duration curve and isohyet map and 3. Convert to intensity by multiplying the depth times 60-minutes/hour and dividing by the time of concentration in minutes.

Runoff Coefficients:

Use Attached Handout (Proposed CCCFCD Standard).

CCCFCD STANDARD - RUNOFF COEFFICIENTS

Rational Formula

Land Use	Runoff Coefficient	Average Impervious Area (%)	Time of Concentration-Roof to Gutter (min)
Residential:			
R - 6	.50 - .70	76	3 - 5
R - 10	.45 - .60	53	5 - 7
R - 20	.40 - .50	35	6 - 8
R - 40	.35 - .45	25	8 - 10
Apartment	.60 - .80		3 - 10
Commercial	.70 - .95		3 - 8
Industrial	.60 - .90		3 - 10
Open	.20 - .40		
Street:			
Asphalt	.75 - .95		
Concrete	.80 - .95		
Drives and Walks	.80 - .95		
Roofs	.75 - .95		

Legend

R - 6 = 6,000 ft^2 Lot
R - 10 = 10,000 ft^2 Lot
R - 20 = 20,000 ft^2 Lot
R - 40 = 40,000 ft^2 Lot

Note: For Contra Costa County Land Uses use the highest runoff coefficient in the range. This more closely approximates the peak flows calculated by the Unit Hydrograph method developed for Contra Costa County and calibrated with local rainfall and runoff data.

INTENSITY (INCHES/HOUR)

The mean seasonal rainfall Isohyetal map (Drawing B-166) and rainfall depth-duration-frequency curves (Drawings B-158-162) for the 5, 10, 25, 50 and 100 year recurrence intervals were developed for this county in 1974. The map and curves can be used together to estimate rainfall amount (depth) or intensity for any location in Contra Costa County.

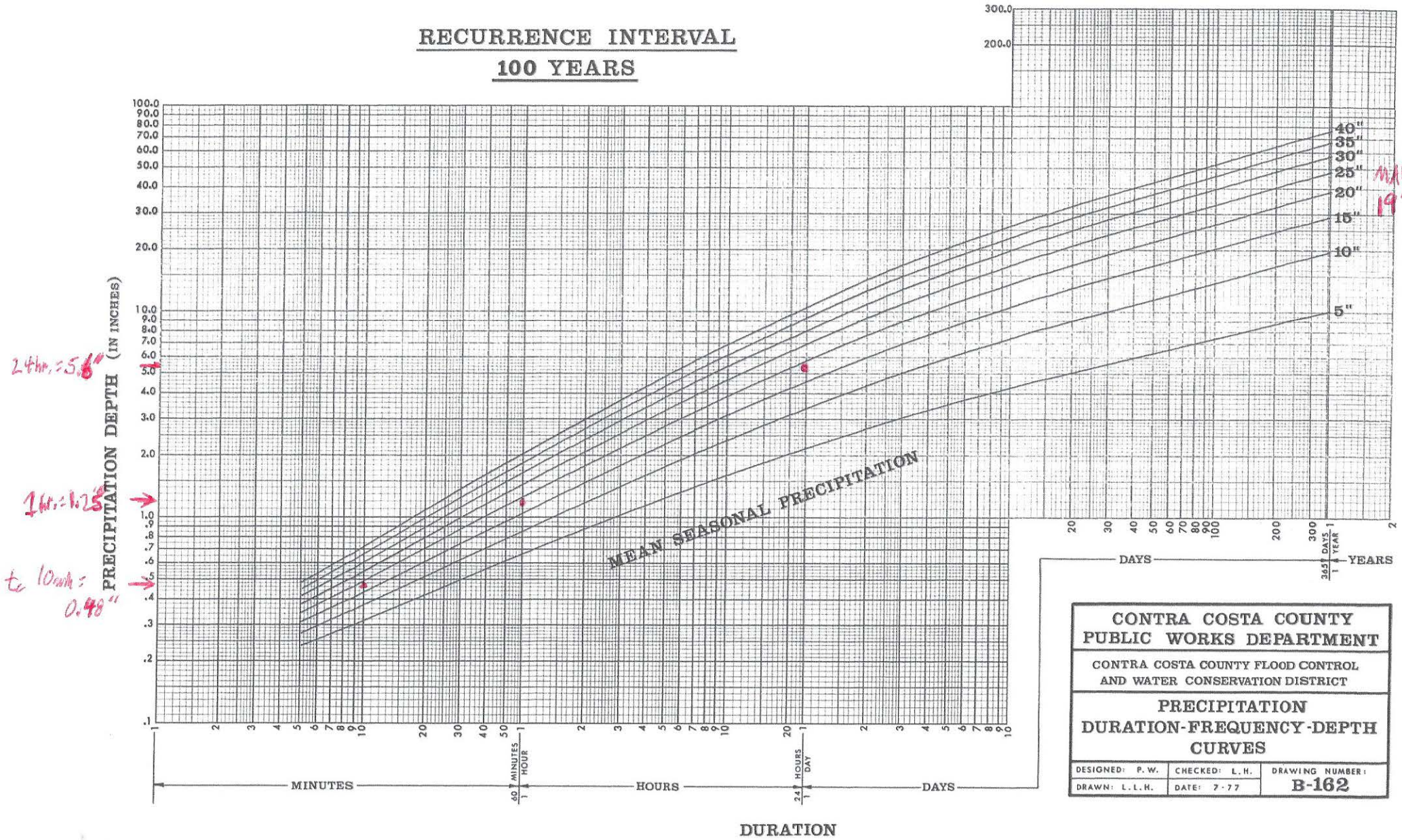
To obtain the intensity (i) for the Rational Formula, use the calculated time of concentration (tc) as the duration, fine the mean seasonal precipitation of your location, obtain the depth of rainfall for that duration, and convert the depth to intensity in inches per hour.

For example: Find the intensity for a 25-year, 30-minute time of concentration in downtown Walnut Creek. From the Isohyetal map, the mean seasonal precipitation is 20-inches; from Drawing B-160, the rainfall depth for a 30-minute storm event is 0.7 inches.

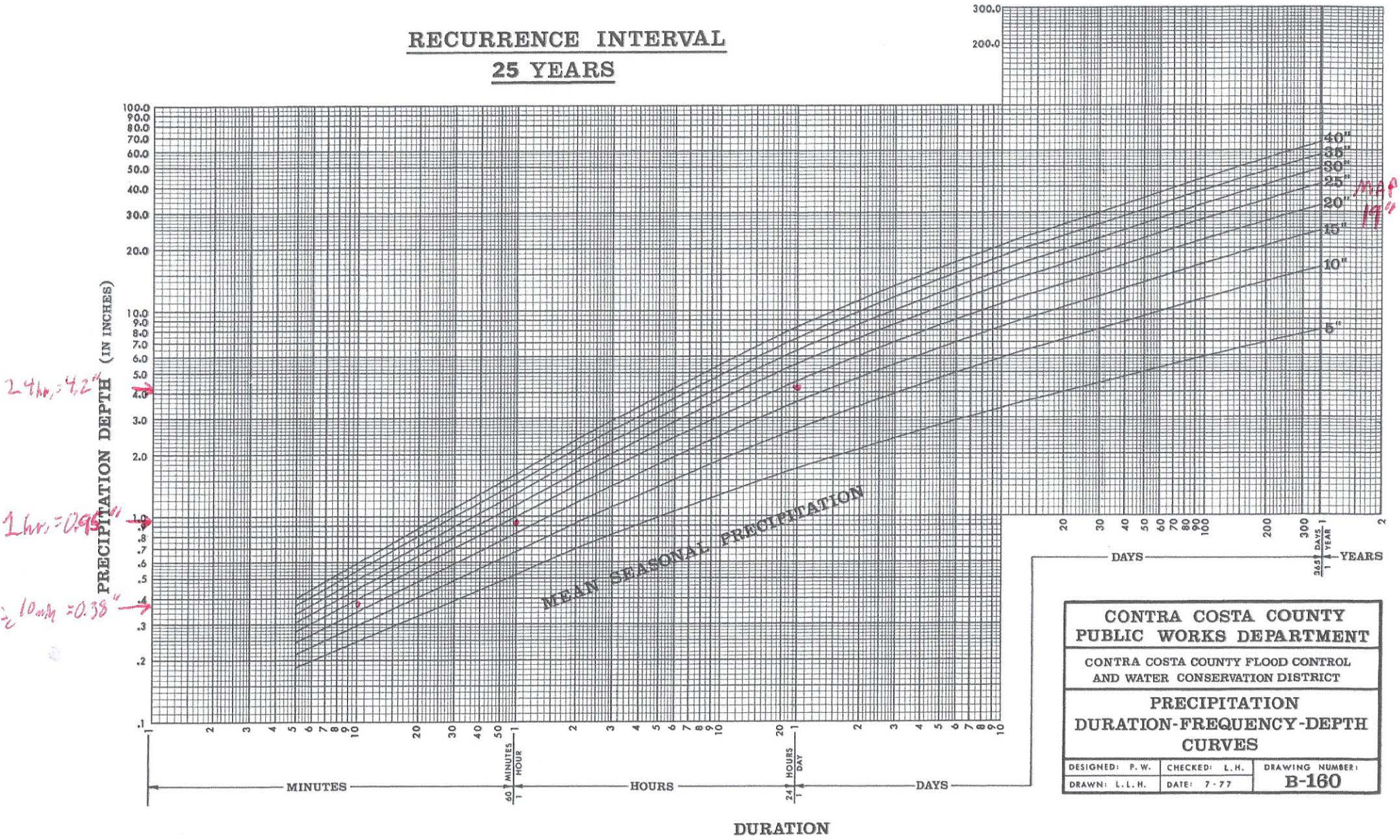
Then the rainfall intensity is:

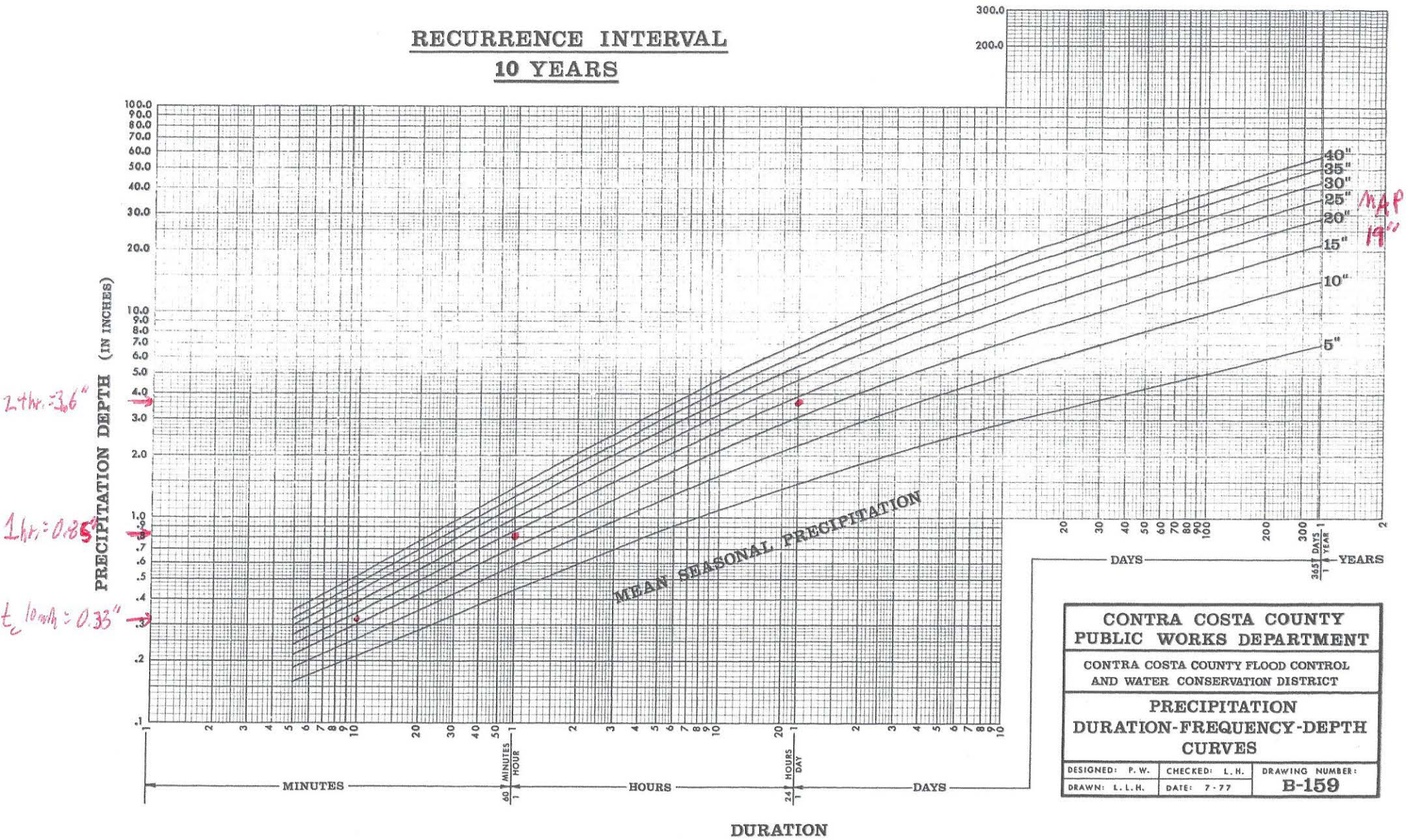
$$\frac{0.7\text{inches} \times 60\text{min/hour}}{30\text{min}} = 1.4 \text{ inches/hour}$$

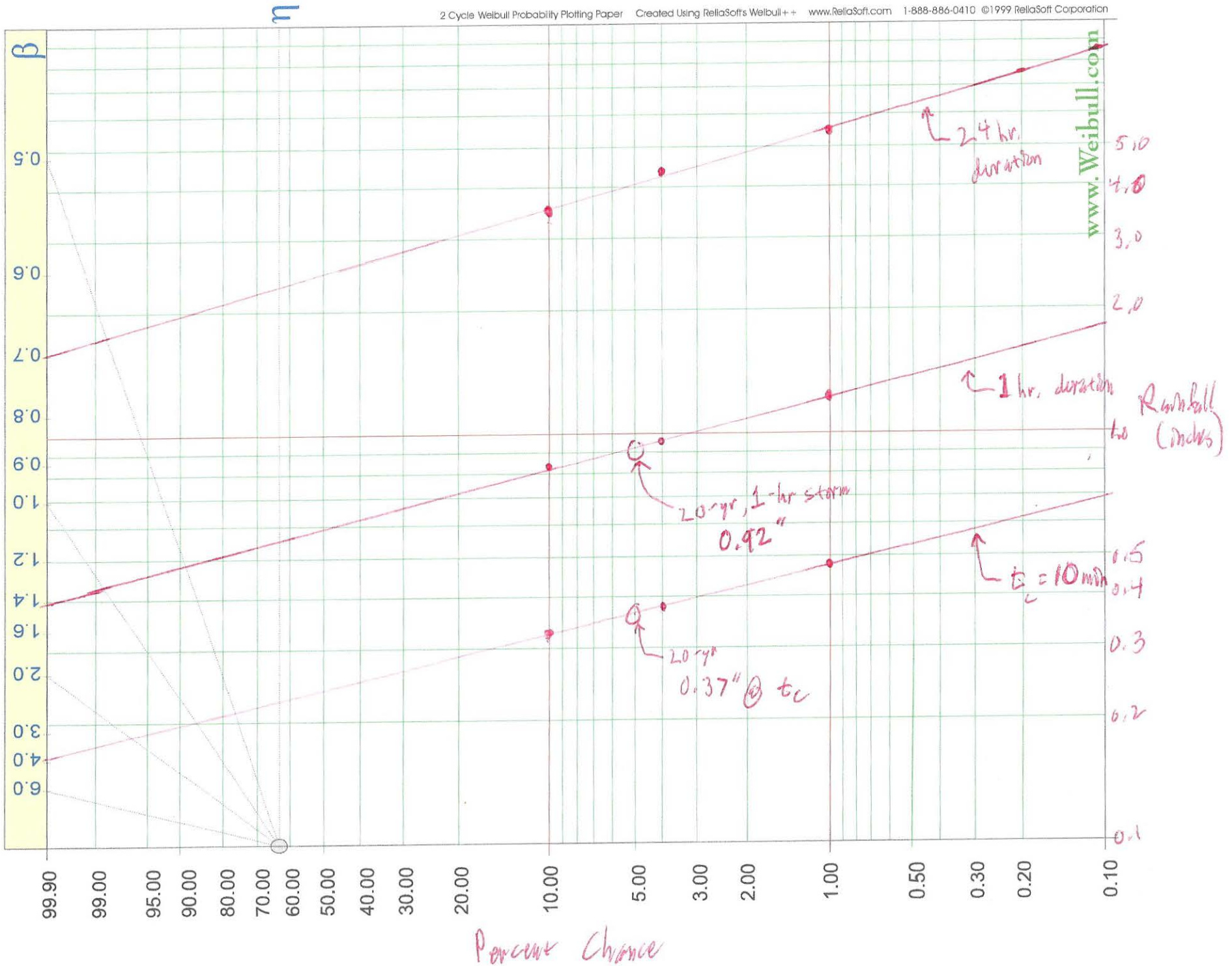
Then back to the Modified Rational Formula, Q=CfiA.



CONTRA COSTA COUNTY PUBLIC WORKS DEPARTMENT		
CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
PRECIPITATION DURATION-FREQUENCY-DEPTH CURVES		
DESIGNED: P. W.	CHECKED: L. H.	DRAWING NUMBER: B-162
DRAWN: L. L. H.	DATE: 7-77	


RECURRENCE INTERVAL
25 YEARS
PRECIPITATION DEPTH (IN INCHES)
MEAN SEASONAL PRECIPITATION
40"
35"
30"
25"
20"
15"
10"
5"
MAP 19"
2.4hr. = 4.2"
1 hr. = 0.95"
10 min = 0.38"
MINUTES
HOUR
HOURS
DAY
DAYS
YEARS
DURATION
CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT
CONTRA COSTA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
PRECIPITATION
DURATION-FREQUENCY-DEPTH
CURVES
DESIGNED: P. W.
CHECKED: L. H.
DRAWN: L. L. H.
DATE: 7-77
DRAWING NUMBER:
B-160


RECURRENCE INTERVAL
10 YEARS
PRECIPITATION DEPTH (IN INCHES)
MEAN SEASONAL PRECIPITATION
40"
35"
30"
25"
20"
15"
10"
5"
MAP 19"
2 hr. = 3.6"
1 hr. = 0.85"
t_c 10 min = 0.33"
MINUTES
HOURS
DAYS
YEARS
60 MINUTES 1 HOUR
24 HOURS 1 DAY
365 DAYS 1 YEAR
DURATION
CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT
CONTRA COSTA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
PRECIPITATION
DURATION-FREQUENCY-DEPTH
CURVES
DESIGNED: P. W.
CHECKED: L. H.
DRAWN: L. L. H.
DATE: 7-77
DRAWING NUMBER:
B-159


2 Cycle Weibull Probability Plotting Paper Created Using ReliaSoft's Weibull++ www.ReliaSoft.com 1-888-886-0410 ©1999 ReliaSoft Corporation
β
η
0.5
0.6
0.7
0.8
0.9
1.0
1.2
1.4
1.6
2.0
3.0
4.0
6.0
99.90
99.00
95.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
5.00
3.00
2.00
1.00
0.50
0.30
0.20
0.10
Percent Chance
www.Weibull.com
5.0
4.0
3.0
2.0
1.5
0.4
0.3
0.2
0.1
Rainfall (inches)
24 hr. duration
1 hr. duration
t_c
20-yr, 1-hr storm
0.92"
t_c = 10 min
20-yr
0.37" @ t_c

Rational Method Calculations for Quarry Watershed Area

Existing Conditions

Watershed	1. Upper Vegetated Area	2. Diabase Highwall	3. Knoxville Slopes	4. Water Surface	Combined	
Area (Ac)	19	55	9	7	90	
Peak Elevation	1630	1520	1075	600	1630	
Minimum Elevation	1170	600	600	600	600	
Height (ft)	460	920	475	0	1030	
Length (ft)	720	640	1715	0	1715	
Time of Concentration -Tc (minutes)	1.5	1.0	4.0	0	2.9	Assume Tc = 10 min
Runoff Coefficient - C	0.4	0.9	0.7	1	0.78	
f - 10 yr	1	1	1	1	1	
f - 100 yr	1.25	1.25	1.25	1	1.25	
Intensity (in/hr) - 10 yr at Tc	1.98	1.98	1.98	1.98	1.98	
Intensity (in/hr) - 100 yr at Tc	2.88	2.88	2.88	2.88	2.88	
Peak Flow - Q (cfs) - 10 yr	15.0	98.0	12.5	13.9	139.4	
Peak Flow - Q (cfs) - 100 yr	27.4	178.2	22.7	20.2	253.4	
f - 20 yr	1.1	1.1	1.1	1.1	1.1	
Intensity (in/hr) - 20 yr at Tc	2.22	2.22	2.22	2.22	2.22	
Peak Flow - Q (cfs) - 20 yr	18.6	120.9	15.4	17.1	171.9	

Reclaimed Conditions

Watershed	1. Upper Vegetated Area	2. Diabase Highwall	3. Knoxville Slopes	4. Water Surface	Combined	
Area (Ac)	17	41	8	32	98	
Peak Elevation	1630	1520	870	735	1630	
Minimum Elevation	1170	735	735	735	600	
Height (ft)	460	785	135	0	1030	
Length (ft)	720	490	225	0	1715	
Time of Concentration -Tc (minutes)	1.5	0.8	0.6	0	2.9	Assume Tc = 10 min
Runoff Coefficient - C	0.4	0.9	0.7	1	0.83	

f - 10 yr	1	1	1	1	1
f - 100 yr	1.25	1.25	1.25	1	1.25
Intensity (in/hr) - 10 yr at Tc	1.98	1.98	1.98	1.98	1.98
Intensity (in/hr) - 100 yr at Tc	2.88	2.88	2.88	2.88	2.88
Peak Flow - Q (cfs) - 10 yr	13.5	73.1	11.1	63.4	161.0
Peak Flow - Q (cfs) - 100 yr	24.5	132.8	20.2	92.2	270.0

For SMARA

f - 20 yr	1.1	1.1	1.1	1.1	1.1
Intensity (in/hr) - 20 yr at Tc	2.22	2.22	2.22	2.22	2.22
Peak Flow - Q (cfs) - 20 yr	16.6	90.1	13.7	78.1	198.5

Rational Method Calculations for East Area

Existing and Reclaimed

Watershed	1. DA71A	2. Mitchell Creek (Existing)	2. Mitchell Creek (Reclaimed	8-acre area	
Area (Ac)	11	89	81	8	
Peak Elevation	715	1050	870	950	
Minimum Elevation	565	590	590	750	
Height (ft)	150	460	280	200	
Length (ft)	1125	1725	1080	2250	
Time of Concentration -Tc (minutes)	3.8	4.0	2.8	7.6	Assume Tc = 10 min
Runoff Coefficient - C	0.4	0.4	0.4	0.4	
f - 10 yr	1	1	1	1	
f - 100 yr	1.25	1.25	1.25	1.25	
Intensity (in/hr) - 10 yr at Tc	1.98	1.98	1.98	1.98	
Intensity (in/hr) - 100 yr at Tc	2.88	2.88	2.88	2.88	
Peak Flow - Q (cfs) - 10 yr	8.7	70.5	64.2	6.3	
Peak Flow - Q (cfs) - 100 yr	15.8	128.2	116.6	11.5	
For SMARA					
f - 20 yr	1.1	1.1	1.1	1.1	
Intensity (in/hr) - 20 yr at Tc	2.22	2.22	2.22	2.22	
Peak Flow - Q (cfs) - 20 yr	10.7	86.9	79.1	7.8	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):
Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 100-yr, 24-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2	3.10	minutes	$T_c = (0.0078)X((L^{1.155}/H^{0.385})$	L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Step 5. Find Runoff Volume (V_{24})

24-hour precipitation (P_{24}): 5.6 inches From B-162

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D
Water	32	100	NA

Find 24-hour runoff (R_{24})	5	inches	Use Attachment 10 or 11	Weighted CN	98	94
Total Runoff Volume (V_{24})	40.83	Acre-feet				

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

Total Rainfall	45.7	Acre-feet
Total Runoff	40.83	Acre-feet
Ratio	0.89	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):

Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 25-yr, 24-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2: 3.10 minutes

T_c = $(0.0078)X((L^{1.155}/H^{0.385})$ L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D

Step 5. Find Runoff Volume (V_{24})

24-hour precipitation (P_{24})	4.2	inches	From B-160	Water	32	100	NA
Find 24-hour runoff (R_{24})	3.7	inches	Use Attachment 10 or 11	Weighted CN	98	94	
Total Runoff Volume (V_{24})	30.22	Acre-feet					

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

Total Rainfall	34.3	Acre-feet
Total Runoff	30.22	Acre-feet
Ratio	0.88	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):

Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 20-yr, 1-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2: 3.10 minutes

T_c = $(0.0078)X((L^{1.155}/H^{0.385})$ L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D

Step 5. Find Runoff Volume (V_{24})

1-hour precipitation (P_1)	0.92	inches	Probability Chart (Appendix A)	Water	32	100	NA
			Use Attachment 10 or	Weighted			
Find 1-hour runoff (R_1)	0.45	inches	11	CN	98	94	
		Acre-					
Total Runoff Volume (V_1)	3.675	feet					

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

		Acre-
Total Rainfall	7.5	feet
		Acre-
Total Runoff	3.675	feet
Ratio	0.49	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):

Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 10-yr, 24-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2: 3.10 minutes

T_c = $(0.0078)X((L^{1.155}/H^{0.385})$ L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D

Step 5. Find Runoff Volume (V_{24})

24-hour precipitation (P_{24})	3.6	inches	From B-159	Water	32	100	NA
Find 24-hour runoff (R_{24})	3.1	inches	Use Attachment 10 or 11	Weighted CN	98	94	
Total Runoff Volume (V_{24})	25.32	Acre-feet					

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

Total Rainfall	29.4	Acre-feet
Total Runoff	25.32	Acre-feet
Ratio	0.86	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):

Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 2-yr, 24-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2: 3.10 minutes

T_c = $(0.0078)X((L^{1.155}/H^{0.385})$ L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D

Step 5. Find Runoff Volume (V_{24})

24-hour precipitation (P_{24})	2.4	inches	Probability Chart (Appendix A)	Water	32	100	NA
Find 24-hour runoff (R_{24})	1.9	inches	Use Attachment 10 or 11	Weighted CN	98	94	
Total Runoff Volume (V_{24})	15.52	Acre-feet					

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

Total Rainfall	19.6	Acre-feet
Total Runoff	15.52	Acre-feet
Ratio	0.79	

Hydrology Analysis for Small Watersheds

Owner/Client:	CEMEX
Project:	Reclaimed Drainage
Location:	Clayton
Source:	Topo maps and CCCFCD
Calc'd by:	AK/KS
Date:	5/7/2020

Input cells (add site data):

Calculated cells (do not alter):

Step 1. Watershed Data

Total Drainage Area (A)	98	acres	0.153125	mi^2
Length of Watershed (L)	1715	feet	0.324811	miles
Highest Elevation	1630	feet msl		
Lowest Elevation	735	feet msl		
Height of Watershed (H)	895	feet		

Step 2. Design Frequency

County Flood Control: 1-yr, 24-hr

Step 3. Find Time of Concentration (T_c)

Basins < 4 mi^2: 3.10 minutes

T_c = $(0.0078)X((L^{1.155}/H^{0.385})$ L in feet; H in feet

CCCFCD Hydrology Rational Formula.PDF document

Step 4. Determine Curve Number (weight if multiple soil types or land uses in watershed)

Curve Number (CN): 94 Use Attachment 3

Watershed	Area (ac)	CN	Soil Gp
Upper	17	81	D
Diabase	41	98	D
Knoxville	8	81	D

Step 5. Find Runoff Volume (V_{24})

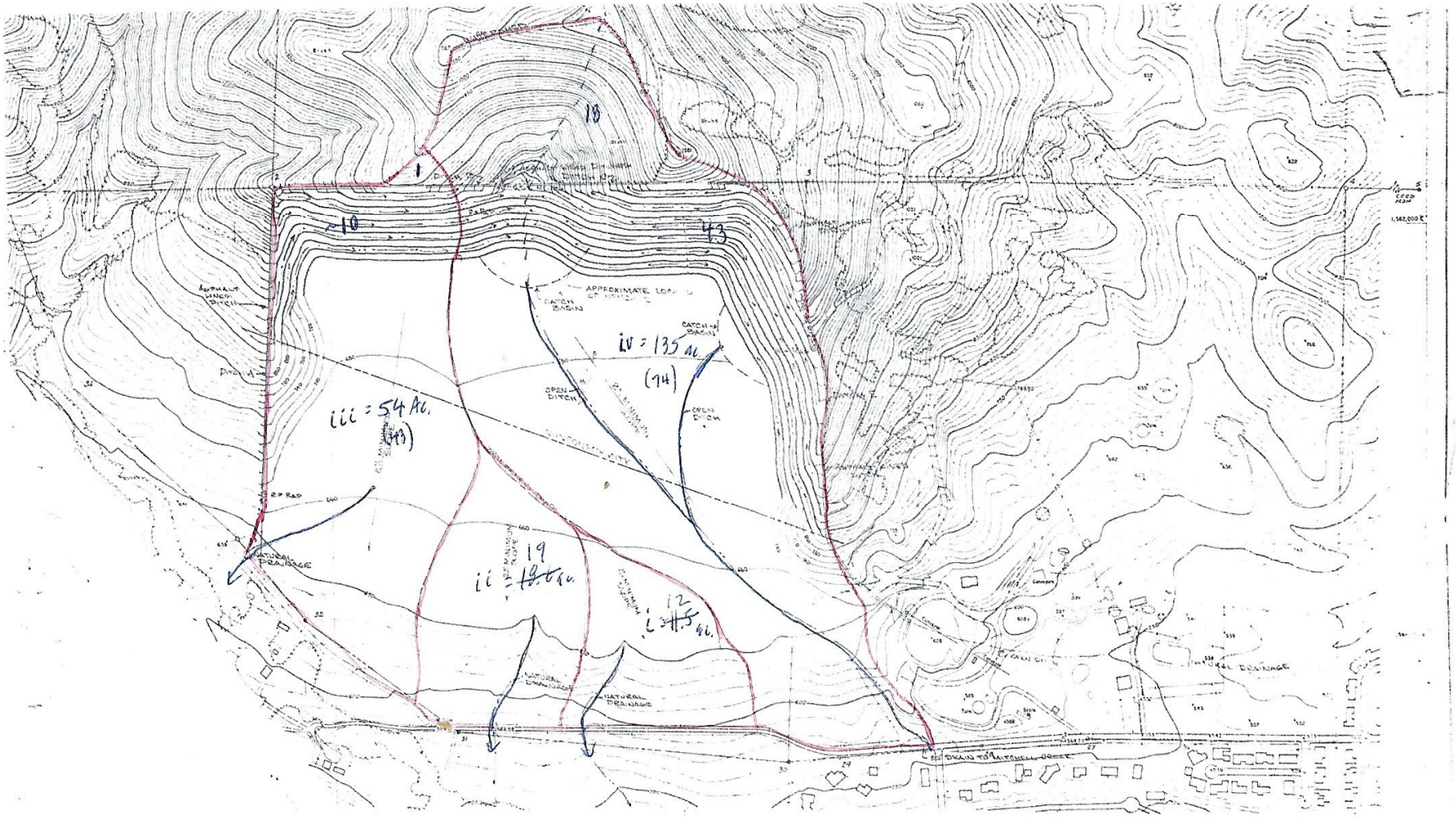
24-hour precipitation (P_{24})	1.6	inches	Probability Chart (Appendix A)	Water	32	100	NA
Find 24-hour runoff (R_{24})	1.1	inches	Use Attachment 10 or 11	Weighted CN	98	94	
Total Runoff Volume (V_{24})	8.98	Acre-feet					

Note: For 20-yr, 1-hr event, substitute the appropriate 1-hour parameters for the 24-hour parameters

Total Rainfall	13.1	Acre-feet
Total Runoff	8.98	Acre-feet
Ratio	0.69	

APPENDIX B

CALCULATIONS FOR 1983 RECLAMATION PLAN



FINAL DRAINAGE PLAN

5-15-84

TOPOGRAPHIC MAP OF
CLAYTON RANCH
FOR
LONE STAR INDUSTRIES

Peak storm runoff from Reclaimed Pit per 1983 Reclamation Plan
5-15-84 Final Drainage Plan

Watershed i.

Vegetated upper area	0	ac
Highwall	0	ac
Reclaimed lower area	12	ac
Total	12	ac

Weighted Runoff Coefficient ©

Vegetated	0.40 X 0/12	0.00
Highwall	0.90 X 0/12	0.00
Lower	0.40 X 12/12	0.40
Weighted Average		0.40

Runoff Calc — Q(cfs) = C x f x i(in/hr) x A(acres)

	C	f	i	A	Q
10-yr	0.40	1	1.98	12	10
20-yr	0.40	1.1	2.22	12	12
100-yr	0.40	1.25	2.88	12	17

Max Elev	660		
Min Elev	590		
Height	70		
Length	1050		
Tc (min)	4.7	Assume:	10

Watershed ii.

Vegetated upper area	0	ac
Highwall	0	ac
Reclaimed lower area	19	ac
Total	19	ac

Weighted Runoff Coefficient ©

Vegetated	0.40 X 0/19	0.00
Highwall	0.90 X 0/19	0.00
Water	0.40 X 12/19	0.40
Weighted Average		0.40

Runoff Calc — Q(cfs) = C x f x i(in/hr) x A(acres)

	C	f	i	A	Q
10-yr	0.40	1	1.98	19	15
25-yr	0.40	1.1	2.22	19	19
100-yr	0.40	1.25	2.88	19	27

Max Elev	670		
Min Elev	590		
Height	80		
Length	1400		
Tc (min)	6.2	Assume:	10

Watershed iii.

Vegetated upper area	1	ac
Highwall	10	ac
Reclaimed lower area	43	ac
Total	54	ac

Weighted Runoff Coefficient ©

Vegetate d	0.40 X 1/54	0.01
Highwall	0.90 X 10/54	0.17
Water	0.40 X 43/54	0.32
Weighted Average		0.49

Runoff Calc — Q(cfs) = C x f x i(in/hr) x A(acres)

	C	f	i	A	Q
10-yr	0.49	1	1.98	54	53
25-yr	0.49	1.1	2.22	54	65
100-yr	0.49	1.25	2.88	54	96

Max Elev	1410		
Min Elev	640		
Height	770		
Length	2400		
Tc (min)	4.8	Assume:	10

Watershed iv.

Vegetated upper area	18	ac
Highwall	43	ac
Reclaimed lower area	74	ac
Total	135	ac

Weighted Runoff Coefficient ©

Vegetate d	0.40 X 18/135	0.05
Highwall	0.90 X 43/135	0.29
Water	0.40 X 74/13596	0.22
Weighted Average		0.56

Runoff Calc — Q(cfs) = C x f x i(in/hr) x A(acres)

	C	f	i	A	Q
10-yr	0.56	1	1.98	135	149
25-yr	0.56	1.1	2.22	135	184
100-yr	0.56	1.25	2.88	135	272

Max Elev	1635		
Min Elev	565		
Height	1070		
Length	4450		
Tc (min)	8.7	Assume:	10

APPENDIX C

WATER BUDGET SPREADSHEETS

WATER BUDGET
Clayton Quarry
DA71 A Drainage Plan

Total acreage:	98	
Disturbed acreage:	81	
Watershed acreage:	17	
Spill-point Elevation	735	ft msl

1. Pit Bottom 110 ft msl

Total Area

Water Surface	3.8	ac
Diabase High Walls	68.2	ac
Knoxville above WT	9	ac
Watershed	17	ac
TOTAL	98	ac

Rainfall

1.58 ft/yr

Runoff Coefficients

Water Surface	1
High Walls	0.98
Knoxville	0.6
Watershed	0.4

Lake Evaporation

3.68 ft/yr

Inputs

Pit	6.0	AF/yr
High Walls	105.6	AF/yr
Knoxville	8.5	AF/yr
Watershed	10.7	AF/yr
	130.9	AF/yr

Outputs

Pit Evap	14.0	AF/yr
NET	116.9	AF/yr
	30.8	ft/yr rise

1.A Midway Between 110 ft msl and 410 msl

Total Area

Water Surface	7.3	ac
Diabase High Walls	64.7	ac
Knoxville above WT	9	ac
Watershed	17	ac
TOTAL	98	ac

Inputs

Pit	11.5	AF/yr
High Walls	100.2	AF/yr
Knoxville	8.5	AF/yr
Watershed	10.7	AF/yr
	131.0	AF/yr

				Outputs			
					Pit Evap	26.9	AF/yr
	Volume	2220	AF	NET		104.1	AF/yr
	Time to Fill	21.3	Years			14.3	ft/yr rise
						21.0	yrs/300 ft

2. At 410 msl

Total Area				Inputs			
	Water Surface	10.8	ac		Pit	17.1	AF/yr
	Diabase High Walls	61.2	ac		High Walls	94.8	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.1	AF/yr
				Outputs			
					Pit Evap	39.7	AF/yr
				NET		91.4	AF/yr
						8.5	ft/yr rise

2.A Midway Between 410 ft msl and 530 msl

Total Area				Inputs			
	Water Surface	13.3	ac		Pit	21.0	AF/yr
	Diabase High Walls	58.7	ac		High Walls	90.9	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.2	AF/yr
				Outputs			
					Pit Evap	48.9	AF/yr
	Volume	1590	AF	NET		82.2	AF/yr

	Time to Fill	19.3	Years			6.2	ft/yr rise
						19.4	yrs/120 ft

3. At 530 msl

Total Area				Inputs			
	Water Surface	15.8	ac		Pit	25.0	AF/yr
	Diabase High Walls	56.2	ac		High Walls	87.0	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.3	AF/yr
				Outputs			
					Pit Evap	58.1	AF/yr
				NET		73.1	AF/yr
						4.6	ft/yr rise

3.A Midway Between 530 ft msl and 630 msl

Total Area				Inputs			
	Water Surface	18.9	ac		Pit	29.9	AF/yr
	Diabase High Walls	53.1	ac		High Walls	82.2	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.4	AF/yr
				Outputs			
					Pit Evap	69.6	AF/yr
	Volume	1880	AF	NET		61.8	AF/yr
	Time to Fill	30.4	Years			3.3	ft/yr rise
						30.6	yrs/100 ft

4. At 630 msl

Total Area				Inputs			

	Water Surface	22	ac		Pit	34.8	AF/yr
	Diabase High Walls	50	ac		High Walls	77.4	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.5	AF/yr
				Outputs			
					Pit Evap	81.0	AF/yr
				NET		50.5	AF/yr
						2.3	ft/yr rise

4.A Midway Between 630 ft msl and 735 msl

Total Area				Inputs			
	Water Surface	27.0	ac		Pit	42.7	AF/yr
	Diabase High Walls	45.5	ac		High Walls	70.5	AF/yr
	Knoxville above WT	8.5	ac		Knoxville	8.1	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			131.9	AF/yr
				Outputs			
					Pit Evap	99.4	AF/yr
	Volume	2830	AF	NET		32.6	AF/yr
	Time to Fill	86.9	Years			1.2	ft/yr rise
						87.1	yrs/105 ft

5. At 735 msl

Total Area				Inputs			
	Water Surface	32	ac		Pit	50.6	AF/yr
	Diabase High Walls	41	ac		High Walls	63.5	AF/yr
	Knoxville above WT	8	ac		Knoxville	7.6	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			132.4	AF/yr

				Outputs			
					Pit Evap	117.8	AF/yr
				NET		14.6	AF/yr
						0.5	ft/yr rise

5.A Midway Between 735 ft msl and 750 msl

Total Area				Inputs			
	Water Surface	32.4	ac		Pit	51.2	AF/yr
	Diabase High Walls	40.6	ac		High Walls	62.9	AF/yr
	Knoxville above WT	8	ac		Knoxville	7.6	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			132.4	AF/yr
				Outputs			
					Pit Evap	119.2	AF/yr
	Volume	434	AF	NET		13.2	AF/yr
	Time to Fill	33.0	Years			0.4	ft/yr rise
						36.9	yrs/15 ft

6. At 750 msl New data per Karen\ Total pit volume = 8954 AF

Total Area				Inputs			
	Water Surface	32.8	ac		Pit	51.8	AF/yr
	Diabase High Walls	40.7	ac		High Walls	63.0	AF/yr
	Knoxville above WT	7.5	ac		Knoxville	7.1	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			132.7	AF/yr
				Outputs			
					Pit Evap	120.7	AF/yr
				NET		12.0	AF/yr

							ft/yr
						0.4	rise

6.A Midway Between 750 ft msl and 755 msl

Total Area				Inputs			
	Water Surface	32.9	ac		Pit	52.0	AF/yr
	Diabase High Walls	40.6	ac		High Walls	62.9	AF/yr
	Knoxville above WT	7.5	ac		Knoxville	7.1	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			132.7	AF/yr
				Outputs			
					Pit Evap	121.1	AF/yr
	Volume	165	AF	NET		11.6	AF/yr
							ft/yr
	Time to Fill	14.2	Years			0.4	rise
							yrs/15
						14.1	ft

7. At 755 msl	New data per Karen\	Total pit volume =		9119	AF		
Total Area				Inputs			
	Water Surface	33	ac		Pit	52.1	AF/yr
	Diabase High Walls	41	ac		High Walls	63.5	AF/yr
	Knoxville above WT	7	ac		Knoxville	6.6	AF/yr
	Watershed	17	ac		Watershed	10.7	AF/yr
	TOTAL	98	ac			133.0	AF/yr
				Outputs			
					Pit Evap	121.4	AF/yr
				NET		11.6	AF/yr
							ft/yr
						0.4	rise

WATER BUDGET
Clayton Quarry
Existing Conditions

Total acreage:	90	
Disturbed acreage:	71	
Watershed acreage:	19	
Spill-point Elevation	755	ft msl

1. Pit Bottom 530 ft msl

Total Area

Water Surface	0.35	ac
Diabase High Walls	62	ac
Knoxville above WT	9	ac
Watershed	19	ac
TOTAL	90.35	ac

Rainfall

1.58 ft/yr

Runoff Coefficients

Water Surface	1
High Walls	0.98
Knoxville	0.6
Watershed	0.4

Lake Evaporation

3.68 ft/yr

Inputs

Pit	0.6	AF/yr
High Walls	96.0	AF/yr
Knoxville	8.5	AF/yr
Watershed	12.0	AF/yr
	117.1	AF/yr

Outputs

Pit Evap	1.3	AF/yr
NET	115.8	AF/yr
	330.9	ft/yr rise

1.A Midway Between 530 ft msl and 540 msl

Total Area

Water Surface	1.7	ac
Diabase High Walls	60.3	ac
Knoxville above WT	9	ac
Watershed	19	ac
TOTAL	90	ac

Inputs

Pit	2.7	AF/yr
High Walls	93.4	AF/yr
Knoxville	8.5	AF/yr
Watershed	12.0	AF/yr
	116.6	AF/yr

Outputs

					Pit Evap	6.3	AF/yr
	Volume	18.5	AF	NET		110.3	AF/yr
	Time to Fill	0.2	Years			64.9	ft/yr rise
						4.6	yrs/300 ft

2. At 540 msl

Total Area				Inputs			
	Water Surface	3	ac		Pit	4.7	AF/yr
	Diabase High Walls	59	ac		High Walls	91.4	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	19	ac		Watershed	12.0	AF/yr
	TOTAL	90	ac			116.6	AF/yr
				Outputs			
					Pit Evap	11.0	AF/yr
				NET		105.6	AF/yr
						35.2	ft/yr rise

2.A Midway Between 540 ft msl and 590 msl

Total Area				Inputs			
	Water Surface	5.0	ac		Pit	7.9	AF/yr
	Diabase High Walls	57	ac		High Walls	88.3	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	19	ac		Watershed	12.0	AF/yr
	TOTAL	90	ac			116.7	AF/yr
				Outputs			
					Pit Evap	18.4	AF/yr
	Volume	256.5	AF	NET		98.3	AF/yr
	Time to Fill	2.6	Years			19.7	ft/yr rise

							yrs/120
						6.1	ft

3. At 590 msl

Total Area				Inputs			
	Water Surface	7	ac		Pit	11.1	AF/yr
	Diabase High Walls	55	ac		High Walls	85.2	AF/yr
	Knoxville above WT	9	ac		Knoxville	8.5	AF/yr
	Watershed	19	ac		Watershed	12.0	AF/yr
	TOTAL	90	ac			116.8	AF/yr
				Outputs			
					Pit Evap	25.8	AF/yr
				NET		91.0	AF/yr
							ft/yr
						13.0	rise

3.A Midway Between 590 ft msl and 755 msl

Total Area				Inputs			
	Water Surface	14.0	ac		Pit	22.1	AF/yr
	Diabase High Walls	46	ac		High Walls	71.2	AF/yr
	Knoxville above WT	11	ac		Knoxville	10.4	AF/yr
	Watershed	19	ac		Watershed	12.0	AF/yr
	TOTAL	90	ac			115.8	AF/yr
				Outputs			
					Pit Evap	51.5	AF/yr
	Volume	2281	AF	NET		64.3	AF/yr
							ft/yr
	Time to Fill	35.5	Years			4.6	rise
							yrs/100
						21.8	ft

4. At 755 msl

Total Area				Inputs			
	Water Surface	20	ac		Pit	31.6	AF/yr

Diabase High Walls	45	ac		High Walls	69.7	AF/yr
Knoxville above WT	6	ac		Knoxville	5.7	AF/yr
Watershed	19	ac		Watershed	12.0	AF/yr
TOTAL	90	ac			119.0	AF/yr
			Outputs			
				Pit Evap	73.6	AF/yr
			NET		45.4	AF/yr
						ft/yr
					2.3	rise

Rainfall accumulation in Pit and Resulting Outflows										
		17	Ac Veg	49	Ac Highwall	32	Ac Lake	Total Runoff	Increase in Water Depth (ft)	Anticipated Outflow
Event	P_{24} (inches)	R_{24} (inches)	Runoff (AF)	R_{24} (inches)	Runoff (AF)	R_{24} (inches)	Runoff (AF)	(AF)	(ft)	(cfs)
10-yr	3.4	1.7	2.4	3.3	13.5	3.4	9.1	25.0	0.779688	3
25-yr	4.3	2.4	3.4	4.2	17.2	4.3	11.5	32.0	1.000521	3.75
50-yr	4.9	2.9	4.1	4.8	19.6	4.9	13.1	36.8	1.149219	4.5
100-yr	5.6	3.5	5.0	5.5	22.5	5.6	14.9	42.4	1.323438	6
1000-yr	7.8	5.1	7.2	7.6	31.0	7.8	20.8	59.1	1.845573	6
	R24/P24:	Varies 50% to 65%		98%		100%				

Estimated water flow through Notch

Based on Open-Channel Flow Calculator

http://www.engineering.com/calculators/open_channel_flow.htm

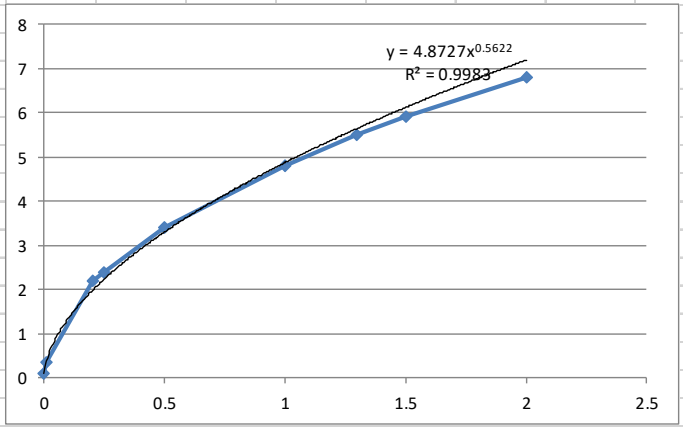
	Water De	Length (ft	Slope	Flow (cfs)
	2	0.5	4	6.8
	1.5	0.5	3	5.9
100-yr	1.3	0.5	2.6	5.5
25-yr	1	0.5	2	4.8
	0.5	0.5	1	3.4
	0.25	0.5	0.5	2.4
	0.2	0.5	0.4	2.2
	0.01	0.5	0.02	0.34
	0.001	0.5	0.002	0.1

Assumptions:

Notch is 8" wide by 3" high

Steel plate is rough cut and 6" thick

Manning's n = 0.02

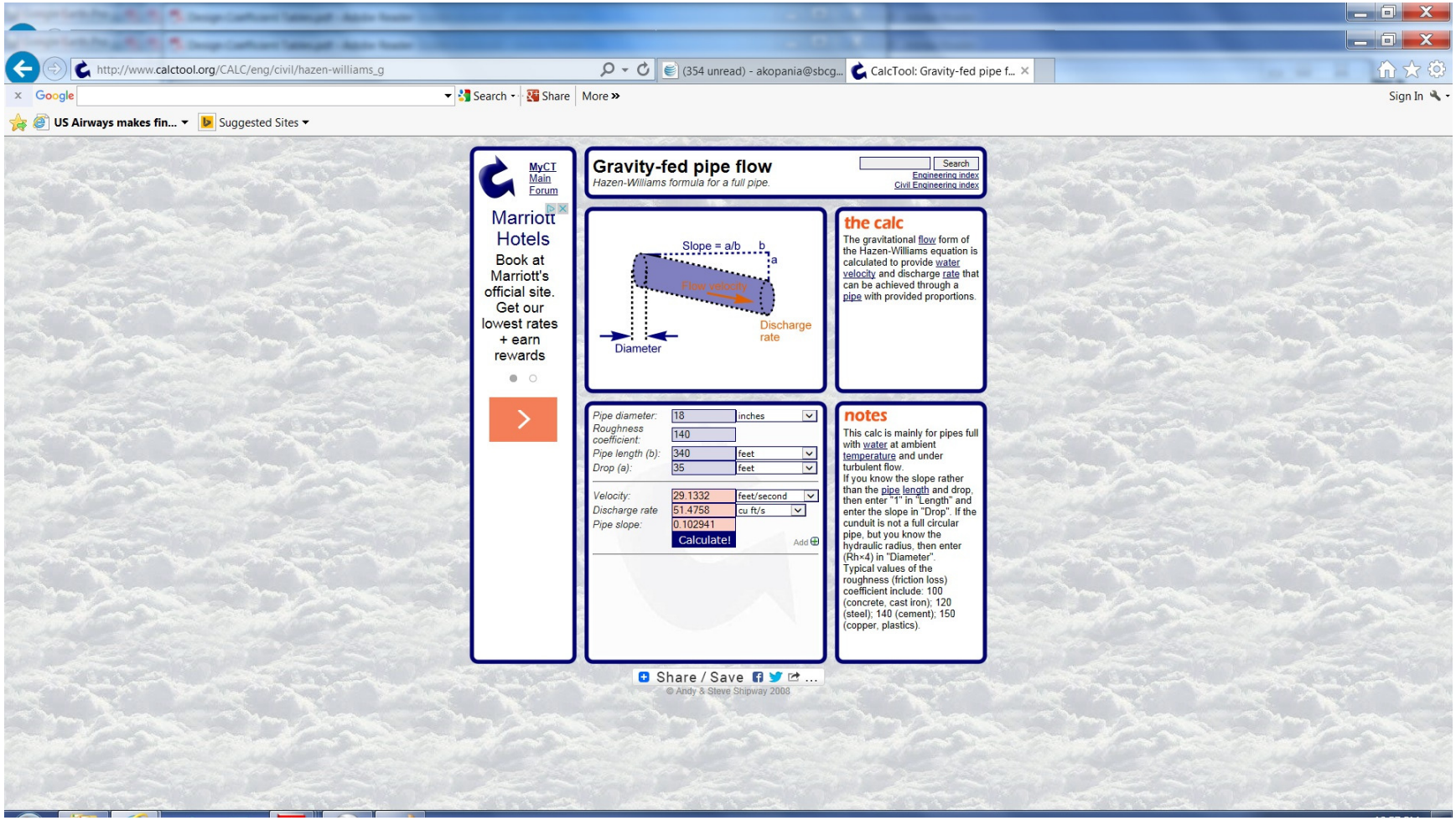


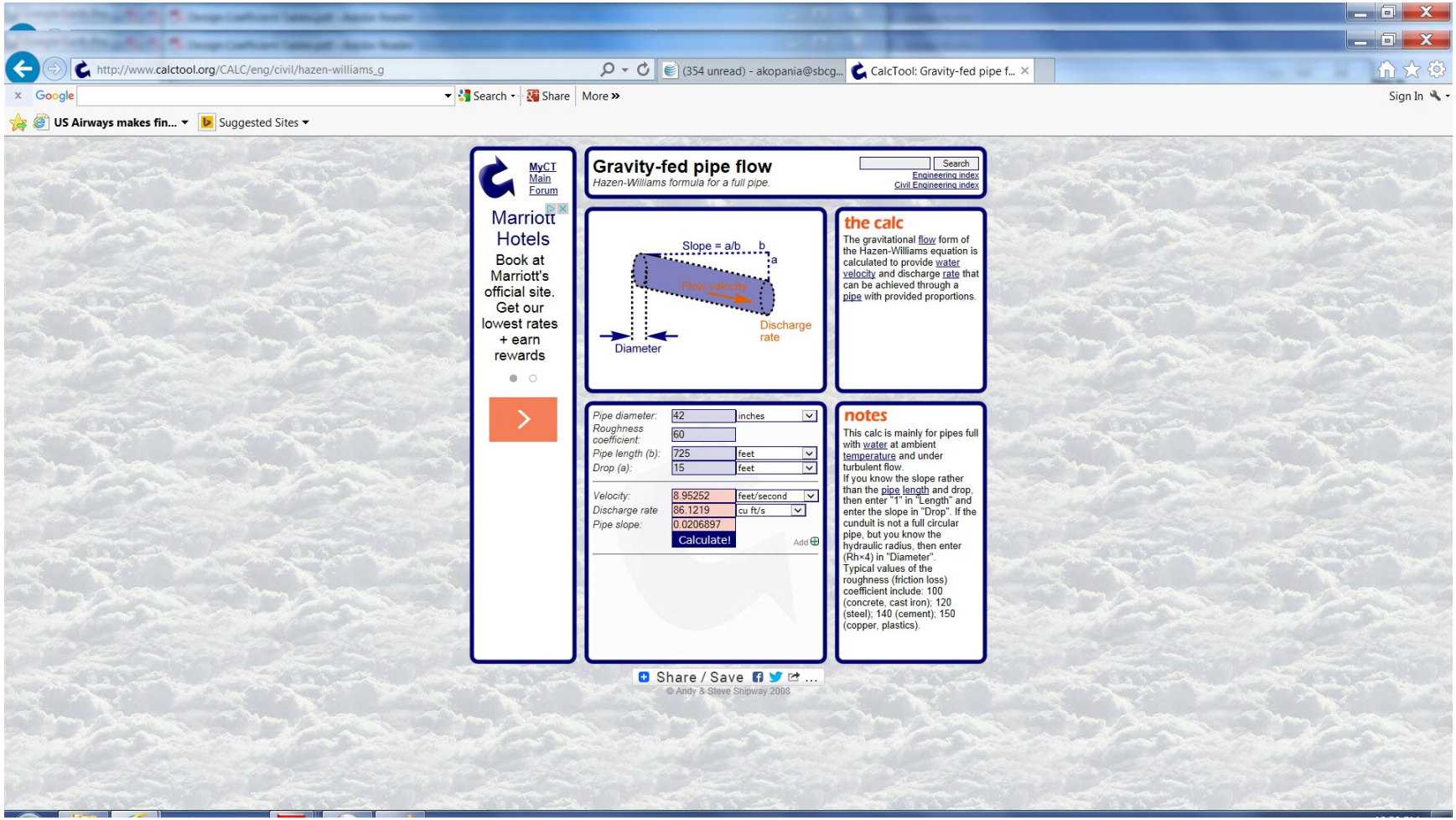
Flow (cfs)	Water Height (ft)	
4.2	0.78	10-yr storm
4.7	0.93	20-yr storm

APPENDIX D

CONVEYANCE PIPE SIZING DOCUMENTS


http://www.calctool.org/CALC/eng/civil/hazen-williams_g
(354 unread) - akopania@sbcg...
CalcTool: Gravity-fed pipe f...
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Suggested Sites
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Marriott Hotels
Book at Marriott's official site. Get our lowest rates + earn rewards
Gravity-fed pipe flow
Hazen-Williams formula for a full pipe.
Search
Engineering index
Civil Engineering index
Slope = a/b
b
a
Flow velocity
Discharge rate
Diameter
the calc
The gravitational flow form of the Hazen-Williams equation is calculated to provide water velocity and discharge rate that can be achieved through a pipe with provided proportions.
Pipe diameter: 15 inches
Roughness coefficient: 140
Pipe length (b): 530 feet
Drop (a): 18 feet
Velocity: 14.2707 feet/second
Discharge rate 17.5104 cu ft/s
Pipe slope: 0.0339623
Calculate!
Add
notes
This calc is mainly for pipes full with water at ambient temperature and under turbulent flow.
If you know the slope rather than the pipe length and drop, then enter "1" in "Length" and enter the slope in "Drop". If the cunduit is not a full circular pipe, but you know the hydraulic radius, then enter (Rh×4) in "Diameter".
Typical values of the roughness (friction loss) coefficient include: 100 (concrete, cast iron); 120 (steel); 140 (cement); 150 (copper, plastics).
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12:55 PM
10/16/2015


http://www.calctool.org/CALC/eng/civil/hazen-williams_g
(354 unread) - akopania@sbcg...
CalcTool: Gravity-fed pipe f...
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Suggested Sites
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Marriott Hotels
Book at Marriott's official site. Get our lowest rates + earn rewards
Gravity-fed pipe flow
Hazen-Williams formula for a full pipe.
Search
Engineering index
Civil Engineering index
Slope = a/b
b
a
Flow velocity
Discharge rate
Diameter
the calc
The gravitational flow form of the Hazen-Williams equation is calculated to provide water velocity and discharge rate that can be achieved through a pipe with provided proportions.
Pipe diameter: 18 inches
Roughness coefficient: 140
Pipe length (b): 340 feet
Drop (a): 35 feet
Velocity: 29.1332 feet/second
Discharge rate 51.4758 cu ft/s
Pipe slope: 0.102941
Calculate!
Add
notes
This calc is mainly for pipes full with water at ambient temperature and under turbulent flow.
If you know the slope rather than the pipe length and drop, then enter "1" in "Length" and enter the slope in "Drop". If the cunduit is not a full circular pipe, but you know the hydraulic radius, then enter (Rh×4) in "Diameter".
Typical values of the roughness (friction loss) coefficient include: 100 (concrete, cast iron); 120 (steel); 140 (cement); 150 (copper, plastics).
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http://www.calctool.org/CALC/eng/civil/hazen-williams_g
(354 unread) - akopania@sbcg...
CalcTool: Gravity-fed pipe f...
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Search
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More
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US Airways makes fin...
Suggested Sites
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Forum
Marriott Hotels
Book at Marriott's official site. Get our lowest rates + earn rewards
Gravity-fed pipe flow
Hazen-Williams formula for a full pipe.
Search
Engineering index
Civil Engineering index
Slope = a/b
b
a
Flow velocity
Discharge rate
Diameter
the calc
The gravitational flow form of the Hazen-Williams equation is calculated to provide water velocity and discharge rate that can be achieved through a pipe with provided proportions.
Pipe diameter: 42 inches
Roughness coefficient: 60
Pipe length (b): 725 feet
Drop (a): 15 feet
Velocity: 8.95252 feet/second
Discharge rate 86.1219 cu ft/s
Pipe slope: 0.0206897
Calculate!
Add
notes
This calc is mainly for pipes full with water at ambient temperature and under turbulent flow.
If you know the slope rather than the pipe length and drop, then enter "1" in "Length" and enter the slope in "Drop". If the cunduit is not a full circular pipe, but you know the hydraulic radius, then enter (Rh×4) in "Diameter".
Typical values of the roughness (friction loss) coefficient include: 100 (concrete, cast iron); 120 (steel); 140 (cement); 150 (copper, plastics).
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www.calctool.org/CALC/eng/civil/hazen-williams_g

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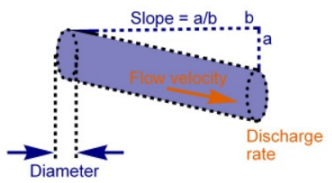
lucidchart.com

Gravity-fed pipe flow

Hazen-Williams formula for a full pipe.

Search

Engineering index
Civil Engineering index



the calc

The gravitational flow form of the Hazen-Williams equation is calculated to provide water velocity and discharge rate that can be achieved through a pipe with provided proportions.

Pipe diameter:	12	inches
Roughness coefficient:	140	
Pipe length (b):	100	feet
Drop (a):	2	feet
Velocity:	9.31555	feet/second
Discharge rate	7.31545	cu ft/s
Pipe slope:	0.0200000	

Calculate!

Add

notes

This calc is mainly for pipes full with water at ambient temperature and under turbulent flow.
If you know the slope rather than the pipe length and drop, then enter "1" in "Length" and enter the slope in "Drop". If the cunduit is not a full circular pipe, but you know the hydraulic radius, then enter (Rh×4) in "Diameter".
Typical values of the roughness (friction loss) coefficient include: 100 (concrete, cast iron); 120 (steel); 140 (cement); 150 (copper, plastics).

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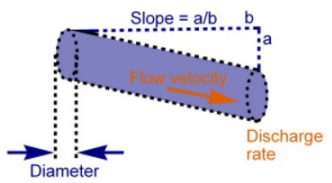
lucidchart.com

Gravity-fed pipe flow

Hazen-Williams formula for a full pipe.

Search

Engineering index
Civil Engineering index



the calc

The gravitational flow form of the Hazen-Williams equation is calculated to provide water velocity and discharge rate that can be achieved through a pipe with provided proportions.

Pipe diameter:	12	inches
Roughness coefficient:	140	
Pipe length (b):	100	feet
Drop (a):	12	feet
Velocity:	24.5138	feet/second
Discharge rate	19.2505	cu ft/s
Pipe slope:	0.120000	

Calculate!

Add

notes

This calc is mainly for pipes full with water at ambient temperature and under turbulent flow.
If you know the slope rather than the pipe length and drop, then enter "1" in "Length" and enter the slope in "Drop". If the cunduit is not a full circular pipe, but you know the hydraulic radius, then enter (Rh×4) in "Diameter".
Typical values of the roughness (friction loss) coefficient include: 100 (concrete, cast iron); 120 (steel); 140 (cement); 150 (copper, plastics).

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APPENDIX E

LABORATORY ANALYTICAL REPORT

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

March 27, 2014

CLS Work Order #: CXC0803
COC #:

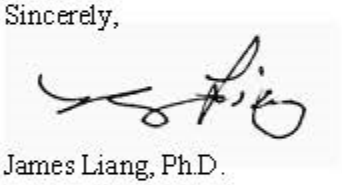
Dr. Andrew Kopania
EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762

Project Name: Clayton Quarry

Enclosed are the results of analyses for samples received by the laboratory on 03/20/14 10:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

EMKO Environmental, Inc.	Project: Clayton Quarry	
551 Lakecrest Dr.	Project Number: [none]	**CLS Work Order #: CXC0803**
El Dorado Hills, CA 95762	Project Manager: Dr. Andrew Kopania	COC #:

email results to:
akopania@sbcglobal.net

Scott Furnas

CLS - Labs

CHAIN OF CUSTODY CLS ID No.: CXC0803 LOG NO. WEB FORM

REPORT TO:
EMKO Environmental, Inc
551 Lakecrest Dr.
El Dorado Hills, CA 95762
Andy Kopania
Clayton Quarry
Ramon Nielson
Clayton Hydrology
Clayton, CA

CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA 95742
OTHER

ANALYSIS REQUESTED
DI-WET - see attached analyte list
Dissolved Metals
General Minerals

GEOTRACKER:
EDF REPORT ☐ YES ☒ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

TURN AROUND TIME: - DAY | 1-2 DAY | 3 DAY | 5 DAY
SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES			
3/12/14	1100	Diabase baserock	rock	1	glass jar	N	X	X	DI Leach
3/12/14	1105	Knoxville sediment	soil	1	glass jar	N	X	X	DI Leach

SUSPECTED CONSTITUENTS
PRESERVATIVES (1) HCl (2) = COLD (3) = H_2SO_4 (7) =
(5) HNO_3 (4) = NAOH (6) = $Na_2S_2O_3$

INVOICE TO:
P.O. #
QUOTE #

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	A. Kopania / EMKO	3/20/14		

RECD AT LAB BY: DATE / TIME: 3-20-14 1000 CONDITIONS / COMMENTS: 4

SHIPPED BY: ☐ FED X ☐ UPS ☒ OTHER dropped off in person AIR BILL #

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762

Project: Clayton Quarry
Project Number: [none]
Project Manager: Dr. Andrew Koparia

CLS Work Order #: CXC0803
COC #

CXC0803

Rock Leachability Testing
Clayton Quarry
Contra Costa County, California

LABORATORY ANALYTES FOR CLAYTON DI-WET ROCK SAMPLES

Metals (1)	General Minerals
Analyte	Analyte
aluminum	total alkalinity
antimony	bicarbonate as CaCO3
+ arsenic	carbonate as CaCO3
barium	hydroxide as CaCO3
beryllium	chloride
boron	nitrate
cadmium	nitrite
chromium	sulfate
cobalt	Specific conductance (EC)
copper	calcium
iron	magnesium
lead	sodium
manganese	potassium
molybdenum	hardness as CaCO3
mercury	pH
nickel	total dissolved solids (TDS)
+ selenium	
silver	
thallium	
vanadium	
zinc	

+ EPA 6020

(1) Leachate should be filtered prior to conducting metals analyses. Metals results should be reported as "DISSOLVED".

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762

Project: Clayton Quarry
Project Number: [none]
Project Manager: Dr. Andrew Kopania

CLS Work Order #: CXC0803
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drabase Base/Rock (CXC0803-01) Rock	**Sampled: 03/12/14 11:00**	**Received: 03/20/14 10:00**							
Total Alkalinity	**24**	5.0	mg/L	1	CX01999	03/24/14	03/24/14	SM2320B	
Bicarbonate as CaCO3	**19**	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	**5.6**	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	**1.6**	0.50	"	"	CX01993	03/24/14	03/24/14	EPA 300.0	
Fluoride	ND	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	0.50	"	"	"	"	"	"	
Sulfate as SO4	**7.7**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**69**	1.0	µmhos/cm	"	CX02003	03/24/14	03/24/14	EPA 120.1	
MBAS as LAS, mol wt 340	**0.16**	0.10	mg/L	"	CX01995	03/24/14	03/24/14	SM5540 C	
Calcium	**6.0**	1.0	"	"	CX02020	03/25/14	03/26/14	EPA 200.7	
Magnesium	**2.2**	1.0	"	"	"	"	"	"	
Potassium	ND	1.0	"	"	"	"	"	"	
Sodium	**4.6**	1.0	"	"	"	"	"	"	
Hardness as CaCO3	**24**	1.0	"	"	"	"	"	"	
Nitrite as N, DI WET	ND	0.40	"	"	CX01993	03/24/14	03/24/14	EPA 300.0	
pH	**8.78**	1.00	pH Units	"	CX01972	03/24/14	03/24/14	EPA 9045C	
Total Dissolved Solids	**44**	10	mg/L	"	CX02059	03/24/14	03/26/14	SM2540C	
Knoxville Sediment (CXC0803-02) Soil	**Sampled: 03/12/14 11:05**	**Received: 03/20/14 10:00**							
Total Alkalinity	**35**	5.0	mg/L	1	CX01999	03/24/14	03/24/14	SM2320B	
Bicarbonate as CaCO3	**35**	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	ND	0.50	"	"	CX01993	03/24/14	03/24/14	EPA 300.0	
Fluoride	**0.17**	0.10	"	"	"	"	"	"	
Nitrate as NO3	**0.56**	0.50	"	"	"	"	"	"	
Sulfate as SO4	**1.9**	1.0	"	"	"	"	"	"	
Specific Conductance (EC)	**70**	1.0	µmhos/cm	"	CX02003	03/24/14	03/24/14	EPA 120.1	
MBAS as LAS, mol wt 340	**0.65**	0.10	mg/L	"	CX01995	03/24/14	03/24/14	SM5540 C	
Calcium	**7.5**	1.0	"	"	CX02020	03/25/14	03/26/14	EPA 200.7	

EMKO Environmental, Inc.
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Project: Clayton Quarry
Project Number: [none]
Project Manager: Dr. Andrew Kopania

CLS Work Order #: CXC0803
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Knoxville Sediment (CXC0803-02) Soil	**Sampled: 03/12/14 11:05**	**Received: 03/20/14 10:00**							
Magnesium	**2.7**	1.0	mg/L	1	CX02020	"	03/26/14	EPA 200.7	
Potassium	ND	1.0	"	"	"	"	"	"	
Sodium	**2.6**	1.0	"	"	"	"	"	"	
Hardness as CaCO3	**30**	1.0	"	"	"	"	"	"	
Nitrite as N, DI WET	ND	0.40	"	"	CX01993	03/24/14	03/24/14	EPA 300.0	
pH	**8.16**	1.00	pH Units	"	CX01972	03/24/14	03/24/14	EPA 9045C	
Total Dissolved Solids	**63**	10	mg/L	"	CX02059	03/24/14	03/26/14	SM2540C	

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COC #:

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drabase Base/Rock (CXC0803-01) Rock Sampled: 03/12/14 11:00 Received: 03/20/14 10:00									
Mercury	ND	1.0	µg/L	1	CX02021	03/25/14	03/26/14	EPA 7470A	
Antimony	ND	50	"	"	CX02020	03/25/14	03/26/14	EPA 6010B	
Barium	ND	20	"	"	"	"	"	"	
Beryllium	ND	10	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Aluminum	**220**	50	"	"	"	"	"	"	
Boron	ND	50	"	"	"	"	"	"	
Iron	ND	100	"	"	"	"	"	"	
Manganese	ND	20	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	CX02022	03/25/14	03/25/14	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Copper	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
Knoxville Sediment (CXC0803-02) Soil Sampled: 03/12/14 11:05 Received: 03/20/14 10:00									
Mercury	ND	1.0	µg/L	1	CX02021	03/25/14	03/26/14	EPA 7470A	
Antimony	ND	50	"	"	CX02020	03/25/14	03/26/14	EPA 6010B	
Barium	**43**	20	"	"	"	"	"	"	
Beryllium	ND	10	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	

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551 Lakecrest Dr.
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COC #:

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Knoxville Sediment (CXC0803-02) Soil	**Sampled: 03/12/14 11:05**		**Received: 03/20/14 10:00**						
Nickel	ND	20	µg/L	1	CX02020	"	03/26/14	EPA 6010B	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	**31**	20	"	"	"	"	"	"	
Aluminum	**150**	50	"	"	"	"	"	"	
Boron	ND	50	"	"	"	"	"	"	
Iron	**220**	100	"	"	"	"	"	"	
Manganese	ND	20	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	CX02022	03/25/14	03/25/14	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	5.0	"	"	"	"	"	"	
Copper	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	

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551 Lakecrest Dr.
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COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX01993 - General Prep										
Blank (CX01993-BLK1)				Prepared & Analyzed: 03/24/14						
Nitrite as N, DI WET	ND	0.40	mg/L							
Chloride	ND	0.50	"							
Fluoride	ND	0.10	"							
Nitrate as NO3	ND	0.50	"							
Sulfate as SO4	ND	1.0	"							
LCS (CX01993-BS1)				Prepared & Analyzed: 03/24/14						
Chloride	4.73	0.50	mg/L	5.00		95	75-125			
Fluoride	1.91	0.10	"	2.00		96	75-125			
Nitrite as N, DI WET	0.654	0.40	"	0.610		107	75-125			
Nitrate as NO3	1.85	0.50	"	2.00		92	75-125			
Sulfate as SO4	4.75	1.0	"	5.00		95	75-125			
LCS Dup (CX01993-BSD1)				Prepared & Analyzed: 03/24/14						
Fluoride	1.84	0.10	mg/L	2.00		92	75-125	4	25	
Nitrite as N, DI WET	0.620	0.40	"	0.610		102	75-125	5	25	
Chloride	5.07	0.50	"	5.00		101	75-125	7	25	
Nitrate as NO3	1.98	0.50	"	2.00		99	75-125	7	25	
Sulfate as SO4	5.15	1.0	"	5.00		103	75-125	8	25	
Matrix Spike (CX01993-MS1)		**Source: CXC0803-01**		Prepared & Analyzed: 03/24/14						
Fluoride	1.82	0.10	mg/L	2.00	ND	91	75-125			
Nitrite as N, DI WET	0.682	0.40	"	0.610	0.00	112	75-125			
Chloride	6.66	0.50	"	5.00	1.63	100	75-125			
Nitrate as NO3	2.10	0.50	"	2.00	0.367	87	75-125			
Sulfate as SO4	13.5	1.0	"	5.00	7.70	116	75-125			
Matrix Spike Dup (CX01993-MSD1)		**Source: CXC0803-01**		Prepared & Analyzed: 03/24/14						
Fluoride	1.82	0.10	mg/L	2.00	ND	91	75-125	0.1	30	
Nitrite as N, DI WET	0.692	0.40	"	0.610	0.00	113	75-125	1	30	
Chloride	6.71	0.50	"	5.00	1.63	102	75-125	0.8	30	
Nitrate as NO3	2.12	0.50	"	2.00	0.367	88	75-125	0.8	30	
Sulfate as SO4	13.6	1.0	"	5.00	7.70	118	75-125	0.5	30	

EMKO Environmental, Inc.
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COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX01993 - General Prep										
Batch CX01995 - General Preparation										
Blank (CX01995-BLK1)				Prepared & Analyzed: 03/24/14						
MBAS as LAS, mol wt 340	ND	0.10	mg/L							
LCS (CX01995-BS1)				Prepared & Analyzed: 03/24/14						
MBAS as LAS, mol wt 340	0.502	0.10	mg/L	0.500		100	80-120			
LCS Dup (CX01995-BSD1)				Prepared & Analyzed: 03/24/14						
MBAS as LAS, mol wt 340	0.505	0.10	mg/L	0.500		101	80-120	0.6	20	
Matrix Spike (CX01995-MS1)		**Source: CXC0803-01**		Prepared & Analyzed: 03/24/14						
MBAS as LAS, mol wt 340	0.668	0.10	mg/L	0.500	0.161	101	75-125			
Matrix Spike Dup (CX01995-MSD1)		**Source: CXC0803-01**		Prepared & Analyzed: 03/24/14						
MBAS as LAS, mol wt 340	0.693	0.10	mg/L	0.500	0.161	106	75-125	4	20	
Batch CX01999 - General Preparation										
Blank (CX01999-BLK1)				Prepared & Analyzed: 03/24/14						
Total Alkalinity	ND	5.0	mg/L							
Bicarbonate as CaCO3	ND	5.0	"							
Carbonate as CaCO3	ND	5.0	"							
Hydroxide as CaCO3	ND	5.0	"							
Duplicate (CX01999-DUP1)		**Source: CXC0866-01**		Prepared & Analyzed: 03/24/14						
Total Alkalinity	66.4	5.0	mg/L		67.0			0.9	20	
Bicarbonate as CaCO3	66.4	5.0	"		67.0			0.9	20	
Carbonate as CaCO3	ND	5.0	"		ND				20	
Hydroxide as CaCO3	ND	5.0	"		ND				20	

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551 Lakecrest Dr.
El Dorado Hills, CA 95762

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Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02003 - General Preparation										
Blank (CX02003-BLK1)				Prepared & Analyzed: 03/24/14						
Specific Conductance (EC)	ND	1.0	µmhos/cm							
Batch CX02020 - EPA 3010A										
Blank (CX02020-BLK1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Calcium	ND	1.0	mg/L							
Magnesium	ND	1.0	"							
Potassium	ND	1.0	"							
Sodium	ND	1.0	"							
Hardness as CaCO3	ND	1.0	"							
LCS (CX02020-BS1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Calcium	9.65	1.0	mg/L	10.0		96	75-125			
Magnesium	9.23	1.0	"	10.0		92	75-125			
Potassium	12.0	1.0	"	12.5		96	75-125			
Sodium	12.1	1.0	"	12.5		97	75-125			
Matrix Spike (CX02020-MS1)	**Source: CXC0803-01**			Prepared: 03/25/14 Analyzed: 03/26/14						
Calcium	15.2	1.0	mg/L	10.0	6.02	92	75-125			
Magnesium	11.0	1.0	"	10.0	2.24	88	75-125			
Potassium	11.6	1.0	"	12.5	0.129	92	75-125			
Sodium	16.1	1.0	"	12.5	4.59	92	75-125			
Matrix Spike Dup (CX02020-MSD1)	**Source: CXC0803-01**			Prepared: 03/25/14 Analyzed: 03/26/14						
Calcium	14.3	1.0	mg/L	10.0	6.02	83	75-125	6	30	
Magnesium	9.88	1.0	"	10.0	2.24	76	75-125	11	30	
Potassium	9.37	1.0	"	12.5	0.129	74	75-125	21	30	QM-5
Sodium	13.4	1.0	"	12.5	4.59	70	75-125	19	30	QM-5

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551 Lakecrest Dr.
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COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02059 - General Preparation										
Blank (CX02059-BLK1)				Prepared: 03/24/14 Analyzed: 03/26/14						
Total Dissolved Solids	ND	10	mg/L							

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CLS Work Order #: CXC0803
COC #:

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02020 - EPA 3010A										
Blank (CX02020-BLK1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Antimony	ND	50	µg/L							
Barium	ND	20	"							
Beryllium	ND	10	"							
Cadmium	ND	10	"							
Cobalt	ND	20	"							
Chromium	ND	20	"							
Molybdenum	ND	20	"							
Nickel	ND	20	"							
Vanadium	ND	20	"							
Zinc	ND	20	"							
Aluminum	ND	50	"							
Boron	ND	50	"							
Iron	ND	100	"							
Manganese	ND	20	"							
LCS (CX02020-BS1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Antimony	446	50	µg/L	500		89	75-125			
Barium	465	20	"	500		93	75-125			
Beryllium	474	10	"	500		95	75-125			
Cadmium	465	10	"	500		93	75-125			
Cobalt	476	20	"	500		95	75-125			
Chromium	485	20	"	500		97	75-125			
Molybdenum	427	20	"	500		85	75-125			
Nickel	480	20	"	500		96	75-125			
Vanadium	236	20	"	250		94	75-125			
Zinc	455	20	"	500		91	75-125			
Aluminum	9640	50	"	10000		96	75-125			
Boron	1140	50	"	1250		91	75-125			
Iron	4710	100	"	5000		94	75-125			
Manganese	473	20	"	500		95	75-125			

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DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02020 - EPA 3010A										
Matrix Spike (CX02020-MS1)	**Source: CXC0803-01**			Prepared: 03/25/14	Analyzed: 03/26/14					
Antimony	448	50	µg/L	500	ND	90	75-125			
Barium	456	20	"	500	10.0	89	75-125			
Beryllium	454	10	"	500	ND	91	75-125			
Cadmium	452	10	"	500	3.40	90	75-125			
Cobalt	457	20	"	500	ND	91	75-125			
Chromium	458	20	"	500	ND	92	75-125			
Molybdenum	440	20	"	500	ND	88	75-125			
Nickel	462	20	"	500	ND	92	75-125			
Vanadium	238	20	"	250	12.5	90	75-125			
Zinc	440	20	"	500	ND	88	75-125			
Aluminum	9490	50	"	10000	218	93	75-125			
Boron	1100	50	"	1250	13.5	87	75-125			
Iron	4580	100	"	5000	50.4	91	75-125			
Manganese	457	20	"	500	0.900	91	75-125			
Matrix Spike Dup (CX02020-MSD1)	**Source: CXC0803-01**			Prepared: 03/25/14	Analyzed: 03/26/14					
Antimony	415	50	µg/L	500	ND	83	75-125	7	30	
Barium	411	20	"	500	10.0	80	75-125	10	30	
Beryllium	416	10	"	500	ND	83	75-125	9	30	
Cadmium	404	10	"	500	3.40	80	75-125	11	30	
Cobalt	416	20	"	500	ND	83	75-125	9	30	
Chromium	433	20	"	500	ND	87	75-125	5	30	
Molybdenum	408	20	"	500	ND	82	75-125	8	30	
Nickel	415	20	"	500	ND	83	75-125	11	30	
Vanadium	219	20	"	250	12.5	83	75-125	8	30	
Zinc	398	20	"	500	ND	80	75-125	10	30	
Aluminum	8250	50	"	10000	218	80	75-125	14	30	
Boron	986	50	"	1250	13.5	78	75-125	10	30	
Iron	4200	100	"	5000	50.4	83	75-125	9	30	
Manganese	422	20	"	500	0.900	84	75-125	8	30	

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551 Lakecrest Dr.
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COC #:

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02021 - EPA 7470A										
Blank (CX02021-BLK1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Mercury	ND	1.0	µg/L							
LCS (CX02021-BS1)				Prepared: 03/25/14 Analyzed: 03/26/14						
Mercury	6.13	1.0	µg/L	5.00		123	75-125			
Matrix Spike (CX02021-MS1)		**Source: CXC0803-01**		Prepared: 03/25/14 Analyzed: 03/26/14						
Mercury	4.67	1.0	µg/L	5.00	ND	93	75-125			
Matrix Spike Dup (CX02021-MSD1)		**Source: CXC0803-01**		Prepared: 03/25/14 Analyzed: 03/26/14						
Mercury	4.59	1.0	µg/L	5.00	ND	92	75-125	2	25	
Batch CX02022 - EPA 3020A										
Blank (CX02022-BLK1)				Prepared & Analyzed: 03/25/14						
Arsenic	ND	5.0	µg/L							
Lead	ND	5.0	"							
Selenium	ND	5.0	"							
Thallium	ND	5.0	"							
Copper	ND	20	"							
Silver	ND	10	"							
LCS (CX02022-BS1)				Prepared & Analyzed: 03/25/14						
Arsenic	96.2	5.0	µg/L	100		96	75-125			
Lead	99.8	5.0	"	100		100	75-125			
Selenium	95.3	5.0	"	100		95	75-125			
Thallium	102	5.0	"	100		102	75-125			
Copper	123	20	"	100		123	75-125			
Silver	95.0	10	"	100		95	75-125			

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COC #:

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CX02022 - EPA 3020A										
Matrix Spike (CX02022-MS1)	**Source: CXC0803-01**			Prepared & Analyzed: 03/25/14						
Arsenic	98.4	5.0	µg/L	100	0.530	98	75-125			
Lead	97.7	5.0	"	100	ND	98	75-125			
Selenium	99.5	5.0	"	100	1.75	98	75-125			
Thallium	102	5.0	"	100	ND	102	75-125			
Copper	103	20	"	100	0.620	102	75-125			
Silver	95.3	10	"	100	1.47	94	75-125			
Matrix Spike Dup (CX02022-MSD1)	**Source: CXC0803-01**			Prepared & Analyzed: 03/25/14						
Arsenic	98.9	5.0	µg/L	100	0.530	98	75-125	0.5	30	
Lead	96.9	5.0	"	100	ND	97	75-125	0.8	30	
Selenium	97.4	5.0	"	100	1.75	96	75-125	2	30	
Thallium	102	5.0	"	100	ND	102	75-125	0.7	30	
Copper	103	20	"	100	0.620	103	75-125	0.4	30	
Silver	99.9	10	"	100	1.47	98	75-125	5	30	

EMKO Environmental, Inc.	Project: Clayton Quarry	
551 Lakecrest Dr.	Project Number: [none]	**CLS Work Order #: CXC0803**
El Dorado Hills, CA 95762	Project Manager: Dr. Andrew Kopania	COC #:

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

APPENDIX G-2
DRAINAGE PLAN

CEMEX CLAYTON QUARRY

DRAINAGE PLAN

EXISTING vs RECLAIMED CONDITIONS

Existing Drainage Conditions: Existing drainage conditions consist of runoff from three primary watershed areas. The Quarry Pit watershed areas (labeled P1, P2, and P3 on the Drainage Plan map) drain into the existing quarry. The Mitchell Creek watershed areas (M1 and M2) drain the area east of the existing quarry and discharge either directly to Mitchell Creek DA71 through local natural drainages (M1) or to the DA71A storm drain system near and along Diablo Downs Drive (M2) that convey the runoff to Mitchell Creek. Runoff from the area north of the quarry and the plant site area north of the haul road and site entrance drains to the north. There is also a small (8-acre) transitional watershed area (T) that currently drains toward Mitchell Creek but that will be captured by the Quarry Pit as mining progresses.

Reclamation Drainage Conditions: Once mining ceases, the runoff from the Quarry Pit watersheds (P1, P2, and P3) and from the transitional water shed (T) will accumulate in the quarry excavation, eventually forming a lake. Once the water level in the pit lake reaches an elevation of 735 ft msl, it would be discharged through an outlet structure that would control the rate of flow. The outlet structure would consist of a 4" X 9" slot in a concrete and steel bulkhead that would allow the water to flow into a 24-inch diameter discharge pipe. While a 12-inch pipe would be more than adequate for the projected discharge rates, the pipe has been over-sized to facilitate maintenance. The discharge pipe would connect to a drop inlet near Mitchell Canyon Road and Diablo Downs Drive, where the DA71A storm drain system would convey the water to Mitchell Creek.

Under the Revised Reclamation Plan, runoff from the north watershed and plant site area will remain unchanged, other than an anticipated small reduction in flows due to the reclamation and revegetation of the current industrial plant site area. Thus, runoff to the north would be reduced under the proposed conditions.

The outlet structure at the north end of the quarry basin will limit the peak outflow rate from the quarry to 4.2 cfs during a 10-year storm event and 5.5 cfs during a 100-year storm event. In addition, the peak storm flows from the quarry would likely not occur until after the peak flows from the lower sub-watersheds had begun to recede due to the time it would take water in the quarry basin to accumulate and rise above the outlet structure opening. As a result, the flow from the quarry would not reach the DA71A storm drains until after the peak storm flows from the more downslope watershed area (M2) had begun to subside.

Under the Revised Reclamation Plan, the 4.2 cfs (for a 10-year event) or 5.5 cfs (for a 100-year event) runoff from the quarry basin into Mitchell Creek and downstream areas would be more than offset by the change in discharge of the transitional watershed T from Mitchell Creek under existing conditions to the quarry pit under reclaimed conditions, as summarized in Table 1. This change is due to the east edge of the mining area being moved approximately 200 feet to the east under existing entitlements. Under existing conditions, the 10-yr storm runoff from transitional watershed T to Mitchell Creek is 6.3 cfs. Under project reclamation conditions, the 10-yr storm runoff from the quarry will be 4.2 cfs. Therefore, for the 10-yr storm the project runoff would be less than the existing runoff by about 2.1 cfs. For the 100-year storm event, runoff under existing conditions from transitional watershed T to Mitchell Creek is 11.5 cfs whereas under reclaimed conditions the peak discharge from the quarry basin would be 5.5 cfs. Therefore, for the 100-yr storm the project runoff would be less than the existing runoff by 6 cfs. Table 1 shows the reduction in runoff to Mitchell Creek due to the project reclamation conditions.

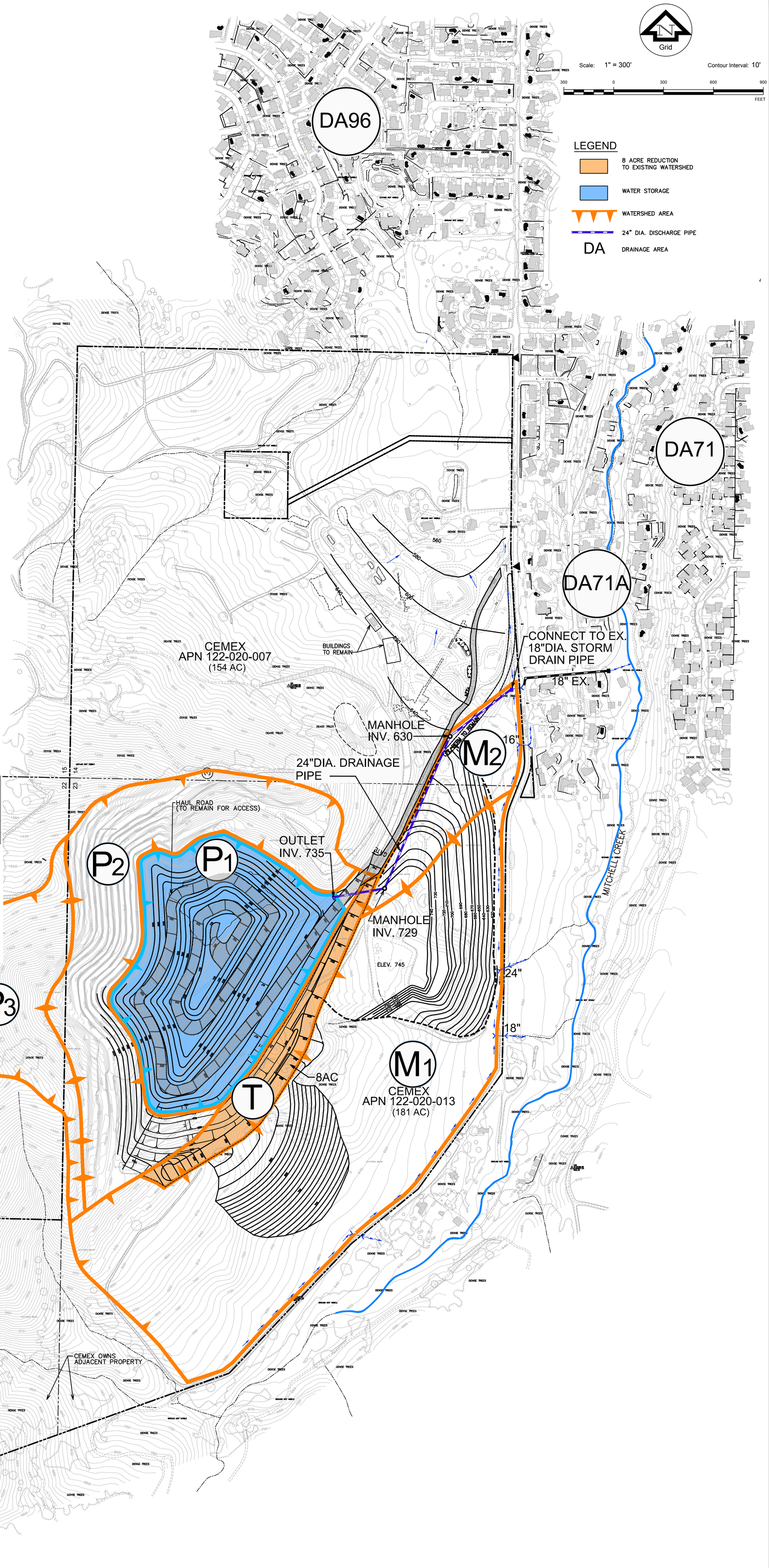
TABLE 1- EXISTING VS RECLAIMED RUNOFF CONDITIONS

Storm Event	Existing Runoff from Watershed T (8 acres)	Controlled Discharge from Reclaimed Quarry	Δ in Runoff to Mitchell Creek
10-year	6.3 cfs	4.2 cfs	- 2.1 cfs
100-year	11.5 cfs	5.5 cfs	- 6.0 cfs

The DA71A storm drain system from the intersection of Mitchell Canyon Road and Diablo Downs Drive to the discharge point in Mitchell Creek will be reevaluated for capacity and functionality and upgraded by CEMEX if deemed inadequate, prior to the time that the quarry pit lake would reach an elevation of 735 ft msl.

References

1. *EMKO Environmental, Inc., Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry*



SHEET NUMBER 1 OF 1 SHEETS	SCALE: 1"=300'	CEMEX CLAYTON QUARRY	Spinardi Associates Civil and Environmental Engineering
JOB NUMBER -	DATE: MAY, 2020	RECLAMATION DRAINAGE PLAN	265 Sea View Ave., Piedmont, CA 94610
REV. DATE DESCRIPTION BY	DESIGN BY: KDS	CONTRA COSTA COUNTY CALIFORNIA	
	DRAWN BY: MLWH		
	CHECKED BY: KDS		

CEMEX\2019 ISABEL URS\19-2917_RecDrainagePlan

APPENDIX G-3
ADAPTIVE MANAGEMENT PROGRAM

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762-3772
(916)718-5511 mobile
akopania@sbcglobal.net

TECHNICAL MEMORANDUM

March 1, 2021

To: Steve Grace, CEMEX

Cc: Yasha Saber, Compass Land Group
Pat Mitchell, Mitchell Chadwick

From: Andy Kopania

Subject: **Adaptive Management Program to evaluate water quality conditions after reclamation of the CEMEX Clayton Quarry**

Impact Analysis

After mining is completed at the CEMEX Clayton Quarry, a quarry lake will form as the former mining excavation fills with water. As described in the *Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry, Clayton, Contra Costa County, California* (EMKO Environmental, Inc., 2020a) (referred to herein as the "May 2020 Hydrology Report"), the primary source of water for the quarry lake will be local rainfall, including rain that falls on the quarry lake and runoff that occurs from the surrounding watershed and the exposed quarry walls. As described in the May 2020 Hydrology Report, it is anticipated that it will take approximately 158 years for the quarry-lake water surface to rise to the outlet elevation of 735 feet above mean sea level (ft msl). Once the quarry lake reaches the outlet elevation, the quarry lake will have a surface area of approximately 32 acres and will hold over 8,500 acre-feet of water. The watershed around the quarry lake will consist of 17 acres of undisturbed vegetated land, 41 acres of diabase high walls, and eight acres of Knoxville Formation slopes[1]. The undisturbed vegetated land is underlain by diabase. Thus, about 88 percent of the 66-acre watershed area will consist of diabase.

Due to the general lack of groundwater within the hardrock formations, the post-mining water quality in the quarry lake will primarily be affected by the leaching of the minerals from the underlying geologic formations in the runoff from the surrounding watershed.

1 The acreages for the watershed areas are approximate and based on the best available information at the time this assessment was conducted. These values are subject to change as additional investigations are conducted and mining progresses.

To evaluate the potential for minerals within the diabase and the Knoxville Formation to leach into rainwater, leaching tests were conducted on samples collected at the Clayton Quarry. Samples of crushed diabase material from the product piles in the processing plant area and samples of native Knoxville Formation from the east rim of the quarry were obtained on March 12, 2014 and submitted to California Laboratory Services in Rancho Cordova, California. The crushed diabase sample consisted of material that had been mined and then crushed around the date the sample was collected. Thus, the 2014 sample represented a composite sample of the active mining area at that time.

The samples were leached using deionized water following the Waste Extraction Test protocols. This type of test is commonly referred to as a DI-WET test.
The DI-WET analytical protocol uses a 10-fold dilution of the solid sample to the deionized water leaching fluid and a 48-hour contact time. Use of the DI-WET methodology with a 48-hour contact time exceeds the recommendations in the Global Acid Rock Drainage Guide (International Network for Acid Prevention, October 21, 2014), which discuss 24-hour batch tests using deionized water. The DI-WET parameters are generally applicable to evaluation of the potential for normal rainfall to leach minerals and metals from soils. The test typically involves crushing the sample to a two-millimeter grain size, which would be consistent with soil particle sizes. However, for exposed bedrock areas such as those that would occur on the walls of the reclaimed quarry, the DI-WET test may actually provide a much greater surface area for leaching than would occur under field conditions where the storm water is running over the surface of the bedrock. Overall, the results from the DI-WET test are considered to be indicative of the effects geologic materials may have on the quality of transient waters such as rainfall runoff.

The leachate samples generated from the DI-WET extraction of the diabase and the Knoxville Formation in 2014 were analyzed for general minerals and metals (see EMKO 2020a for results). Subsequent to the 2014 sampling, observations were made of several zones within the quarry that consist of carbonate veining and minor sulfide mineralization (i.e. pyrite). Photo 1 shows a fresh exposure of the diabase with calcareous (i.e. calcite and/or dolomite) veining. Photo 2 shows a weathered surface on the diabase with apparent oxidation of the iron sulfide (pyrite) mineralization. The presence of the zones of calcareous veining and sulfide mineralization were not known in 2014.

Preliminary literature review by EMKO and CEMEX geology staff suggests that localized oxidation of the pyrite is being neutralized by the calcareous veins, such that acid rock drainage (ARD) is not occurring. However, neutralization of the oxidized pyrite may result in the formation of soluble sulfate, calcium, and magnesium in the water that passes through the mineralized zones within the diabase. The following chemical equation defines the reaction (Gomo, 2018):

$$FeS_2 + CaMg(CO_3)_2 + 3.75O_2 + 1.5H_2O \leftrightarrow Fe(OH)_3 + 2(SO_4)^{2-} + Ca^{2+} + Mg^{2+} + 2CO_2$$

The reaction indicates that oxidation of pyrite in the presence of water and limestone or dolomite results in insoluble ferric (Fe^{3+}) oxide, dissolved ions of sulfate, calcium and magnesium, and carbon dioxide. Such a reaction has the potential to result in elevated concentrations of sulfate, calcium, and magnesium along with elevated total dissolved solids (TDS) levels in the runoff water. As discussed in Attachment C, the laboratory data confirm that the acid neutralization potential was greater than the acid generation potential in all samples except for one of the altered diabase samples. However, in that one sample, the pH was neutral. Thus, the field conditions at the Clayton quarry are consistent with the above reaction, demonstrating that the carbonate veins are neutralizing any acid that may form from oxidation of the pyrite.



Photo 1. Fresh diabase surfaces showing calcareous veining (January 2, 2020).



Photo 2. Weathered diabase surfaces in quarry showing oxidation (January 2, 2020).

The rock exposures in the current walls and floor of the quarry are not the same as those that will exist once mining is completed, except for part of the west diabase highwall. This is because quarrying activity will continue to progress in the east face of the quarry to reach the design reclamation contours. Given the duration of the proposed mining activities at Clayton (anticipated until 2068), and the long timeframe after reclamation for the quarry lake to form, it is not possible with the existing data, or with data from the existing diabase exposures in the quarry, to determine the water quality in the reclaimed quarry lake and assess whether or not water quality standards would potentially be exceeded in the future. Thus, the potential for a future impact to water quality is unknown. Any potential impact can be addressed through an adaptive management strategy that includes monitoring, comparison of monitoring results with action levels, and subsequent implementation of mitigation measures if the action levels are exceeded.

Monitoring Program and Action Levels

EMKO reviewed a range of guidance documents and peer-reviewed studies to identify methods that may be applicable for assessing potential future impacts to water quality. Attachment A, below, lists the documents that were reviewed and considered. Most of the documents focus on analytical procedures and test methods while only providing general suggestions on the appropriate number of samples and sampling strategies. However, two documents do provide more specific guidance on sampling.

Chapter Nine regarding Sampling Plans in the USEPA SW-846 manual defines statistical procedures that can be used to identify the number of samples that would be appropriate to determine if a specific standard was likely to be exceeded. Use of the USEPA procedure requires some prior data to define statistical parameters such as the mean and variance of the initial data set. There are not enough measurements from the 2014 sampling to use the USEPA statistical procedures. Thus, additional sampling has been conducted in accordance with the recommendations in EMKO (2020b), as described further below.

The 2014 Global Acid Rock Drainage Guide provides guidance on sampling programs during prospecting and resource development “to evaluate the potential of a particular rock type to generate acid, neutralize acid, or leach metals” (International Network for Acid Prevention, 2014, Section 4.3.2.3). The goal of the Global Acid Rock Drainage Guide is to obtain data appropriate to prevent or minimize acid rock drainage. From the existing data at the Clayton quarry and the neutralization mechanism described above, there does not appear to be any appreciable potential for acid rock drainage to occur at Clayton quarry. However, the methods identified in the 2014 Global Acid Rock Drainage Guide are also applicable to the assessment of what elements or metals may form or be released during the acid neutralization process into the quarry lake after reclamation.

Table 4-5 of the 2014 Global Acid Rock Drainage Guide suggests that, as part of resource definition, static testing of five to ten representative samples is appropriate. Since this adaptive management strategy is intended to assess conditions that may occur as the diabase mineral resource at Clayton is further developed, the resource definition recommendations would be applicable since the nature of the pyrite and carbonate mineralization in the future resource are undefined at this time.

Based on the guidance discussed above, Geocon Consultants, Inc. conducted a field sampling program on October 14, 2020 to collect representative samples of Knoxville Formation, altered diabase, and unaltered diabase. Attachment B provides a summary of the field sampling procedures. Four samples of unaltered diabase were collected from locations mid-distance between areas of mineralization and veining. Four representative mineralized zones were selected in the field and samples were collected from rock exposures where both pyrite and carbonate veining were observed. In addition, one quality assurance/quality control (QA/QC) duplicate sample was collected from the diabase. Details of the sampling procedures, sample locations, and QA/QC are described in Attachment B.

The Knoxville Formation is a part of the Great Valley Sequence of Late Jurassic to Cretaceous age sedimentary rocks that were deposited in a seaway after the Coast Range Ophiolite (of which the diabase in the Clayton Quarry is a part) was emplaced. At the Clayton Quarry, the sediments making up the Knoxville Formation are unaltered and not mineralized. However, to verify that the Knoxville Formation would not contribute to acid rock drainage or other water quality concerns once mining ceases, five samples were collected from the Knoxville outcrop along the eastern side of the existing quarry in accordance with Table 4-5 of the 2014 Global Acid Rock Drainage Guide. Sample locations and methods are described in Attachment B.

The nine diabase and five Knoxville samples were submitted to a California-licensed analytical laboratory under appropriate chain-of-custody protocols. Static testing using the DI-WET test methodology was conducted on all samples to mimic rainfall conditions. The samples were also evaluated for sulfur speciation and acid-base accounting analysis, including acid generation potential, acid neutralization potential, and net generation or neutralization potential, as appropriate. This analytical program is consistent with the recommendations in Section 4.3.2.3 of the 2014 Global Acid Rock Drainage Guide. Six individual constituents exceeded their respective standards or action levels, referred to as the Regulatory Threshold in the USEPA SW-846 manual[2], in at least one of the 14 samples collected and analyzed:

- Arsenic from one of the Knoxville Formation samples;
- Manganese from one of the altered diabase samples;

2 See Footnote 1 in Attachment C for a more detailed definition of the Regulatory Thresholds used for this analysis.

- pH from all four of the unaltered diabase samples;
- Conductivity from two of the altered diabase samples;
- Total dissolved solids (TDS) from three of the altered diabase samples; and
- Sulfate from three of the altered diabase samples.

The analytical results are discussed in more detail in Attachment C. The laboratory analytical data report is provided in Attachment D.

The data obtained from the field samples were evaluated using the USEPA SW-846 statistical procedures to determine the appropriate future quarry lake water sampling program once mining ceases and the quarry lake begins to fill with water. The statistical analysis is discussed in Attachment C. Based on that analysis, a total of four water samples, one each from four different locations, should be collected from the quarry lake each sampling round.

To facilitate reproducibility and consistency for the sampling program, four specific locations should be established once mining is completed and the quarry lake begins to fill with water. As the quarry fills with water, the locations relative to the perimeter of the lake should remain the same but will need to be moved to successively higher benches as the water level rises. To provide a reasonable distribution of sampling points, one water sample should be collected each sampling event from the following four locations in the future quarry:

1. near the outlet of the Quarry Lake;
2. along the east wall of the quarry, in an area from which either the Knoxville Formation contacts the water in the future Quarry Lake or runoff from the Knoxville Formation runs down the quarry wall into the future Quarry Lake;
3. along the diabase outcrop in the south side of the Quarry Lake; and
4. at an accessible location along the diabase high wall on the west side of the Quarry Lake.

The quarry lake water quality sampling program would begin once mining is completed and water begins to accumulate within the bottom of the excavation.

Based on seasonal changes in runoff and evaporation from the quarry lake, monitoring would be conducted twice a year, near the end of the wet season (March or April) and again near the end of the dry season (September or October). Field measurements would be conducted for the parameters listed in Table 1 at each of the four sampling locations. The field parameters listed in Table 1 are general indicators of water quality, based on Basin Plan limits and typical National Pollutant Discharge Elimination System (NPDES) requirements or geochemical conditions that could result from oxidation-reduction (redox) reactions that could affect or be caused by the sulfide mineralization.

TABLE 1. Semiannual Field Indicator Parameters	
Parameter	*Action Level*
pH	>8.5
Conductivity	>900 mg/L
Dissolved oxygen (DO)	<5.5 mg/L or <50% of saturation
Oxidation-reduction potential (ORP)	<0

The four quarry lake water samples would be submitted to a California-licensed analytical laboratory for analysis of the six specific constituents identified above and in Attachment C. If any of the action levels shown in Table 1 for the field data, or any of the Regulatory Thresholds defined in Attachment C for the laboratory analyses, are exceeded for two successive monitoring events, then an action plan would be developed to implement corrective measures to address the exceedances.

Corrective Measures

Specific corrective actions would depend on the nature of the underlying exceedance.

1. If pH, dissolved oxygen, or ORP levels fall outside of the limits in Table 1, aeration or mechanical circulation of the water in the quarry lake could be used to neutralize the pH and/or increase the dissolved oxygen and ORP levels.
2. If TDS or conductivity levels or individual ions or metals (i.e. sulfate, arsenic, manganese) exceed their standards, then the quarry lake water could be treated using reverse osmosis (RO) or ion-exchange prior to discharge from the quarry lake.
3. If specific areas or volumes of wall rock are identified as being problematic, the corrective measures could include removal of the rock mass or sealing off the rock mass with grout or other materials.

The corrective measures described above are established technologies that are feasible and cost-effective to implement. Additional technologies that may be developed between the time this adaptive management strategy was prepared and the time that monitoring data indicate an exceedance, if ever, could also be deployed.

It is important to note that geochemical conditions on the diabase and in the quarry lake are likely to change over time. Shortly after mining ceases, most of the diabase will be exposed to the atmosphere and intermittent seasonal precipitation. However, as the quarry lake fills, much of the exposed diabase will be permanently submerged and the exposure to available oxygen will be diminished, which would be expected to restrict oxidation of the pyrite or other sulfides, based on the chemical reaction described above. These changes are likely to have some effect on the water quality in the quarry

lake. Thus, corrective actions that may be required early in the life of the quarry lake could become unnecessary later. Likewise, if corrective actions are not necessary early on, that does not necessarily indicate they would not be needed later. It is also possible that the specific exceedances could change over time, necessitating a change in the appropriate corrective measure.

Reporting

Monitoring results would be reported to the County on an annual basis. The annual report would also describe any additional measures that have been or are planned to be taken based on the monitoring results. If the triggers described above to implement corrective measures are exceeded for two monitoring rounds, then the annual report would also describe the corrective actions that have been or are planned to be implemented under the adaptive management program.

However, if after five years of monitoring there have been no exceedances of the action levels in Table 1 and the Regulatory Thresholds defined in Attachment C, the monitoring and reporting frequency would be reduced to once every two years. If, after an additional 10 years of monitoring, there have been no exceedances of these same standards, then the monitoring and reporting frequency would be reduced to once every five years. If exceedances occur that trigger the need for corrective action, then monitoring would revert back to the original twice per year schedule, with annual reporting. If the corrective actions are successful, then subsequent monitoring and reporting frequencies would be reduced following the same schedule described above in this paragraph.

References Cited

International Network for Acid Prevention, October 21, 2014, Global Acid Rock Drainage Guide.

EMKO Environmental, Inc. (EMKO), 2020a, Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry, Clayton, Contra Costa County, California.

EMKO, 2020b, Technical Memorandum: Initial Sampling to Support Adaptive Management Plan, Clayton Quarry, August 13, 2020.

Gomo, M., 2018, Conceptual hydrogeochemical characteristics of a calcite and dolomite acid mine drainage neutralised circumneutral groundwater system, Water Science, vol. 32, pp. 355-361, https://www.sciencedirect.com/science/article/pii/S1110492917300036

United States Department of Environmental Protection (USEPA), Hazardous Waste Test Methods/SW-846, Chapter Nine, Sampling Plans (https://www.epa.gov/hw-sw846/chapter-nine-sw-846-compendium-sampling-plans, accessed June 29, 2020).

ATTACHMENT A
Documents Reviewed and Considered

International Network for Acid Prevention, October 21, 2014, Global Acid Rock Drainage Guide.

Nevada Bureau of Land Management, Rock Characterization and Water Resources Analysis Guidance for Mining Activities.

Nevada Division of Environmental Protection (NDEP), Bureau of Mining Regulation and Reclamation, March 4, 2019, Pit-Lake Characterization Analytical Profile.

NDEP, March 22, 2019, Nevada Modified Sobek Procedure Summary.

NDEP, Bureau of Mining Regulation and Reclamation, April 12, 2019, Waste Rock, Overburden, and Ore Characterization and Evaluation.

NDEP, Pit Lake Water Quality Characterization Program, NDEP Profile III.

O2 Marine, January 25, 2019, Kirkalocka Pit Water Quality Sampling Technical Report 2018 for Adaman Resources, Western Australia, 18WAU-0038/T1800150.

United States Department of Environmental Protection (USEPA), Hazardous Waste Test Methods/SW-846, Chapter Nine, Sampling Plans (https://www.epa.gov/hw-sw846/chapter-nine-sw-846-compendium-sampling-plans, accessed June 29, 2020).

USEPA, December 2002, Guidance on Choosing a Sampling Design for Environmental Data Collection for Use in Developing a Quality Assurance Project Plan, EPA QA/G-5S.

Zhao, Lu Y.L., Clint D. Mccullough, Mark A. Lund, and Michelle Newport, June 2010, Mine Voids Management Strategy (III): A Monitoring Strategy for Pit Lakes and Connected Waters, Mine Water and Environment Research/Centre for Ecosystem Management Report No. 2010-02, Edith Cowan University, Perth, Western Australia.

ATTACHMENT B
Geocon Consultants, Inc. Sampling Procedures Report

Project No. S1832-05-02
February 12, 2021

Yasha Saber
Compass Land Group
3140 Peacekeeper Way, Suite 102
McClellan, California 95652

Subject: SAMPLING PROCEDURE REPORT
CLAYTON QUARRY
515 MITCHELL CANYON ROAD
CLAYTON, CALIFORNIA

Mr. Saber:

In accordance with your email authorization dated October 13, 2020, we sampled altered and unaltered diabase and surrounding Knoxville formation from the Clayton Quarry (the site) at 515 Mitchell Canyon Road, Clayton, California (Vicinity Map, Figure 1). Samples collected were submitted to ACZ Laboratories, Inc. (ACZ) in Steamboat Springs, Colorado under chain-of-custody protocols. The samples were crushed and analyzed for waste extraction test methodology with deionized water (DI-WET) to mimic rainfall conditions. Results will be used by others to assist in the planning of future use of the quarry.

OBJECTIVE

The objective of our services was to collect eight representative rock samples from the altered and unaltered diabase in the quarry (Site Plan, Figure 2 and Diabase Sample Map, Figure 3) below an elevation of approximately 735 feet above mean sea level. Additionally, we collected five representative samples of the Knoxville Formation to verify the formation is not a contributor to acid mine drainage. Samples were to be shipped under chain-of-custody to ACZ to be analyzed for waste extraction test methodology with DI-WET.

ROCK FORMATION DESCRIPTIONS

Diabase

The diabase at the site is part of the Coast Range Ophiolite. The unaltered diabase is a blue-gray, mafic, fine-grained to aphanitic holocrystalline with few very thin calcareous veins, fresh to slightly weathered, rock (Photo 1). Parts of the diabase have been altered by sulfide mineralization and veining. The altered diabase ranges from a reddish brown to reddish yellow (photo 2) fine-grained holocrystalline with some thin to thick calcareous veins (Photo 3), fresh to slightly weathered rock. Altered zones are sporadic in exposed diabase. Altered zones in the quarry ranged from greater than 50 feet to less than a foot in length (Photo 4). However, the altered zones in the sample area ranged from 0.5 to 3 feet in length.

Knoxville Formation

The Knoxville Formation is a part of the Great Valley Sequence of Late Jurassic to Cretaceous age sedimentary rocks that were deposited in a seaway after the Coast Range Ophiolite was emplaced. There is an outcrop with talus (Photo 5) of the Knoxville formation located on the eastern end of the quarry. The on-site exposure of the formation is a gray to brown, thinly bedded, moderately to intensely weathered shale with high facility, and contains bivalve fossils (Photo 6).

SAMPLE COLLECTION PROCEDURE

Diabase

Samples of altered and unaltered diabase were collected from the safely accessible cliff faces of Bench 1 and Bench 2 (Figure 3) on October 14, 2020. Benches above 1 and 2 could not be safely accessed and therefore were not sampled. An area of altered or unaltered diabase identified by a California Professional Geologist was marked on the field map and sampled. The cliff face was chipped away using a rock hammer and a sledge. Dislodged pieces were placed into two 1-gallon plastic bags and labeled with unique sample identifier with date and time collected. Two samples of altered diabase and two samples of unaltered diabase were collected from each bench. Below is a table of sample identifiers and locations:

Sample Identifier	Bench Location	Altered or Unaltered
Bench 1 A1	Bench 1	Altered
Bench 1 U1	Bench 1	Unaltered
Bench 1 A2	Bench 1	Altered
Bench 1 U2	Bench 1	Unaltered
Bench 2 A1	Bench 2	Altered
Bench 2 U1	Bench 2	Unaltered
Bench 2 A2	Bench 2	Altered
Bench 2 U2	Bench 2	Unaltered

For quality control and assurance, a split blind duplicate sample was collected from Bench 1 A1 and labeled Bench 3 A1 with the correct date and a false collection time.

Knoxville Formation

Samples of the Knoxville Formation were collected from an outcrop along the eastern rim of the quarry adjacent to the haul road (Figure 2). A 150-foot long section of exposed outcrop with safe access was identified and divided into 5 quadrants. In each quadrant, rock samples were collected from the talus or broken off from intact outcrop using a rock hammer. Samples were placed in two 1-gallon plastic bags and labeled with unique sample identifier with date and time collected. Below is a table of sample identifiers and locations:

Sample Identifier	Quadrant Number
KxF1	1
KxF2	2
KxF3	3
KxF4	4
KxF5	5

SAMPLE HANDLING

Sample bags were placed in cardboard boxes and transported back to Geocon. Approximately 600 grams of sample material was removed from each sample and placed in a new 1-gallon plastic bag and labeled with the unique identifier with date and time collected. The 600-gram samples were placed in a cooler with ice and shipped to ACZ Laboratories next day air via FedEx on October 19, 2020. Remaining sample material is currently stored at the Geocon office.

CLOSURE

This report has been prepared exclusively for Compass Land Group. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained. This report is not a comprehensive site characterization and should not be construed as such. We strived to perform the services summarized herein in accordance with the standard of care in the geographic region at the time the services were rendered. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation.

We appreciate the opportunity to assist Compass Land Group and CEMEX with this project. Please contact the undersigned at your convenience if you have any questions concerning this letter or if we may be of further service.

Sincerely,

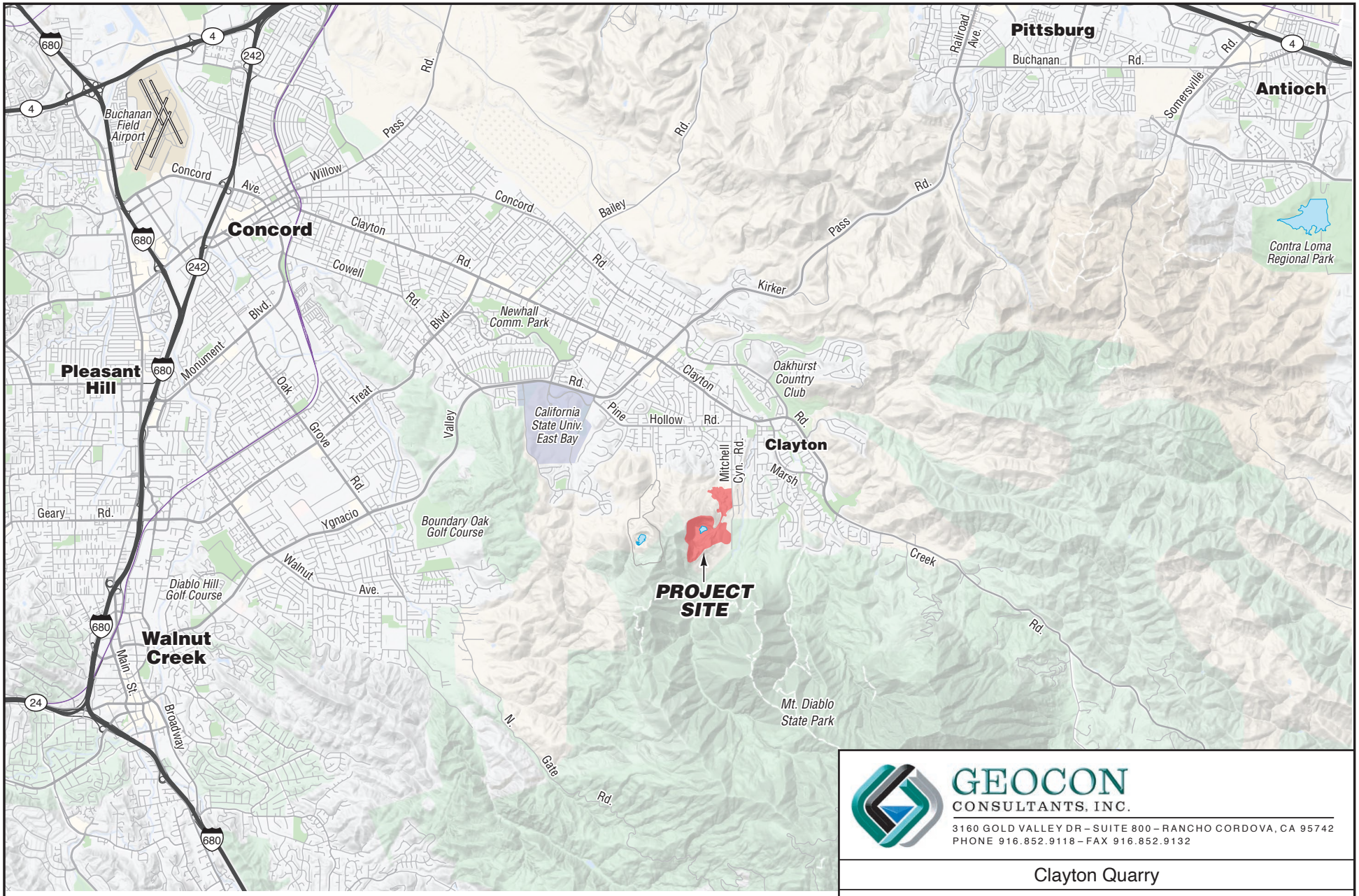
GEOCON CONSULTANTS, INC.

PROFESSIONAL GEOLOGIST
Lauren E. Short
9774
STATE OF CALIFORNIA

Lauren E Short, PG
Project Geologist

Jeremy Zorne, PE, GE
Senior Engineer

Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan
Figure 3, Diabase Sample Map
Photos 1 through 6
Chain-of-custody Documentation



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Clayton Quarry

Contra Costa County, California

VICINITY MAP

S1832-05-02	February 2021	Figure 1



0 250

Scale in Feet

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Clayton Quarry

Contra Costa County,
California

SITE PLAN

S1832-05-02	February 2021	Figure 2



LEGEND:

1 ● Approximate Altered Diabase Sample Location

1 ■ Approximate Unaltered Diabase Sample Location

Photo Date: 10/14/2020

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Contra Costa County, California

DIABASE SAMPLE MAP

S1832-05-02	February 2021	Figure 3

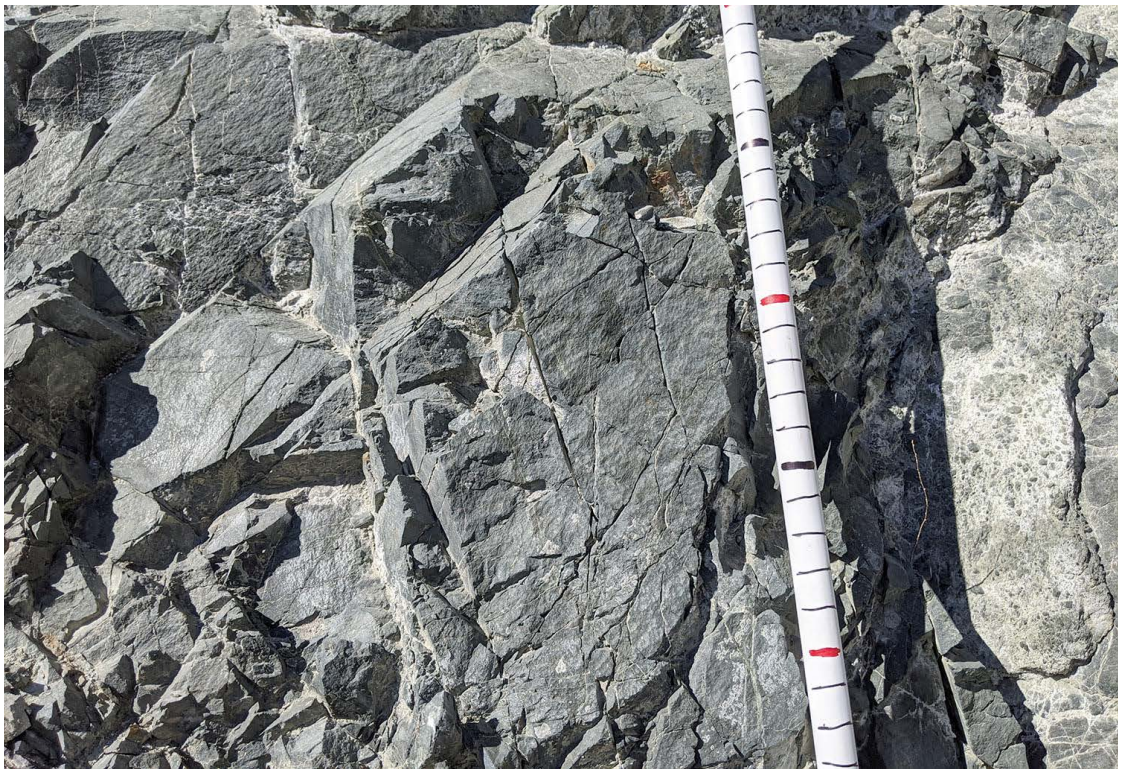


Photo No. 1 Example of unaltered diabase in an outcrop



Photo No. 2 Example of sulfide mineralization in altered diabase

PHOTOS NO. 1 & 2

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Clayton Quarry

Contra Costa County,
California

GEOCON Project No. S1832-05-02 | February 2021



Photo No. 3 Example of a carbonate vein from altered diabase

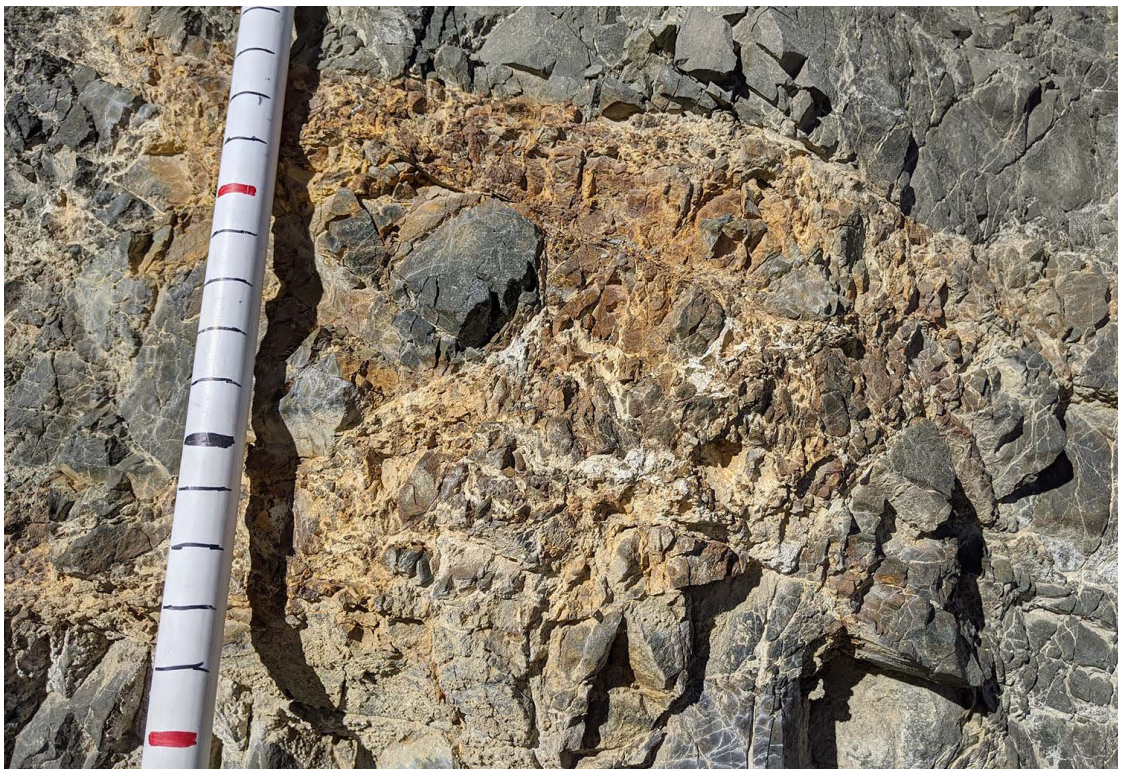


Photo No. 4 Example of moderate sulfide mineralization in altered diabase in an outcrop

PHOTOS NO. 3 & 4

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Clayton Quarry

Contra Costa County,
California

GEOCON Project No. S1832-05-02 | February 2021



Photo No. 5 Example of an intact outcrop of the Knoxville Formation with talus below



Photo No. 6 Example of a bivalve fossil indicative of Knoxville Formation

PHOTOS NO. 5 & 6

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Clayton Quarry

Contra Costa County, California

GEOCON Project No. S1832-05-02 | February 2021

ACZ Laboratories, Inc. L62449

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Andrew Kopania
Company: EMKO/Geocon
E-mail: akopania@sbcglobal.net
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916-718-5511

Copy of Report to:

Name: Yasha Saber
Company: Compass Land
E-mail: ysaber@compassland.net
Telephone:

Invoice to:

Name: Jeremy Zorne
Company: Geocon Consultants, INC
E-mail: Zorne@geoconinc.com
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916.852.9118

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☒

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☒

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: LE Short Sampler's Site Information State CA Zip code 94517 Time Zone PST

*Sampler's Signature: _____

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: Clayton-Quarry
PO#: S1832-05-02
Reporting state for compliance testing:
Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED *(attach list or use quote number)*

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	See Quote Attached
KxF1	10/14 1430	Rock	1	☒
KxF2	10/14 1433		1	☒
KxF3	10/14 1443		1	☒
KxF4	10/14 1459		1	☒
KxF5	10/14 1511	V	1	☒
				☐
				☐
				☐
				☐
				☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Additional copy of the report to Pat Mitchell pmitchell@mitchellchadwick.com
Log in receipt only to Lauren Short short@geoconinc.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	10/14/20 1900	FedEx	10/14/20 1900
		[signature] 10/20/20	11:32

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.

L62449 Chain of Custod

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Andrew Kopania
Company: EMKO/Geocon
E-mail: akopania@sbcglobal.net
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916-718-5511

Copy of Report to:

Name: Yasha Saber
Company: Compass Land
E-mail: ysaber@compassland.net
Telephone:

Invoice to:

Name: Jeremy Zorne
Company: Geocon Consultants, INC
E-mail: Zorne@geoconinc.com
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916.852.9118

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☒

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☒

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: LE Short Sampler's Site Information State CA Zip code 94517 Time Zone PST

*Sampler's Signature: _____

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: Clayton-Quarry
PO#: S1832-05-02
Reporting state for compliance testing:
Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED *(attach list or use quote number)*

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	See Quote Attached
Bench 1 A1	10/14 1100	Rock	1	☒
Bench 1 U1	10/14 1020		1	☒
Bench 1 A2	10/14 1130		1	☒
Bench 1 U2	10/14 1200		1	☒
Bench 2 A1	10/14 1320		1	☒
Bench 2 U1	10/14 1250		1	☒
Bench 2 A2	10/14 1340		1	☒
Bench 2 U2	10/14 1412		1	☒
Bench 3 A1	10/14 1425		1	☒
				☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Additional copy of the report to Pat Mitchell pmitchell@mitchellchadwick.com
Log in receipt only to Lauren Short short@geoconinc.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	10/13/20 1700	1400 FedEx	1400 10/14/20
			11:30

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.

ATTACHMENT C
Laboratory Data Review and Statistical Analysis

Rock samples were collected from the CEMEX Clayton Quarry and subjected to DI-WET leaching as a proxy for future water quality in the quarry lake. This testing was conducted to assist in the definition of the appropriate future water quality monitoring program as part of an adaptive management strategy.

In accordance with the August 13, 2020 sampling plan to support this Adaptive Management Program (EMKO, 2020b), 14 rock samples were collected at the Clayton Quarry on October 14, 2020. Five samples were collected from the Knoxville Formation outcrop along the east side of the quarry. Four samples and one duplicate sample of altered diabase were collected from three different quarry benches below an elevation of 735 feet. Four samples of unaltered diabase were collected from two different benches between the altered diabase samples. A summary of the field sampling procedures is provided in the technical memorandum from Geocon Consultants, Inc. (Geocon, 2021) provided as Attachment B to the Adaptive Management Program. Maps and field photographs documenting the sampling locations are also provided in Attachment B.

Tables C-1, C-2, and C-3 provide a summary of the laboratory analytical results for metals, acid-base accounting and sulfur parameters, and general mineral constituents, respectively. As indicated in Tables C-1 through C-3, six constituents exceeded their applicable Regulatory Threshold[1] (RT) in the DI-WET leachate from at least one of the samples collected. These six constituents are:

- Arsenic from one of the Knoxville Formation samples
- Manganese from one of the altered diabase samples;
- pH in the saturated paste[2] from all four of the unaltered diabase samples;
- Conductivity from two of the altered diabase samples;
- Total dissolved solids (TDS) from three of the altered diabase samples; and

1 The Regulatory Thresholds considered in this analysis are the primary and secondary maximum contaminant levels (MCLs) for drinking water, as reported by the California State Water Resources Control Board (SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021 https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions). The MCLs for the detected constituents are also typically equivalent to Basin Plan water quality standards and NPDES discharge limits.

2 The saturated paste pH was used for this assessment because it is more representative of the conditions that will exist in the geologic formations that are in direct contact with the water in the Quarry Lake (i.e. the water that accumulates in the Quarry Lake will saturate the fractures and void spaces within the adjacent diabase and Knoxville Formation).

- Sulfate from three of the altered diabase samples.

The acid-base potential evaluation indicated that the acid neutralization potential was greater than the acid generation potential in all samples except for one of the altered diabase samples (sample BENCH 2 A1 – see Table C-2). Despite the slight negative acid-base potential in BENCH 2 A1, the leaching pH and saturated paste pH values of 6.4 and 6.8 are within the RT and do not indicate the potential for the generation of acid rock drainage. As discussed further below, pH will be part of the monitoring program for the reclaimed Quarry Lake, which will allow for the assessment and subsequent mitigation of any potential for acid pH issues.

An initial statistical evaluation of the sampling results for the six parameters listed above indicates that the data for five of the six parameters (i.e. all but pH) are not normally distributed, as illustrated by the strongly skewed data distributions shown on Figures C-1A and C-2A. As indicated by the green highlighted cells in Table C-4, for these constituents, the standard deviation is typically much higher than the mean. The primary reason for the non-normal distribution of the data is the large range of values, with most of the results clustered at low concentrations, or non-detectable values, and the few RT exceedances being as many as three orders of magnitude greater. The USEPA SW-846 evaluation methodology assumes that the data approximate a normal distribution. To accommodate the USEPA SW-846 approach, the data were transformed using the base-10 logarithm. Figures C-2A and C-2B compare the distribution of the manganese laboratory results and the log-transformed manganese data. As illustrated on Figure C-2A, the laboratory reported results cluster at very low concentrations, with a long tail to the right for the single RT exceedance. Figure C-2B shows that the log-transformed manganese data better approximate a normal distribution. Figures C-3A and C-3B provide a similar comparison of the TDS data for the laboratory reported and log-transformed values.

Table C-4 provides a summary of the laboratory data for all six parameters that exceed their respective RTs and the log-transformed values for each parameter except pH. In Table C-4, values reported as not detected (ND) are shown at one-half of the method detection limit (MDL). Typically, ND values would be shown at one-half of the practical quantitation limit (PQL), also known as the laboratory reporting limit (RL). However, due to the prevalence of B-flagged data, where the laboratory was able to approximate values between the MDL and PQL, use of one-half of the PQL would over-estimate the mean and other statistical parameters.

Table C-4 also shows the mean and standard deviations for each parameter, along with the RT. Values of the standard deviation that exceed the mean are highlighted in green on Table C-4. Note that for values below one, the log transformation results in negative values. The presence of negative values does not affect the evaluation, however, because the log-transformed RTs for those constituents are also negative. In addition, the USEPA SW-846 calculations are based on the square of the difference

between the RT and the average, and on the square of the standard deviation, which eliminates negative values.

For the SW-846 procedure, the mean ($\dot{x}$) and the standard deviation (s) of the sample set are calculated. The value delta (Δ) is then calculated by subtracting the mean from the RT:

$$\Delta = RT - \dot{x}.$$

Then, using the t value for n-1 degrees of freedom from Table 9-2 of SW-846, the number of water samples (N) to collect from the future Quarry Lake to evaluate whether a constituent exceeds its water-quality RT is defined as:

$$N = (t^2 \times s^2)/\Delta^2.$$

The calculations are summarized in Table 4 for each constituent based on 14 samples and 13 degrees of freedom (n-1).

The appropriate number of water samples, N, to collect from the future Quarry Lake for each sampling round for each constituent are shown at the bottom of Table C-4. N ranges from 0.66 for arsenic to 3.38 for pH. In general, the N values shown in Table C-4 should be increased to the next highest whole number. Thus, the appropriate number of samples for arsenic and manganese is one, the appropriate number of samples for conductivity and TDS is two, the appropriate number of samples for sulfate is three, and the appropriate number of samples for pH is four.

To provide a consistent and easily implementable water quality monitoring program, it is recommended that the number of samples be the same for each constituent for each monitoring round. Thus, four water samples should be collected each sampling event and analyzed for the six constituents identified in Table C-4. To facilitate reproducibility and consistency for the sampling program, four specific locations should be established once mining is completed and the Quarry Lake begins to fill with water. Thus, for each sampling round, a single water sample would be collected from each of the four established sampling locations. As the quarry fills with water, the locations relative to the perimeter of the lake should remain the same but will need to be moved to successively higher benches as the water level rises. To provide a reasonable distribution of sampling points, one water sample should be collected each sampling event from each the following four locations:

1. near the outlet of the Quarry Lake;
2. along the east wall of the quarry, in an area from which either the Knoxville Formation contacts the water in the future Quarry Lake or runoff from the Knoxville Formation runs down the quarry wall into the future Quarry Lake;
3. along the diabase outcrop in the south side of the Quarry Lake; and

4. at an accessible location along the diabase high wall on the west side of the Quarry Lake.

Due to the substantial variation in rainfall and hydrologic conditions between the wet and dry seasons, it is recommended that one sampling event be conducted near the end of the wet season (March or April) each year and that a second sampling event be conducted near the end of the dry season (September or October) each year.

TABLE C-1
Metals Results from DI-WET Extraction
Wall Rock Samples Collected on October 14, 2020
CEMEX Clayton Quarry

KNOXVILLE FORMATION SAMPLES																							
ANALYTE	UNITS	KXF1		KXF2		KXF3		KXF4		KXF5		MDL	PQL	RT
Aluminum (WET DI)	mg/L	0.093	B	0.216	B	0.232	B	ND		0.818		0.05	0.25	1
Antimony (WET DI)	mg/L	0.00101	B	0.00085	B	0.00105	B	0.00151	B	0.00283		0.0004	0.002	0.006
Arsenic (WET DI)	mg/L	0.0031		0.00307		0.00507		0.00181		0.02		0.0002	0.001	0.01
Barium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.007	0.035	1
Beryllium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.00008	0.00025	0.004
Boron (WET DI)	mg/L	0.051	B	0.042	B	0.043	B	0.053	B	0.253		0.02	0.1	1
Cadmium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.00005	0.00025	0.005
Calcium (WET DI)	mg/L	9.08		7.94		7.27		22.3		0.17	B	0.1	0.5	
Chromium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	0.05
Cobalt (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	
Copper (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	1.3
Iron (WET DI)	mg/L	ND		0.105	B	0.101	B	ND		0.29		0.06	0.15	0.3
Lead (WET DI)	mg/L	ND		ND		ND		ND		ND		0.03	0.15	0.015
Magnesium (WET DI)	mg/L	2.85		2.54		1.49		1.72		ND		0.2	1	
Manganese (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	0.05
Mercury (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0002	0.001	0.002
Molybdenum (WET DI	mg/L	ND		ND		ND		ND		ND		0.02	0.1	
Nickel (WET DI)	mg/L	ND		ND		ND		ND		ND		0.008	0.04	0.1
Potassium (WET DI)	mg/L	1.52		1.27		1.19		1.37		ND		0.2	1	
Selenium (WET DI)	mg/L	0.00271		0.00195		0.00123		0.00471		0.0068		0.0001	0.00025	0.05
Silver (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.025	0.1
Sodium (WET DI)	mg/L	5.76		5.12		5.97		7.16		45.1		0.2	1	
Thallium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0001	0.0005	0.002
Vanadium (WET DI)	mg/L	0.015	B	0.017	B	0.029		ND		0.132		0.01	0.025	
Zinc (WET DI)	mg/L	ND		ND		ND		ND		ND		0.02	0.05	5
ALTERED DIABASE SAMPLES																							
ANALYTE	UNITS	BENCH 1 A1		BENCH 1 A2		BENCH 2 A1		BENCH 2 A2		BENCH 3 A1		MDL	PQL	RT
Aluminum (WET DI)	mg/L	ND		0.076	B	ND		0.083	B	0.075	B	0.05	0.25	1
Antimony (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0004	0.002	0.006
Arsenic (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0002	0.001	0.01
Barium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.007	0.035	1
Beryllium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.00008	0.00025	0.004
Boron (WET DI)	mg/L	0.024	B	ND		ND		ND		ND		0.02	0.1	1
Cadmium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.00005	0.00025	0.005
Calcium (WET DI)	mg/L	490		81.4		109		11.9		530		0.1	0.5	
Chromium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	0.05
Cobalt (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	
Copper (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	1.3
Iron (WET DI)	mg/L	ND		ND		ND		0.062	B	ND		0.06	0.15	0.3
Lead (WET DI)	mg/L	ND		ND		ND		ND		ND		0.03	0.15	0.015
Magnesium (WET DI)	mg/L	9.99		18.2		20.9		9.58		10.6		0.2	1	
Manganese (WET DI)	mg/L	0.028	B	0.015	B	0.334		0.011	B	0.019	B	0.01	0.05	0.05
Mercury (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0002	0.001	0.002
Molybdenum (WET DI	mg/L	ND		ND		ND		ND		ND		0.02	0.1	
Nickel (WET DI)	mg/L	ND		ND		ND		ND		ND		0.008	0.04	0.1
Potassium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.2	1	
Selenium (WET DI)	mg/L	0.00199		0.00016	B	0.0003		0.00011	B	0.00014	B	0.0001	0.00025	0.05
Silver (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.025	0.1
Sodium (WET DI)	mg/L	4.03		4.72		5.12		5.9		0.29	B	0.2	1	
Thallium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0001	0.0005	0.002
Vanadium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.025	
Zinc (WET DI)	mg/L	ND		ND		ND		ND		ND		0.02	0.05	5
UNALTERED DIABASE SAMPLES																							
ANALYTE	UNITS	BENCH 1 U1		BENCH 1 U2		BENCH 2 U1		BENCH 2 U2				MDL	PQL	RT
Aluminum (WET DI)	mg/L	0.321		0.199	B	0.233	B	0.29				0.05	0.25	1
Antimony (WET DI)	mg/L	ND		ND		ND		0.0005	B			0.0004	0.002	0.006
Arsenic (WET DI)	mg/L	0.0004	B	ND		0.00035	B	0.00073	B			0.0002	0.001	0.01
Barium (WET DI)	mg/L	ND		ND		ND		ND				0.007	0.035	1
Beryllium (WET DI)	mg/L	ND		ND		ND		ND				0.00008	0.00025	0.004
Boron (WET DI)	mg/L	ND		0.02	B	ND		ND				0.02	0.1	1
Cadmium (WET DI)	mg/L	ND		ND		ND		ND				0.00005	0.00025	0.005
Calcium (WET DI)	mg/L	7.12		12.2		7.49		7.24				0.1	0.5	
Chromium (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.05	0.05
Cobalt (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.05	
Copper (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.05	1.3
Iron (WET DI)	mg/L	0.124	B	ND		0.134	B	0.156				0.06	0.15	0.3
Lead (WET DI)	mg/L	ND		ND		ND		ND				0.03	0.15	0.015
Magnesium (WET DI)	mg/L	2.4		3.17		3.25		3.23				0.2	1	
Manganese (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.05	0.05
Mercury (WET DI)	mg/L	ND		ND		ND		ND				0.0002	0.001	0.002
Molybdenum (WET DI	mg/L	ND		ND		ND		ND				0.02	0.1	
Nickel (WET DI)	mg/L	ND		ND		ND		ND				0.008	0.04	0.1
Potassium (WET DI)	mg/L	0.21	B	ND		0.47	B	0.72	B			0.2	1	
Selenium (WET DI)	mg/L	0.00027		0.00028		ND		ND				0.0001	0.00025	0.05
Silver (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.025	0.1
Sodium (WET DI)	mg/L	5.06		5.63		4.57		7.52				0.2	1	
Thallium (WET DI)	mg/L	ND		ND		ND		ND				0.0001	0.0005	0.002
Vanadium (WET DI)	mg/L	0.018	B	0.012	B	ND		ND				0.01	0.025	
Zinc (WET DI)	mg/L	ND		ND		ND		ND				0.02	0.05	5

MDL = Method Detection Limit
PQL = Practical Quantitation Limit
ND = Not detected above the PQL
B = Concentration detected at a value between the MDL and PQL. Reported value is an estinated quantity.
RT = Regulatory Threshold, equivalent to primary or secondary maximum contaminant level, based on:
SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021
https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions
0.334 = Highlighted results exceed the RT

TABLE C-2
Acid-Base Accounting and Sulfur Parameter Results
Wall Rock Samples Collected on October 14, 2020
CEMEX Clayton Quarry

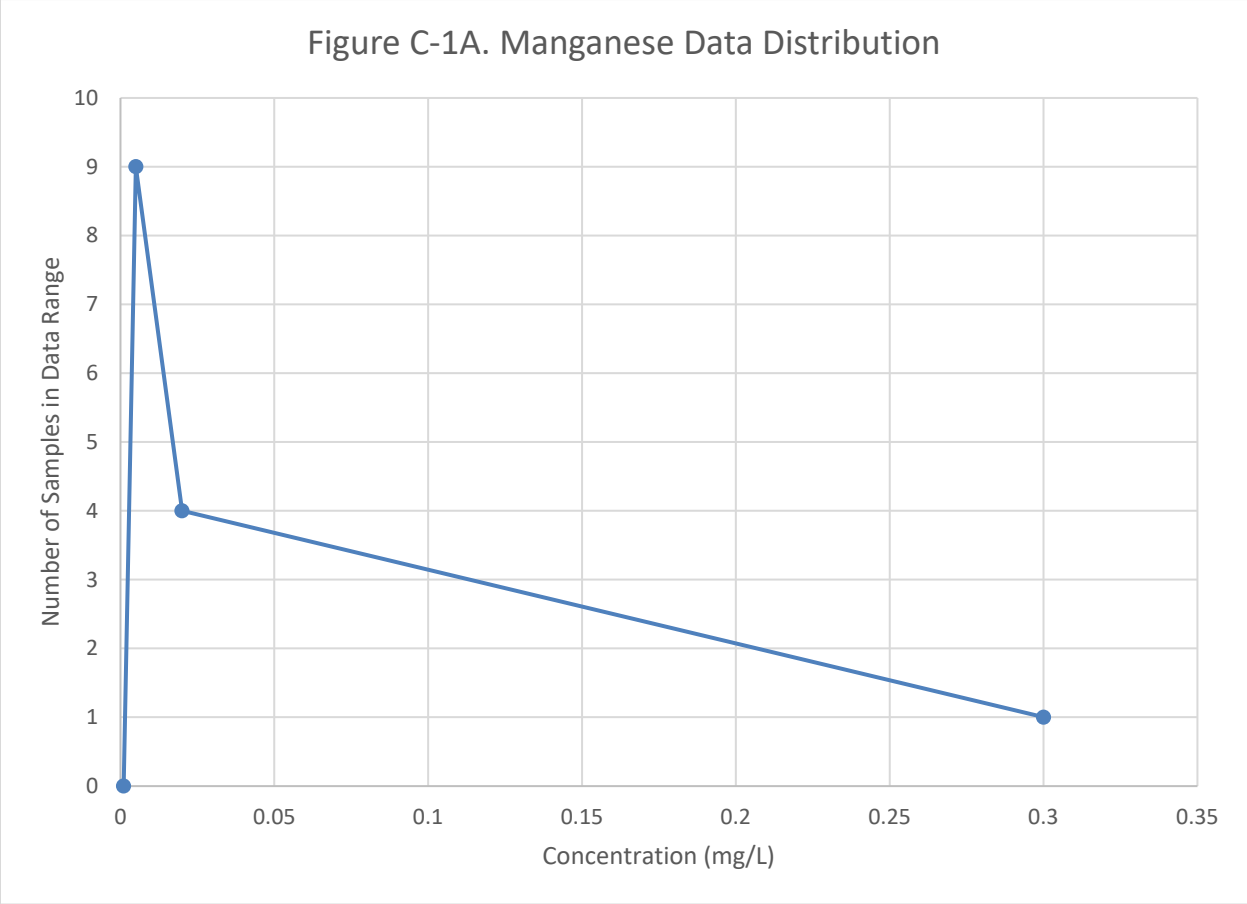
KNOXVILLE FORMATION SAMPLES																						
ANALYTE	UNITS	KXF1		KXF2		KXF3		KXF4		KXF5		MDL	PQL	RT								
Acid Generation Potential (calc on Sulfur t	t CaCO3/Kt	14.1		7.5		6.88		11.9		11.9		0.31	3.1									
Acid Neutralization Potential (calc)	t CaCO3/Kt	20		19		21		17		15		1	5									
Acid-Base Potential (calc on Sulfur total)	t CaCO3/Kt	5.9		11.5		14.1		5.1		3.1				>0								
Neutralization Potential as CaCO3	%	2		1.9		2.1		1.7		1.5		0.1	0.5									
pH	units	8.5		8.7		8.9		8.4		9.8		0.1	0.1									
pH, Saturated Paste	units	7.6		7.8		7.9		7.8		8.4		0.1	0.1	6.5 - 8.5								
Sulfur HCl Residue	%	0.4		0.2		0.19		0.35		0.35		0.01	0.1									
Sulfur HNO3 Residue	%	0.01	B	ND		ND		ND		ND		0.01	0.1									
Sulfur Organic Residual	%	0.01	B	ND		ND		ND		ND		0.01	0.1									
Sulfur Pyritic Sulfide	%	0.39		0.2		0.19		0.35		0.35		0.01	0.1									
Sulfur Sulfate	%	0.05	B	0.04	B	0.03	B	0.03	B	0.03	B	0.01	0.1									
Sulfur Total	%	0.45		0.24		0.22		0.38		0.38		0.01	0.1									
Temperature	C	21.5		21.5		21.5		21.5		21.5		0.1	0.1									
Total Sulfur minus Sulfate	%	0.4		0.2		0.19		0.35		0.35		0.01	0.1									
ALTERED DIABASE SAMPLES																						
ANALYTE	UNITS	BENCH 1 A1		BENCH 1 A2		BENCH 2 A1		BENCH 2 A2		BENCH 3 A1		MDL	PQL	RT								
Acid Generation Potential (calc on Sulfur t	t CaCO3/Kt	84.4		32.5		28.8		12.5		16.9		0.31	3.1									
Acid Neutralization Potential (calc)	t CaCO3/Kt	420		34		13		15		714		1	5									
Acid-Base Potential (calc on Sulfur total)	t CaCO3/Kt	336		1.5		-15.8		2.5		697				>0								
Neutralization Potential as CaCO3	%	42		3.4		1.3		1.5		71.4		0.1	0.5									
pH	units	7.6		8.1		6.4		7.9		7.8		0.1	0.1									
pH, Saturated Paste	units	6.9		7.8		6.8		7.9		7.3		0.1	0.1	6.5 - 8.5								
Sulfur HCl Residue	%	1.62		0.64		0.58		0.22		0.26		0.01	0.1									
Sulfur HNO3 Residue	%	ND		ND		ND		ND		ND		0.01	0.1									
Sulfur Organic Residual	%	ND		ND		ND		ND		ND		0.01	0.1									
Sulfur Pyritic Sulfide	%	1.62		0.64		0.58		0.22		0.26		0.01	0.1									
Sulfur Sulfate	%	1.08		0.4		0.34		0.18		0.28		0.01	0.1									
Sulfur Total	%	2.7		1.04		0.92		0.4		0.54		0.01	0.1									
Temperature	C	21.5		21.5		21.5		21.5		21.5		0.1	0.1									
Total Sulfur minus Sulfate	%	1.62		0.64		0.58		0.22		0.26		0.01	0.1									
UNALTERED DIABASE SAMPLES																						
ANALYTE	UNITS	BENCH 1 U1		BENCH 1 U2		BENCH 2 U1		BENCH 2 U2				MDL	PQL	RT								
Acid Generation Potential (calc on Sulfur t	t CaCO3/Kt	1.88	B	5.31			U	0.63	B			0.31	3.1									
Acid Neutralization Potential (calc)	t CaCO3/Kt	13		19		15		18				1	5									
Acid-Base Potential (calc on Sulfur total)	t CaCO3/Kt	11.1		13.7		15		17.4						>0								
Neutralization Potential as CaCO3	%	1.3		1.9		1.5		1.8				0.1	0.5									
pH	units	9.1		9.1		9		9.1				0.1	0.1									
pH, Saturated Paste	units	8.9		9		8.8		8.9				0.1	0.1	6.5 - 8.5								
Sulfur HCl Residue	%	0.03	B	0.13		ND		0.01	B			0.01	0.1									
Sulfur HNO3 Residue	%	ND		ND		ND		ND				0.01	0.1									
Sulfur Organic Residual	%	ND		ND		ND		ND				0.01	0.1									
Sulfur Pyritic Sulfide	%	0.03	B	0.13		ND		0.01	B			0.01	0.1									
Sulfur Sulfate	%	0.03	B	0.04	B	ND		0.01	B			0.01	0.1									
Sulfur Total	%	0.06	B	0.17		ND		0.02	B			0.01	0.1									
Temperature	C	21.5		21.5		21.5		21.5				0.1	0.1									
Total Sulfur minus Sulfate	%	0.03	B	0.13		ND		0.01	B			0.01	0.1									

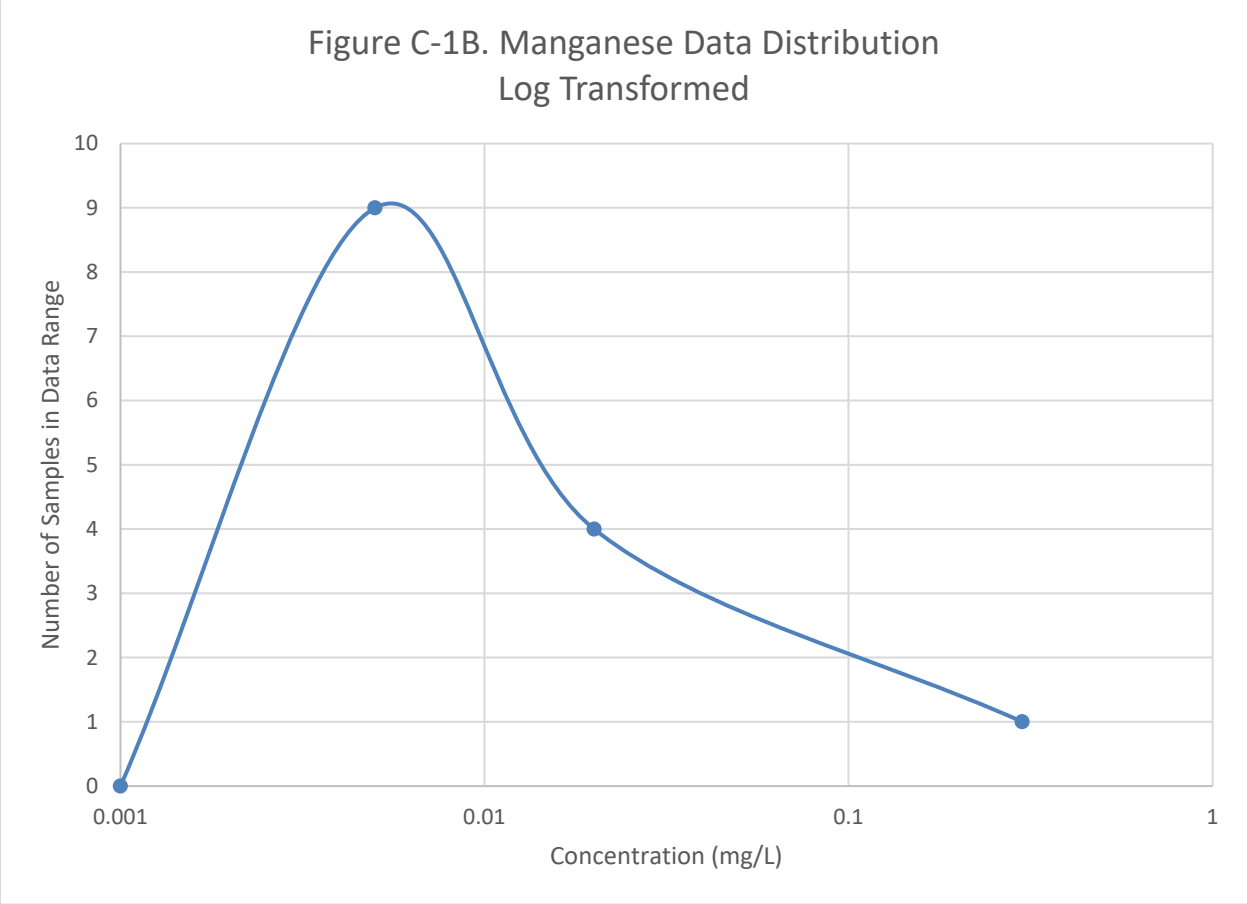
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
ND = Not detected above the PQL
B = Concentration detected at a value between the MDL and PQL. Reported value is an estinated quantity.
RT = Regulatory Threshold, equivalent to primary or secondary maximum contaminant level, based on:
SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021
https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions
8.9 = Highlighted results exceed the RT

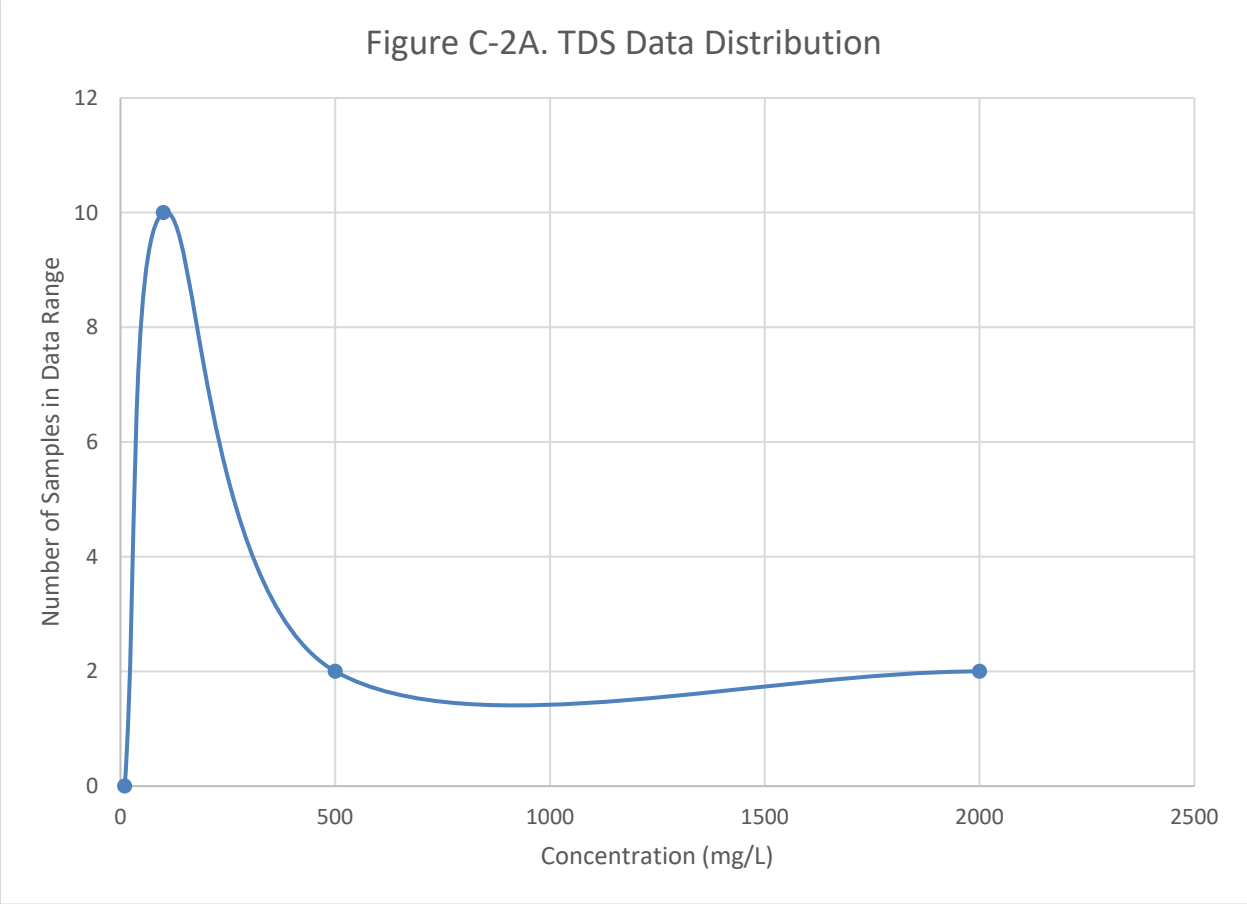
TABLE C-3
General Mineral Constituent Results from DI-WET Extraction
Wall Rock Samples Collected on October 14, 2020
CEMEX Clayton Quarry

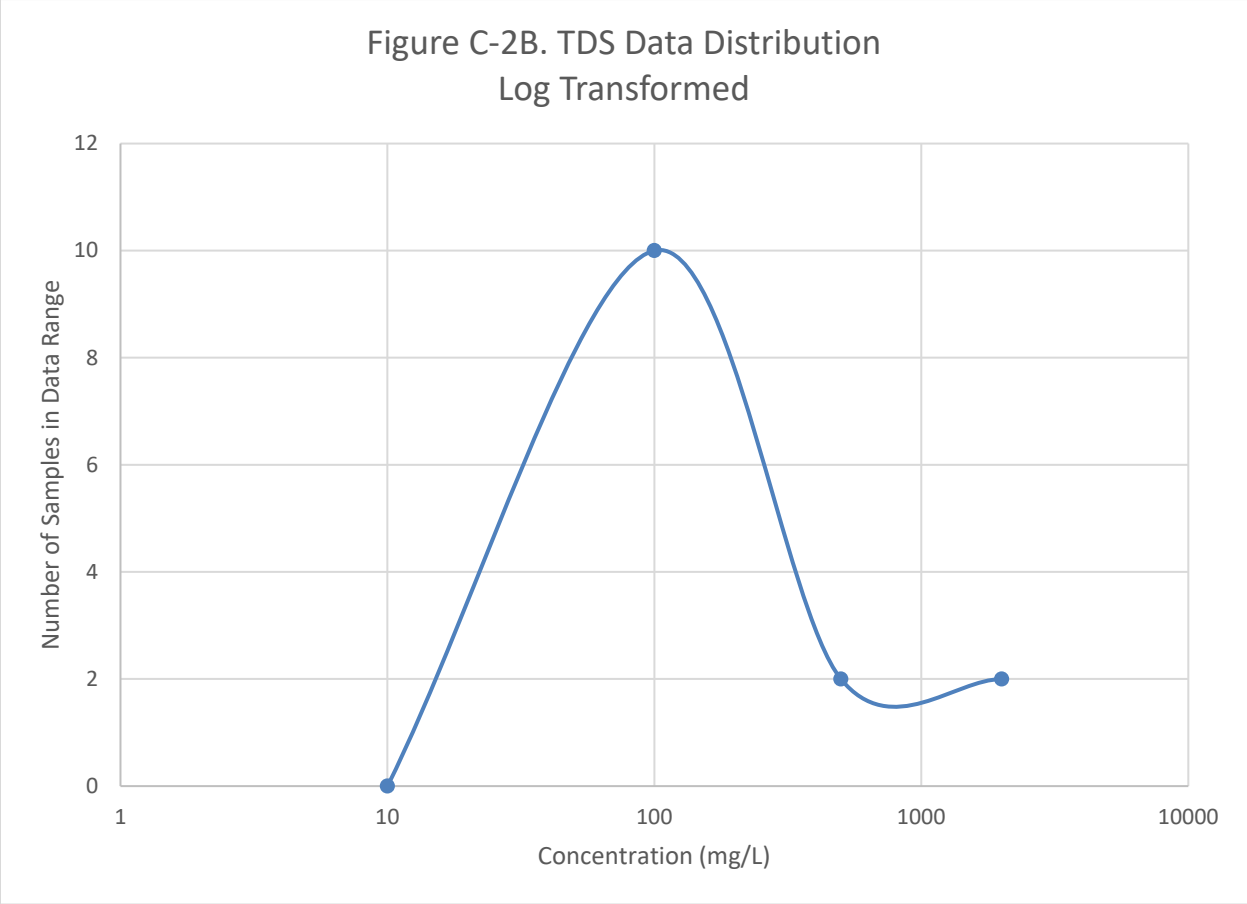
KNOXVILLE FORMATION SAMPLES																	
ANALYTE	UNITS	KXF1		KXF2		KXF3		KXF4		KXF5		MDL		PQL		RT	
Bicarbonate as CaCO3	mg/L	28.9		30.2		28.7		27.8		52.9		2		20			
Carbonate as CaCO3	mg/L	ND		ND		ND		ND		31.9		2		20			
Chloride (WET DI)	mg/L	0.8	B	0.6	B	0.81	B	1.45	B	3.12		0.5		2		250	
Conductivity @25C (WET-DI)	umhos/cr	108		86		76		177		202		1		10		900	
Fluoride (WET DI)	mg/L	0.3	B	0.3	B	0.3	B	ND		0.1	B	0.2		0.7		2	
Hardness as CaCO3 (WET-DI)	mg/L	34		30		24		63		0.424	B	0.2		5			
Hydroxide as CaCO3	mg/L	ND		ND		ND		ND		ND		2		20			
Nitrate as N (WET-DI)	mg/L	0.09	BH	0.04	BH	0.03	BH	0.03	BH	0.05	BH	0.02		0.1		10	
Nitrate/Nitrite as N (WET DI)	mg/L	0.093	BH	0.037	BH	0.029	BH	0.028	BH	0.052	BH	0.02		0.1			
Nitrite as N (WET DI)	mg/L	ND	H	ND	H		H		H	ND	H	0.01		0.05		1	
Residue, Filterable (TDS) @180C (WET DI	mg/L	66		52		52		104		120		20		40		500	
Sulfate (WET DI)	mg/L	22	B	ND		ND		50		ND		20		50		250	
Total Alkalinity	mg/L	28.9				28.7		27.8		84.8		2		20			
ALTERED DIABASE SAMPLES																	
ANALYTE	UNITS	BENCH 1 A1		BENCH 1 A2		BENCH 2 A1		BENCH 2 A2		BENCH 3 A1		MDL		PQL		RT	
Bicarbonate as CaCO3	mg/L	72.3		38.8		20.3		14.8	B	37.8		2		20			
Carbonate as CaCO3	mg/L	ND		ND		ND		ND		ND		2		20			
Chloride (WET DI)	mg/L	1.61	B	5.21		2.34		1.74	B	0.64	B	0.5		2		250	
Conductivity @25C (WET-DI)	umhos/cr	1770		522		650		177		1810		1		10		900	
Fluoride (WET DI)	mg/L	ND		ND		ND		0.2	B	ND		0.2		0.7		2	
Hardness as CaCO3 (WET-DI)	mg/L	1260		278		358		69		1370		0.2		5			
Hydroxide as CaCO3	mg/L	ND		ND		ND		ND		ND		2		20			
Nitrate as N (WET-DI)	mg/L	0.45	H	0.06	BH	0.04	BH	0.04	BH	0.09	BH	0.02		0.1		10	
Nitrate/Nitrite as N (WET DI)	mg/L	0.451	H	0.055	BH	0.044	BH	0.037	BH	0.086	BH	0.02		0.1			
Nitrite as N (WET DI)	mg/L	ND	H	ND	H	ND	H	ND	H	ND	H	0.01		0.05		1	
Residue, Filterable (TDS) @180C (WET DI	mg/L	1910		390		528		102		2020		20		40		500	
Sulfate (WET DI)	mg/L	1170		238		351		65		1300		20		50		250	
Total Alkalinity	mg/L	72.3		38.8		20.3		14.8	B	37.8		2		20			
UNALTERED DIABASE SAMPLES																	
ANALYTE	UNITS	BENCH 1 U1		BENCH 1 U2		BENCH 2 U1		BENCH 2 U2				MDL		PQL		RT	
Bicarbonate as CaCO3	mg/L	21.8		25.4		18.1	B	25.3				2		20			
Carbonate as CaCO3	mg/L	ND		ND		ND		ND				2		20			
Chloride (WET DI)	mg/L	1.12	B	2.28		1.47	B	1.5	B			0.5		2		250	
Conductivity @25C (WET-DI)	umhos/cr	90		121		95		105				1		10		900	
Fluoride (WET DI)	mg/L	ND		ND		0.2	B	0.3	B			0.2		0.7		2	
Hardness as CaCO3 (WET-DI)	mg/L	28		44		32		31				0.2		5			
Hydroxide as CaCO3	mg/L	ND		ND		ND		ND				2		20			
Nitrate as N (WET-DI)	mg/L	0.24	H	0.34	H	0.91	H	1.3	H			0.02		0.1		10	
Nitrate/Nitrite as N (WET DI)	mg/L	0.244	H	0.338	H	0.925	H	1.32	H			0.02		0.1			
Nitrite as N (WET DI)	mg/L	ND	H	ND	H	0.014	BH	0.018	BH			0.01		0.05		1	
Residue, Filterable (TDS) @180C (WET DI	mg/L	54		78		60		66				20		40		500	
Sulfate (WET DI)	mg/L	22	B	35	B	29	B	27	B			20		50		250	
Total Alkalinity	mg/L	21.8		25.4		18.1	B	25.3				2		20			

MDL = Method Detection Limit
PQL = Practical Quantitation Limit
ND = Not detected above the PQL
B = Concentration detected at a value between the MDL and PQL. Reported value is an estinated quantity.
H = Hold time exceeded
RT = Regulatory Threshold, equivalent to primary or secondary maximum contaminant level, based on:
SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021
https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions
1170 = Highlighted results exceed the RT


Figure C-1A. Manganese Data Distribution
Number of Samples in Data Range
10
9
8
7
6
5
4
3
2
1
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
Concentration (mg/L)


Figure C-1B. Manganese Data Distribution
Log Transformed
Number of Samples in Data Range
10
9
8
7
6
5
4
3
2
1
0
0.001
0.01
0.1
1
Concentration (mg/L)


Figure C-2A. TDS Data Distribution
Number of Samples in Data Range
Concentration (mg/L)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500


Figure C-2B. TDS Data Distribution
Log Transformed
Number of Samples in Data Range
12
10
8
6
4
2
0
1
10
100
1000
10000
Concentration (mg/L)

ATTACHMENT D
Laboratory Analytical Report

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 02, 2020

Report to:
Andrew Kopania
Compass Land Group
3160 Gold Valley Dr
Suite 800
Ranch Cordova, CA 95742

cc: Yasha Saber

Bill to:
Jeremy Zorne
Compass Land Group
3160 Gold Valley Dr
Suite 800
Ranch Cordova, CA 95742

Project ID: S1832-05-02
ACZ Project ID: L62449

Andrew Kopania:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 20, 2020. This project has been assigned to ACZ's project number, L62449. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L62449. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 01, 2021. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

Max Janicek has reviewed and approved this report.

Compass Land Group

December 02, 2020

Project ID: S1832-05-02
ACZ Project ID: L62449

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 14 miscellaneous samples from Compass Land Group on October 20, 2020. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L62449. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition, the following has been noted with this specific project:

The below is from WG509119
Qualifier: N1
Applies to:
L62449-01/TOTAL DISSOLVED SOLIDS
L62449-02/TOTAL DISSOLVED SOLIDS
L62449-03/TOTAL DISSOLVED SOLIDS
L62449-04/TOTAL DISSOLVED SOLIDS
L62449-05/TOTAL DISSOLVED SOLIDS
L62449-06/TOTAL DISSOLVED SOLIDS
L62449-07/TOTAL DISSOLVED SOLIDS
L62449-08/TOTAL DISSOLVED SOLIDS
L62449-09/TOTAL DISSOLVED SOLIDS
L62449-10/TOTAL DISSOLVED SOLIDS
L62449-11/TOTAL DISSOLVED SOLIDS
L62449-12/TOTAL DISSOLVED SOLIDS
L62449-13/TOTAL DISSOLVED SOLIDS
L62449-14/TOTAL DISSOLVED SOLIDS

Oven range is 80 C to 91 C. Over the weekend, the oven had a minor exceedance in oven temperature. When the oven temperature was checked on Monday 11/9/20, the max temp read at 94.5 C. The WG was removed from the oven on 11/9/20 when the oven was back in range. The WG was examined and there was no splattering of samples.

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF1

ACZ Sample ID: ***L62449-01***
Date Sampled: *10/14/20 14:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.093	B	*	mg/L	0.05	0.25	11/07/20 4:22	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00101	B	*	mg/L	0.0004	0.002	11/06/20 10:44	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00310		*	mg/L	0.0002	0.001	11/06/20 10:44	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:22	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:44	mfm
Boron (WET DI)	6010D ICP	1	0.051	B	*	mg/L	0.02	0.1	11/07/20 4:22	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:44	mfm
Calcium (WET DI)	6010D ICP	1	9.08			mg/L	0.1	0.5	11/07/20 4:22	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:22	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:22	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:22	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 4:22	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:22	kja
Magnesium (WET DI)	6010D ICP	1	2.85		*	mg/L	0.2	1	11/07/20 4:22	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:22	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:30	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:22	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:22	kja
Potassium (WET DI)	6010D ICP	1	1.52		*	mg/L	0.2	1	11/07/20 4:22	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00271		*	mg/L	0.0001	0.00025	11/06/20 10:44	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:22	kja
Sodium (WET DI)	M6010D ICP	1	5.76		*	mg/L	0.2	1	11/07/20 4:22	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:44	mfm
Vanadium (WET DI)	6010D ICP	1	0.015	B	*	mg/L	0.01	0.025	11/07/20 4:22	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:22	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF1

ACZ Sample ID: ***L62449-01***
Date Sampled: *10/14/20 14:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		14.1			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		20.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		5.9			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	2.0		*	%	0.1	0.5	11/30/20 18:23	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	8.5			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.6		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.40		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.39		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.05	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.45		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.40		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:30	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 12:00	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:16	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF1

ACZ Sample ID: ***L62449-01***
Date Sampled: *10/14/20 14:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	28.9			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	28.9			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	0.80	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	108			umhos/cm	1	10	11/10/20 13:53	eep
Fluoride (WET DI)	SM4500F-C	2	0.3	B	*	mg/L	0.2	0.7	11/11/20 19:22	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		34			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.09	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.093	BH	*	mg/L	0.02	0.1	11/07/20 19:09	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:09	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	66		*	mg/L	20	40	11/06/20 11:22	jck
Sulfate (WET DI)	SM4500 SO4-D	1	22	B		mg/L	20	50	11/06/20 10:08	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF2

ACZ Sample ID: ***L62449-02***
Date Sampled: *10/14/20 14:33*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.216	B	*	mg/L	0.05	0.25	11/07/20 4:26	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00085	B	*	mg/L	0.0004	0.002	11/06/20 10:46	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00307		*	mg/L	0.0002	0.001	11/06/20 10:46	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:26	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:46	mfm
Boron (WET DI)	6010D ICP	1	0.042	B	*	mg/L	0.02	0.1	11/07/20 4:26	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:46	mfm
Calcium (WET DI)	6010D ICP	1	7.94			mg/L	0.1	0.5	11/07/20 4:26	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:26	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:26	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:26	kja
Iron (WET DI)	6010D ICP	1	0.105	B	*	mg/L	0.06	0.15	11/07/20 4:26	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:26	kja
Magnesium (WET DI)	6010D ICP	1	2.54		*	mg/L	0.2	1	11/07/20 4:26	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:26	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:31	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:26	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:26	kja
Potassium (WET DI)	6010D ICP	1	1.27		*	mg/L	0.2	1	11/07/20 4:26	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00195		*	mg/L	0.0001	0.00025	11/06/20 10:46	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:26	kja
Sodium (WET DI)	M6010D ICP	1	5.12		*	mg/L	0.2	1	11/07/20 4:26	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:46	mfm
Vanadium (WET DI)	6010D ICP	1	0.017	B	*	mg/L	0.01	0.025	11/07/20 4:26	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:26	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF2

ACZ Sample ID: ***L62449-02***
Date Sampled: *10/14/20 14:33*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		7.50			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		19.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		11.5			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.9		*	%	0.1	0.5	11/30/20 18:42	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	8.7			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.8		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.20		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.20		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.04	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.24		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.20		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:32	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 12:15	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:17	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF2

ACZ Sample ID: ***L62449-02***
Date Sampled: *10/14/20 14:33*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	30.2			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	30.2			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	0.60	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	86			umhos/cm	1	10	11/10/20 13:55	eep
Fluoride (WET DI)	SM4500F-C	1	0.3	B	*	mg/L	0.1	0.4	11/11/20 19:25	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		30			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.04	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.037	BH	*	mg/L	0.02	0.1	11/07/20 19:12	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:12	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	52		*	mg/L	20	40	11/06/20 11:27	jck
Sulfate (WET DI)	SM4500 SO4-D	1	<20	U		mg/L	20	50	11/06/20 10:11	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF3

ACZ Sample ID: ***L62449-03***
Date Sampled: *10/14/20 14:43*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.232	B	*	mg/L	0.05	0.25	11/07/20 4:30	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00105	B	*	mg/L	0.0004	0.002	11/06/20 10:49	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00507		*	mg/L	0.0002	0.001	11/06/20 10:49	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:30	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:49	mfm
Boron (WET DI)	6010D ICP	1	0.043	B	*	mg/L	0.02	0.1	11/07/20 4:30	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:49	mfm
Calcium (WET DI)	6010D ICP	1	7.27			mg/L	0.1	0.5	11/07/20 4:30	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:30	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:30	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:30	kja
Iron (WET DI)	6010D ICP	1	0.101	B	*	mg/L	0.06	0.15	11/07/20 4:30	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:30	kja
Magnesium (WET DI)	6010D ICP	1	1.49		*	mg/L	0.2	1	11/07/20 4:30	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:30	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:32	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:30	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:30	kja
Potassium (WET DI)	6010D ICP	1	1.19		*	mg/L	0.2	1	11/07/20 4:30	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00123		*	mg/L	0.0001	0.00025	11/06/20 10:49	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:30	kja
Sodium (WET DI)	M6010D ICP	1	5.97		*	mg/L	0.2	1	11/07/20 4:30	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:49	mfm
Vanadium (WET DI)	6010D ICP	1	0.029		*	mg/L	0.01	0.025	11/07/20 4:30	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:30	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF3

ACZ Sample ID: ***L62449-03***
Date Sampled: *10/14/20 14:43*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		6.88			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		21.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		14.1			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	2.1		*	%	0.1	0.5	11/30/20 18:49	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	8.9			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.9		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.19		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.19		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.22		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.19		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:34	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 12:30	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:18	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF3

ACZ Sample ID: ***L62449-03***
Date Sampled: *10/14/20 14:43*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	28.7			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	28.7			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	0.81	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	76			umhos/cm	1	10	11/10/20 13:57	eep
Fluoride (WET DI)	SM4500F-C	1	0.3	B	*	mg/L	0.1	0.4	11/11/20 19:36	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		24			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.03	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.029	BH	*	mg/L	0.02	0.1	11/07/20 19:13	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:13	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	52		*	mg/L	20	40	11/06/20 11:30	jck
Sulfate (WET DI)	SM4500 SO4-D	1	<20	U		mg/L	20	50	11/06/20 10:14	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF4

ACZ Sample ID: ***L62449-04***
Date Sampled: *10/14/20 14:59*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	<0.05	U	*	mg/L	0.05	0.25	11/07/20 4:34	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00151	B	*	mg/L	0.0004	0.002	11/06/20 10:51	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00181		*	mg/L	0.0002	0.001	11/06/20 10:51	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:34	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:51	mfm
Boron (WET DI)	6010D ICP	1	0.053	B	*	mg/L	0.02	0.1	11/07/20 4:34	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:51	mfm
Calcium (WET DI)	6010D ICP	1	22.3			mg/L	0.1	0.5	11/07/20 4:34	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:34	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:34	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:34	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 4:34	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:34	kja
Magnesium (WET DI)	6010D ICP	1	1.72		*	mg/L	0.2	1	11/07/20 4:34	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:34	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:33	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:34	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:34	kja
Potassium (WET DI)	6010D ICP	1	1.37		*	mg/L	0.2	1	11/07/20 4:34	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00471		*	mg/L	0.0001	0.00025	11/06/20 10:51	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:34	kja
Sodium (WET DI)	M6010D ICP	1	7.16		*	mg/L	0.2	1	11/07/20 4:34	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:51	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:34	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:34	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF4

ACZ Sample ID: ***L62449-04***
Date Sampled: *10/14/20 14:59*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		11.9			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		17.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		5.1			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.7		*	%	0.1	0.5	11/30/20 18:55	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	8.4			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.8		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.38		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:36	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 12:45	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:19	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF4

ACZ Sample ID: ***L62449-04***
Date Sampled: *10/14/20 14:59*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	27.8			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	27.8			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.45	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	177			umhos/cm	1	10	11/10/20 13:59	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 19:40	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		63			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.03	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.028	BH	*	mg/L	0.02	0.1	11/07/20 19:14	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:14	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	104		*	mg/L	20	40	11/06/20 11:32	jck
Sulfate (WET DI)	SM4500 SO4-D	1	50			mg/L	20	50	11/06/20 10:18	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF5

ACZ Sample ID: ***L62449-05***
Date Sampled: *10/14/20 15:11*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.818		*	mg/L	0.05	0.25	11/07/20 4:38	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00283		*	mg/L	0.0004	0.002	11/06/20 10:56	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.0200		*	mg/L	0.0002	0.001	11/06/20 10:56	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:38	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:56	mfm
Boron (WET DI)	6010D ICP	1	0.253		*	mg/L	0.02	0.1	11/07/20 4:38	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:56	mfm
Calcium (WET DI)	6010D ICP	1	0.17	B		mg/L	0.1	0.5	11/07/20 4:38	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:38	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:38	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:38	kja
Iron (WET DI)	6010D ICP	1	0.290		*	mg/L	0.06	0.15	11/07/20 4:38	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:38	kja
Magnesium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 4:38	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:38	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:34	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:38	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:38	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 4:38	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00680		*	mg/L	0.0001	0.00025	11/06/20 10:56	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:38	kja
Sodium (WET DI)	M6010D ICP	1	45.1		*	mg/L	0.2	1	11/07/20 4:38	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:56	mfm
Vanadium (WET DI)	6010D ICP	1	0.132		*	mg/L	0.01	0.025	11/07/20 4:38	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:38	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF5

ACZ Sample ID: ***L62449-05***
Date Sampled: *10/14/20 15:11*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		11.9			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		15.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		3.1			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.5		*	%	0.1	0.5	11/30/20 19:02	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	9.8			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	8.4		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.38		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.35		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:38	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 13:00	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:20	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: KXF5

ACZ Sample ID: ***L62449-05***
Date Sampled: *10/14/20 15:11*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	52.9			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	31.9			mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	84.8			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	3.12		*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	202			umhos/cm	1	10	11/10/20 14:01	eep
Fluoride (WET DI)	SM4500F-C	1	0.1	B	*	mg/L	0.1	0.4	11/11/20 19:44	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		0.424	B		mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.05	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.052	BH	*	mg/L	0.02	0.1	11/07/20 19:15	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:15	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	120		*	mg/L	20	40	11/06/20 11:35	jck
Sulfate (WET DI)	SM4500 SO4-D	1	<20	U		mg/L	20	50	11/06/20 10:21	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A1

ACZ Sample ID: ***L62449-06***
Date Sampled: *10/14/20 11:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	<0.05	U	*	mg/L	0.05	0.25	11/07/20 4:50	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 10:58	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 10:58	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:50	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 10:58	mfm
Boron (WET DI)	6010D ICP	1	0.024	B	*	mg/L	0.02	0.1	11/07/20 4:50	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 10:58	mfm
Calcium (WET DI)	6010D ICP	2	490		*	mg/L	0.2	1	11/10/20 14:15	jlw
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:50	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:50	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:50	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 4:50	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:50	kja
Magnesium (WET DI)	6010D ICP	1	9.99		*	mg/L	0.2	1	11/07/20 4:50	kja
Manganese (WET DI)	6010D ICP	1	0.028	B	*	mg/L	0.01	0.05	11/07/20 4:50	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:39	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:50	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:50	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 4:50	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00199		*	mg/L	0.0001	0.00025	11/06/20 10:58	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:50	kja
Sodium (WET DI)	M6010D ICP	1	4.03		*	mg/L	0.2	1	11/07/20 4:50	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 10:58	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:50	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:50	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A1

ACZ Sample ID: ***L62449-06***
Date Sampled: *10/14/20 11:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		84.4			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		420			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		336			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	42.0		*	%	0.1	0.5	12/01/20 17:20	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	7.6			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	6.9		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	1.62		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	1.62		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	1.08		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	2.70		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	1.62		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:40	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 13:15	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:21	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A1

ACZ Sample ID: ***L62449-06***
Date Sampled: *10/14/20 11:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	72.3			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	72.3			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.61	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	1770			umhos/cm	1	10	11/10/20 14:04	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 19:49	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		1260			mg/L	0.8	7	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.45	H		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.451	H	*	mg/L	0.02	0.1	11/07/20 19:17	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:17	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	1910		*	mg/L	20	40	11/06/20 11:37	jck
Sulfate (WET DI)	SM4500 SO4-D	10	1170			mg/L	200	500	11/06/20 10:24	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U1

ACZ Sample ID: ***L62449-07***
Date Sampled: *10/14/20 10:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.321		*	mg/L	0.05	0.25	11/07/20 4:54	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:03	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00040	B	*	mg/L	0.0002	0.001	11/06/20 11:03	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 4:54	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:03	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:54	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:03	mfm
Calcium (WET DI)	6010D ICP	1	7.12			mg/L	0.1	0.5	11/07/20 4:54	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:54	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:54	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:54	kja
Iron (WET DI)	6010D ICP	1	0.124	B	*	mg/L	0.06	0.15	11/07/20 4:54	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 4:54	kja
Magnesium (WET DI)	6010D ICP	1	2.40		*	mg/L	0.2	1	11/07/20 4:54	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 4:54	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:40	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 4:54	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 4:54	kja
Potassium (WET DI)	6010D ICP	1	0.21	B	*	mg/L	0.2	1	11/07/20 4:54	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00027		*	mg/L	0.0001	0.00025	11/06/20 11:03	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 4:54	kja
Sodium (WET DI)	M6010D ICP	1	5.06		*	mg/L	0.2	1	11/07/20 4:54	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:03	mfm
Vanadium (WET DI)	6010D ICP	1	0.018	B	*	mg/L	0.01	0.025	11/07/20 4:54	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 4:54	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U1

ACZ Sample ID: ***L62449-07***
Date Sampled: *10/14/20 10:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		1.88	B		t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		13.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		11.1			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.3		*	%	0.1	0.5	11/30/20 19:08	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	9.1			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	8.9		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.06	B	*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.03	B	*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:42	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 13:30	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:22	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U1

ACZ Sample ID: ***L62449-07***
Date Sampled: *10/14/20 10:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	21.8			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	21.8			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.12	B	*	mg/L	0.5	2	11/09/20 12:55	mss2
Conductivity @25C (WET-DI)	SM2510B	1	90			umhos/cm	1	10	11/10/20 14:06	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 19:53	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		28			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.24	H		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.244	H	*	mg/L	0.02	0.1	11/07/20 19:18	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:18	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	54		*	mg/L	20	40	11/06/20 11:40	jck
Sulfate (WET DI)	SM4500 SO4-D	1	22	B		mg/L	20	50	11/06/20 10:28	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A2

ACZ Sample ID: ***L62449-08***
Date Sampled: *10/14/20 11:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.076	B	*	mg/L	0.05	0.25	11/07/20 5:06	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:05	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 11:05	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:06	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:05	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:06	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:05	mfm
Calcium (WET DI)	6010D ICP	1	81.4			mg/L	0.1	0.5	11/07/20 5:06	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:06	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:06	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:06	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 5:06	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:06	kja
Magnesium (WET DI)	6010D ICP	1	18.2		*	mg/L	0.2	1	11/07/20 5:06	kja
Manganese (WET DI)	6010D ICP	1	0.015	B	*	mg/L	0.01	0.05	11/07/20 5:06	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:41	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:06	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:06	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 5:06	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00016	B	*	mg/L	0.0001	0.00025	11/06/20 11:05	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:06	kja
Sodium (WET DI)	M6010D ICP	1	4.72		*	mg/L	0.2	1	11/07/20 5:06	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:05	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:06	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:06	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A2

ACZ Sample ID: ***L62449-08***
Date Sampled: *10/14/20 11:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		32.5			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		34.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		1.5			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	3.4		*	%	0.1	0.5	11/30/20 19:21	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	8.1			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.8		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.64		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.64		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.40		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	1.04		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.64		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:44	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 13:45	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:24	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 A2

ACZ Sample ID: ***L62449-08***
Date Sampled: *10/14/20 11:30*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	38.8			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	38.8			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	5.21		*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	522			umhos/cm	1	10	11/10/20 14:08	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 19:57	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		278			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.06	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.055	BH	*	mg/L	0.02	0.1	11/07/20 19:23	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:23	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	390		*	mg/L	20	40	11/06/20 11:42	jck
Sulfate (WET DI)	SM4500 SO4-D	1	238			mg/L	20	50	11/06/20 10:31	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U2

ACZ Sample ID: ***L62449-09***
Date Sampled: *10/14/20 12:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.199	B	*	mg/L	0.05	0.25	11/07/20 5:10	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:07	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 11:07	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:10	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:07	mfm
Boron (WET DI)	6010D ICP	1	0.020	B	*	mg/L	0.02	0.1	11/07/20 5:10	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:07	mfm
Calcium (WET DI)	6010D ICP	1	12.2			mg/L	0.1	0.5	11/07/20 5:10	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:10	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:10	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:10	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 5:10	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:10	kja
Magnesium (WET DI)	6010D ICP	1	3.17		*	mg/L	0.2	1	11/07/20 5:10	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:10	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:42	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:10	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:10	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 5:10	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00028		*	mg/L	0.0001	0.00025	11/06/20 11:07	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:10	kja
Sodium (WET DI)	M6010D ICP	1	5.63		*	mg/L	0.2	1	11/07/20 5:10	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:07	mfm
Vanadium (WET DI)	6010D ICP	1	0.012	B	*	mg/L	0.01	0.025	11/07/20 5:10	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:10	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U2

ACZ Sample ID: ***L62449-09***
Date Sampled: *10/14/20 12:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		5.31			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		19.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		13.7			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.9		*	%	0.1	0.5	11/30/20 19:27	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	9.1			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	9.0		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.13		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.13		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.04	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.17		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.13		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:46	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 14:00	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:25	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 1 U2

ACZ Sample ID: ***L62449-09***
Date Sampled: *10/14/20 12:00*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	25.4			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	25.4			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	2.28		*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	121			umhos/cm	1	10	11/10/20 14:10	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 20:02	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		44			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.34	H		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.338	H	*	mg/L	0.02	0.1	11/07/20 19:24	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:24	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	78		*	mg/L	20	40	11/06/20 11:45	jck
Sulfate (WET DI)	SM4500 SO4-D	1	35	B		mg/L	20	50	11/06/20 10:34	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A1

ACZ Sample ID: ***L62449-10***
Date Sampled: *10/14/20 13:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	<0.05	U	*	mg/L	0.05	0.25	11/07/20 5:18	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:09	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 11:09	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:18	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:09	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:18	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:09	mfm
Calcium (WET DI)	6010D ICP	1	109			mg/L	0.1	0.5	11/07/20 5:18	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:18	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:18	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:18	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 5:18	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:18	kja
Magnesium (WET DI)	6010D ICP	1	20.9		*	mg/L	0.2	1	11/07/20 5:18	kja
Manganese (WET DI)	6010D ICP	1	0.334		*	mg/L	0.01	0.05	11/07/20 5:18	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:43	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:18	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:18	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 5:18	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00030		*	mg/L	0.0001	0.00025	11/06/20 11:09	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:18	kja
Sodium (WET DI)	M6010D ICP	1	5.12		*	mg/L	0.2	1	11/07/20 5:18	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:09	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:18	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:18	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A1

ACZ Sample ID: ***L62449-10***
Date Sampled: *10/14/20 13:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		28.8			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		13.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		-15.8			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.3		*	%	0.1	0.5	11/30/20 19:34	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	6.4			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	6.8		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.58		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.58		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.34		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.92		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.58		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:48	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 14:15	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:26	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A1

ACZ Sample ID: ***L62449-10***
Date Sampled: *10/14/20 13:20*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	20.3			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	20.3			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	2.34		*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	650			umhos/cm	1	10	11/10/20 14:12	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 20:07	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		358			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.04	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.044	BH	*	mg/L	0.02	0.1	11/07/20 19:26	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:26	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	528		*	mg/L	20	40	11/06/20 11:47	jck
Sulfate (WET DI)	SM4500 SO4-D	2	351			mg/L	40	100	11/06/20 10:38	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U1

ACZ Sample ID: ***L62449-11***
Date Sampled: *10/14/20 12:50*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.233	B	*	mg/L	0.05	0.25	11/07/20 5:22	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:11	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00035	B	*	mg/L	0.0002	0.001	11/06/20 11:11	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:22	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:11	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:22	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:11	mfm
Calcium (WET DI)	6010D ICP	1	7.49			mg/L	0.1	0.5	11/07/20 5:22	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:22	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:22	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:22	kja
Iron (WET DI)	6010D ICP	1	0.134	B	*	mg/L	0.06	0.15	11/07/20 5:22	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:22	kja
Magnesium (WET DI)	6010D ICP	1	3.25		*	mg/L	0.2	1	11/07/20 5:22	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:22	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:44	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:22	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:22	kja
Potassium (WET DI)	6010D ICP	1	0.47	B	*	mg/L	0.2	1	11/07/20 5:22	kja
Selenium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.00025	11/06/20 11:11	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:22	kja
Sodium (WET DI)	M6010D ICP	1	4.57		*	mg/L	0.2	1	11/07/20 5:22	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:11	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:22	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:22	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U1

ACZ Sample ID: ***L62449-11***
Date Sampled: *10/14/20 12:50*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4			U		t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		15.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		15.0			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.5		*	%	0.1	0.5	11/30/20 19:40	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	9.0			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	8.8		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:50	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 14:30	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:27	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U1

ACZ Sample ID: ***L62449-11***
Date Sampled: *10/14/20 12:50*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	18.1	B		mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	18.1	B		mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.47	B	*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	95			umhos/cm	1	10	11/10/20 14:16	eep
Fluoride (WET DI)	SM4500F-C	1	0.2	B	*	mg/L	0.1	0.4	11/11/20 20:23	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		32			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.91	H		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.925	H	*	mg/L	0.02	0.1	11/07/20 19:27	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.014	BH	*	mg/L	0.01	0.05	11/07/20 19:27	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	60		*	mg/L	20	40	11/06/20 11:50	jck
Sulfate (WET DI)	SM4500 SO4-D	1	29	B		mg/L	20	50	11/06/20 10:41	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A2

ACZ Sample ID: ***L62449-12***
Date Sampled: *10/14/20 13:40*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.083	B	*	mg/L	0.05	0.25	11/07/20 5:26	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:12	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 11:12	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:26	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:12	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:26	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:12	mfm
Calcium (WET DI)	6010D ICP	1	11.9			mg/L	0.1	0.5	11/07/20 5:26	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:26	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:26	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:26	kja
Iron (WET DI)	6010D ICP	1	0.062	B	*	mg/L	0.06	0.15	11/07/20 5:26	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:26	kja
Magnesium (WET DI)	6010D ICP	1	9.58		*	mg/L	0.2	1	11/07/20 5:26	kja
Manganese (WET DI)	6010D ICP	1	0.011	B	*	mg/L	0.01	0.05	11/07/20 5:26	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:44	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:26	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:26	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 5:26	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00011	B	*	mg/L	0.0001	0.00025	11/06/20 11:12	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:26	kja
Sodium (WET DI)	M6010D ICP	1	5.90		*	mg/L	0.2	1	11/07/20 5:26	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:12	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:26	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:26	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A2

ACZ Sample ID: ***L62449-12***
Date Sampled: *10/14/20 13:40*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		12.5			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		15.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		2.5			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.5		*	%	0.1	0.5	11/30/20 19:47	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	7.9			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.9		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.22		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.22		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.18		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.40		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.22		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:52	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 14:45	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:28	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 A2

ACZ Sample ID: ***L62449-12***
Date Sampled: *10/14/20 13:40*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	14.8	B		mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	14.8	B		mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.74	B	*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	177			umhos/cm	1	10	11/10/20 14:18	eep
Fluoride (WET DI)	SM4500F-C	1	0.2	B	*	mg/L	0.1	0.4	11/11/20 20:27	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		69			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.04	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.037	BH	*	mg/L	0.02	0.1	11/07/20 19:28	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:28	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	102		*	mg/L	20	40	11/06/20 11:52	jck
Sulfate (WET DI)	SM4500 SO4-D	1	65			mg/L	20	50	11/06/20 10:44	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U2

ACZ Sample ID: ***L62449-13***
Date Sampled: *10/14/20 14:12*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.290		*	mg/L	0.05	0.25	11/07/20 5:30	kja
Antimony (WET DI)	6020B ICP-MS	1	0.00050	B	*	mg/L	0.0004	0.002	11/06/20 11:14	mfm
Arsenic (WET DI)	6020B ICP-MS	1	0.00073	B	*	mg/L	0.0002	0.001	11/06/20 11:14	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:30	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:14	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:30	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:14	mfm
Calcium (WET DI)	6010D ICP	1	7.24			mg/L	0.1	0.5	11/07/20 5:30	kja
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:30	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:30	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:30	kja
Iron (WET DI)	6010D ICP	1	0.156		*	mg/L	0.06	0.15	11/07/20 5:30	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:30	kja
Magnesium (WET DI)	6010D ICP	1	3.23		*	mg/L	0.2	1	11/07/20 5:30	kja
Manganese (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:30	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:45	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:30	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:30	kja
Potassium (WET DI)	6010D ICP	1	0.72	B	*	mg/L	0.2	1	11/07/20 5:30	kja
Selenium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.00025	11/06/20 11:14	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:30	kja
Sodium (WET DI)	M6010D ICP	1	7.52		*	mg/L	0.2	1	11/07/20 5:30	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:14	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:30	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:30	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U2

ACZ Sample ID: ***L62449-13***
Date Sampled: *10/14/20 14:12*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		0.63	B		t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		18.0			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		17.4			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	1.8		*	%	0.1	0.5	11/30/20 19:53	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	9.1			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	8.9		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.02	B	*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.01	B	*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:54	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 15:00	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:29	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 2 U2

ACZ Sample ID: ***L62449-13***
Date Sampled: *10/14/20 14:12*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	25.3			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	25.3			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	1.50	B	*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	105			umhos/cm	1	10	11/10/20 14:20	eep
Fluoride (WET DI)	SM4500F-C	1	0.3	B	*	mg/L	0.1	0.4	11/11/20 20:31	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		31			mg/L	0.2	5	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		1.30	H		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	1.32	H	*	mg/L	0.02	0.1	11/07/20 19:29	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.018	BH	*	mg/L	0.01	0.05	11/07/20 19:29	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	66		*	mg/L	20	40	11/06/20 11:55	jck
Sulfate (WET DI)	SM4500 SO4-D	1	27	B		mg/L	20	50	11/06/20 10:48	mlh

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 3 A1

ACZ Sample ID: ***L62449-14***
Date Sampled: *10/14/20 14:25*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Aluminum (WET DI)	6010D ICP	1	0.075	B	*	mg/L	0.05	0.25	11/07/20 5:34	kja
Antimony (WET DI)	6020B ICP-MS	1	<0.0004	U	*	mg/L	0.0004	0.002	11/06/20 11:16	mfm
Arsenic (WET DI)	6020B ICP-MS	1	<0.0002	U	*	mg/L	0.0002	0.001	11/06/20 11:16	mfm
Barium (WET DI)	6010D ICP	1	<0.007	U	*	mg/L	0.007	0.035	11/07/20 5:34	kja
Beryllium (WET DI)	6020B ICP-MS	1	<0.00008	U	*	mg/L	0.00008	0.00025	11/06/20 11:16	mfm
Boron (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:34	kja
Cadmium (WET DI)	6020B ICP-MS	1	<0.00005	U	*	mg/L	0.00005	0.00025	11/06/20 11:16	mfm
Calcium (WET DI)	6010D ICP	2	530		*	mg/L	0.2	1	11/10/20 14:23	jlw
Chromium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:34	kja
Cobalt (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:34	kja
Copper (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.05	11/07/20 5:34	kja
Iron (WET DI)	6010D ICP	1	<0.06	U	*	mg/L	0.06	0.15	11/07/20 5:34	kja
Lead (WET DI)	6010D ICP	1	<0.03	U	*	mg/L	0.03	0.15	11/07/20 5:34	kja
Magnesium (WET DI)	6010D ICP	1	10.6		*	mg/L	0.2	1	11/07/20 5:34	kja
Manganese (WET DI)	6010D ICP	1	0.019	B	*	mg/L	0.01	0.05	11/07/20 5:34	kja
Mercury (WET DI)	M7470A CVAA	1	<0.0002	U	*	mg/L	0.0002	0.001	11/09/20 14:46	llr
Molybdenum (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.1	11/07/20 5:34	kja
Nickel (WET DI)	6010D ICP	1	<0.008	U	*	mg/L	0.008	0.04	11/07/20 5:34	kja
Potassium (WET DI)	6010D ICP	1	<0.2	U	*	mg/L	0.2	1	11/07/20 5:34	kja
Selenium (WET DI)	6020B ICP-MS	1	0.00014	B	*	mg/L	0.0001	0.00025	11/06/20 11:16	mfm
Silver (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:34	kja
Sodium (WET DI)	M6010D ICP	1	0.29	B	*	mg/L	0.2	1	11/07/20 5:34	kja
Thallium (WET DI)	6020B ICP-MS	1	<0.0001	U	*	mg/L	0.0001	0.0005	11/06/20 11:16	mfm
Vanadium (WET DI)	6010D ICP	1	<0.01	U	*	mg/L	0.01	0.025	11/07/20 5:34	kja
Zinc (WET DI)	6010D ICP	1	<0.02	U	*	mg/L	0.02	0.05	11/07/20 5:34	kja

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 3 A1

ACZ Sample ID: ***L62449-14***
Date Sampled: *10/14/20 14:25*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 3.2.4		16.9			t CaCO3/Kt	0.31	3.1	12/02/20 0:00	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		714			t CaCO3/Kt	1	5	12/02/20 0:00	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		697			t CaCO3/Kt			12/02/20 0:00	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1	71.4		*	%	0.1	0.5	12/01/20 17:32	jms
pH, (WET-DI)	M9045D/M9040C									
pH		1	7.8			units	0.1	0.1	11/05/20 0:00	cra
Temperature		1	21.5			C	0.1	0.1	11/05/20 0:00	cra
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			11/19/20 0:00	mlp
pH		1	7.3		*	units	0.1	0.1	11/19/20 0:00	mlp
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		1	0.26		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur HNO3 Residue		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Organic Residual		1	<0.01	U	*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Pyritic Sulfide		1	0.26		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Sulfate		1	0.28		*	%	0.01	0.1	11/18/20 0:00	cra
Sulfur Total		1	0.54		*	%	0.01	0.1	11/18/20 0:00	cra
Total Sulfur minus Sulfate		1	0.26		*	%	0.01	0.1	11/18/20 0:00	cra

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees	USDA No. 1, 1972								11/02/20 11:56	krs
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3								11/06/20 15:15	sjm
Saturated Paste Extraction	USDA No. 60 (2)								11/18/20 17:30	mlp
Waste Extraction Test - DI H2O	California Method, Title 22								11/02/20 14:05	cra

Compass Land Group
Project ID: S1832-05-02
Sample ID: BENCH 3 A1

ACZ Sample ID: ***L62449-14***
Date Sampled: *10/14/20 14:25*
Date Received: *10/20/20*
Sample Matrix: *Soil*

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity (WET DI)	SM2320B - Titration									
Bicarbonate as CaCO3		1	37.8			mg/L	2	20	11/10/20 0:00	eep
Carbonate as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Hydroxide as CaCO3		1	<2	U		mg/L	2	20	11/10/20 0:00	eep
Total Alkalinity		1	37.8			mg/L	2	20	11/10/20 0:00	eep
Chloride (WET DI)	SM4500Cl-E	1	0.64	B	*	mg/L	0.5	2	11/09/20 12:56	mss2
Conductivity @25C (WET-DI)	SM2510B	1	1810			umhos/cm	1	10	11/10/20 14:22	eep
Fluoride (WET DI)	SM4500F-C	1	<0.1	U	*	mg/L	0.1	0.4	11/11/20 20:34	eep
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation		1370			mg/L	0.8	7	12/02/20 0:00	calc
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2		0.09	BH		mg/L	0.02	0.1	12/02/20 0:00	calc
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	0.086	BH	*	mg/L	0.02	0.1	11/07/20 19:31	pjb
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	1	<0.01	UH	*	mg/L	0.01	0.05	11/07/20 19:31	pjb
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	1	2020		*	mg/L	20	40	11/06/20 11:57	jck
Sulfate (WET DI)	SM4500 SO4-D	5	1300			mg/L	100	250	11/06/20 10:51	mlh

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:
https://acz.com/wp-content/uploads/2019/04/Ext-Qual-List.pdf

REP001.03.15.02

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509364													
WG509364PBW	PBW	11/10/20 15:18				6.9	mg/L		-20	20			
WG509364LCSW1	LCSW	11/10/20 15:29	WC201104-10	820.0001		760.5	mg/L	93	90	110			
WG508728PBS	PBS	11/10/20 15:39				3.1	mg/L		-20	20			
L62449-14DUP	DUP	11/10/20 17:54			37.8	36.8	mg/L				3	20	
WG509364LCSW2	LCSW	11/10/20 18:06	WC201104-10	820.0001		781.1	mg/L	95	90	110			

Aluminum (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.985	mg/L	99	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.15	0.15			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.15	0.15			
L62449-05AS	AS	11/07/20 4:42	II201027-3	1.0012	.818	1.908	mg/L	109	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	1.0012	.818	1.906	mg/L	109	75	125	0	20	
L62449-14DUP	DUP	11/07/20 5:38			.075	.07	mg/L				7	20	RA

Antimony (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.02004		.02113	mg/L	105	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.0012	0.0012			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.0012	0.0012			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.01	.00151	.00968	mg/L	82	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.01	.00151	.01	mg/L	85	75	125	3	20	
L62449-14DUP	DUP	11/06/20 11:18			U	U	mg/L				0	20	RA

Arsenic (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.05		.05065	mg/L	101	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.0006	0.0006			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.0006	0.0006			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.05005	.00181	.05039	mg/L	97	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.05005	.00181	.0524	mg/L	101	75	125	4	20	
L62449-14DUP	DUP	11/06/20 11:18			U	U	mg/L				0	20	RA

Barium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		2.01	mg/L	101	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.021	0.021			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.021	0.021			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5005	U	.5124	mg/L	102	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5005	U	.5197	mg/L	104	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Beryllium (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.05		.048786	mg/L	98	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.00024	0.00024			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.00024	0.00024			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.05005	U	.047409	mg/L	95	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.05005	U	.047375	mg/L	95	75	125	0	20	
L62449-14DUP	DUP	11/06/20 11:18			U	U	mg/L				0	20	RA

Boron (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.991	mg/L	100	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.06	0.06			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.06	0.06			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5005	.253	.765	mg/L	102	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5005	.253	.774	mg/L	104	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Cadmium (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.05		.050829	mg/L	102	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.00015	0.00015			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.00015	0.00015			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.05005	U	.047937	mg/L	96	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.05005	U	.048119	mg/L	96	75	125	0	20	
L62449-14DUP	DUP	11/06/20 11:18			U	U	mg/L				0	20	RA

Calcium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	100		98.54	mg/L	99	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.3	0.3			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.3	0.3			
L62449-05AS	AS	11/07/20 4:42	II201027-3	67.99353	.17	70.13	mg/L	103	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	67.99353	.17	70.74	mg/L	104	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			539	511.1	mg/L				5	20	
WG509265													
WG509265ICV	ICV	11/10/20 13:43	II201022-1	100		97.77	mg/L	98	90	110			
WG509265ICB	ICB	11/10/20 13:47				U	mg/L		-0.3	0.3			
WG508728PBS	PBS	11/10/20 14:11				U	mg/L		-0.3	0.3			
L62449-14AS	AS	11/10/20 14:27	II201110-2	136.0056	530	635.4	mg/L	77	75	125			
L62449-14ASD	ASD	11/10/20 14:30	II201110-2	136.0056	530	628.8	mg/L	73	75	125	1	20	M3
L62449-14DUP	DUP	11/10/20 14:34			530	489	mg/L				8	20	

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Chloride (WET DI) SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509229													
WG509229ICB	ICB	11/09/20 9:47				U	mg/L		-1.5	1.5			
WG509229ICV	ICV	11/09/20 9:47	WI200506-2	55.055		56.13	mg/L	102	90	110			
WG509229LFB	LFB	11/09/20 12:55	WI200327-3	30.03		30.63	mg/L	102	90	110			
WG508728PBS	PBS	11/09/20 12:55				U	mg/L		-1.5	1.5			
L62449-01AS	AS	11/09/20 12:55	WI200327-3	30.03	.8	31.72	mg/L	103	90	110			
L62449-14DUP	DUP	11/09/20 12:56			.64	.55	mg/L				15	20	RA

Chromium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.956	mg/L	98	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5015	U	.514	mg/L	102	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5015	U	.519	mg/L	103	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Cobalt (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2.004		1.928	mg/L	96	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5	U	.504	mg/L	101	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5	U	.507	mg/L	101	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Conductivity @25C (WET-DI) SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509340													
WG509340PBW	PBW	11/10/20 13:47				U	umhos/cm		-10	10			
WG509340LCSW1	LCSW	11/10/20 13:49	PCN62208	1409		1479	umhos/cm	105	90	110			
WG508728PBS	PBS	11/10/20 13:51				6	umhos/cm		-4	4			
L62449-14DUP	DUP	11/10/20 14:25			1810	1759	umhos/cm				3	20	
WG509340LCSW2	LCSW	11/10/20 14:27	PCN62208	1409		1399	umhos/cm	99	90	110			

Copper (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.932	mg/L	97	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.501	U	.512	mg/L	102	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.501	U	.521	mg/L	104	75	125	2	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Compass Land Group

ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Fluoride (WET DI) SM4500F-C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509422													
WG509422ICV	ICV	11/11/20 13:27	WC201030-11	2.002		2.07	mg/L	103	90	110			
WG509422ICB	ICB	11/11/20 13:31				U	mg/L		-0.33	0.33			
WG509448													
WG509448ICV	ICV	11/11/20 18:52	WC201030-11	2.002		2.12	mg/L	106	90	110			
WG509448ICB	ICB	11/11/20 19:00				U	mg/L		-0.33	0.33			
WG508728PBS	PBS	11/11/20 19:15				U	mg/L		-0.33	0.33			
WG509448LFB2	LFB	11/11/20 19:18	WC200511-1	5		5.14	mg/L	103	90	110			
L62449-02AS	AS	11/11/20 19:29	WC200511-1	5	.3	5.4	mg/L	102	90	110			
L62449-02ASD	ASD	11/11/20 19:32	WC200511-1	5	.3	5.38	mg/L	102	90	110	0	20	
L62449-14AS	AS	11/11/20 20:38	WC200511-1	5	U	4.86	mg/L	97	90	110			
L62449-14DUP	DUP	11/11/20 20:41			U	.12	mg/L				200	20	RA

Iron (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.959	mg/L	98	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.18	0.18			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.18	0.18			
L62449-05AS	AS	11/07/20 4:42	II201027-3	1.0018	.29	1.345	mg/L	105	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	1.0018	.29	1.362	mg/L	107	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Lead (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	4		3.876	mg/L	97	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.09	0.09			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.09	0.09			
L62449-05AS	AS	11/07/20 4:42	II201027-3	1.0014	U	1.025	mg/L	102	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	1.0014	U	1.044	mg/L	104	75	125	2	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Magnesium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	100		99.79	mg/L	100	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.6	0.6			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.6	0.6			
L62449-05AS	AS	11/07/20 4:42	II201027-3	49.99922	U	51.39	mg/L	103	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	49.99922	U	51.77	mg/L	104	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			10.6	10.46	mg/L				1	20	

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Manganese (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.951	mg/L	98	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5005	U	.52	mg/L	104	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5005	U	.526	mg/L	105	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			.019	.016	mg/L				17	20	RA

Mercury (WET DI) M7470A CVAA

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509204													
WG509204ICV	ICV	11/09/20 13:17	HG201109-2	.005		.00512	mg/L	102	95	105			
WG509204ICB	ICB	11/09/20 13:18				U	mg/L		-0.0002	0.0002			
WG509202													
WG509202PBW	PBW	11/09/20 14:28				U	mg/L		-0.00044	0.00044			
WG509202LCSW	LCSW	11/09/20 14:28	HG201027-4	.002002		.00176	mg/L	88	85	115			
WG508728PBS	PBS	11/09/20 14:29				U	mg/L		-0.0006	0.0006			
L62449-05MS	MS	11/09/20 14:35	HG201027-4	.002002	U	.00175	mg/L	87	85	115			
L62449-05MSD	MSD	11/09/20 14:38	HG201027-4	.002002	U	.00179	mg/L	89	85	115	2	20	
L62449-14DUP	DUP	11/09/20 14:49			U	U	mg/L				0	20	RA

Molybdenum (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		2	mg/L	100	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.06	0.06			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.06	0.06			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.498	U	.52	mg/L	104	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.498	U	.522	mg/L	105	75	125	0	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Neutralization Potential as CaCO3 M600/2-78-054 3.2.3

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG510406													
WG510406PBS	PBS	11/30/20 18:10				.1	%		-0.2	0.2			
WG510406LCSS	LCSS	11/30/20 18:17	PCN59475	99.9		101	%	101	80	120			
L62449-01MS	MS	11/30/20 18:30	SI190303-1	1	2	2.9	%	90	70	130			
L62449-01DUP	DUP	11/30/20 18:36			2	1.9	%				5	20	
WG510407													
L62449-06DUP	DUP	12/01/20 17:24			42	41.5	%				1	20	
L62449-06MS	MS	12/01/20 17:28	SI190303-3	10	42	51.4	%	94	70	130			
WG510407LCSS	LCSS	12/01/20 17:56	PCN59475	99.9		102.5	%	103	80	120			
WG510407PBS	PBS	12/01/20 18:00				U	%		-0.2	0.2			

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Nickel (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.962	mg/L	98	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.024	0.024			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.024	0.024			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.501	U	.5257	mg/L	105	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.501	U	.5272	mg/L	105	75	125	0	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Nitrate/Nitrite as N (WET DI) M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509190													
WG509190ICV	ICV	11/07/20 18:41	WI200815-1	2.416		2.365	mg/L	98	90	110			
WG509190ICB	ICB	11/07/20 18:42				U	mg/L		-0.02	0.02			
WG509192													
WG509192LFB	LFB	11/07/20 19:07	WI201001-11	2		2.005	mg/L	100	90	110			
WG508728PBS	PBS	11/07/20 19:08				U	mg/L		-0.02	0.02			
L62449-01AS	AS	11/07/20 19:10	WI201001-11	2	.093	2.109	mg/L	101	90	110			
L62449-14DUP	DUP	11/07/20 19:32			.086	.081	mg/L				6	20	RA

Nitrite as N (WET DI) M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509190													
WG509190ICV	ICV	11/07/20 18:41	WI200815-1	.609		.61	mg/L	100	90	110			
WG509190ICB	ICB	11/07/20 18:42				U	mg/L		-0.01	0.01			
WG509192													
WG509192LFB	LFB	11/07/20 19:07	WI201001-11	1		1.029	mg/L	103	90	110			
WG508728PBS	PBS	11/07/20 19:08				U	mg/L		-0.01	0.01			
L62449-01AS	AS	11/07/20 19:10	WI201001-11	1	U	1.023	mg/L	102	90	110			
L62449-14DUP	DUP	11/07/20 19:32			U	U	mg/L				0	20	RA

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG510563													
WG510563ICV	ICV	11/05/20 13:00	PCN61057	4.01		4	units	100	3.9	4.1			
L62449-14DUP	DUP	11/05/20 13:00			7.8	7.8	units				0	20	

pH, Saturated Paste EPA 600/2-78-054 section 3.2.2

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509895													
WG509895ICV	ICV	11/19/20 16:21	PCN61057	4.01		4	units	100	3.9	4.1			
L62449-07DUP	DUP	11/19/20 16:40			8.9	8.9	units				0	20	

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Potassium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	20		19.81	mg/L	99	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.6	0.6			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.6	0.6			
L62449-05AS	AS	11/07/20 4:42	II201027-3	99.96637	U	100.8	mg/L	101	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	99.96637	U	101.9	mg/L	102	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Residue, Filterable (TDS) @180C (WET DI) SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509119													
WG509119PBS	PBS	11/06/20 11:15				U	mg/L		-40	40			
WG509119LCSW	LCSW	11/06/20 11:17	PCN62452	1000		1002	mg/L	100	80	120			
WG508728PBS	PBS	11/06/20 11:20				U	mg/L		-40	40			
L62449-14DUP	DUP	11/06/20 12:00			2020	1914	mg/L				5	10	

Selenium (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.05		.05005	mg/L	100	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.0003	0.0003			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.0003	0.0003			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.05	.00471	.05386	mg/L	98	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.05	.00471	.05353	mg/L	98	75	125	1	20	
L62449-14DUP	DUP	11/06/20 11:18			.00014	U	mg/L				200	20	RA

Silver (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	1		.975	mg/L	98	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.5	U	.409	mg/L	82	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.5	U	.385	mg/L	77	75	125	6	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Sodium (WET DI) M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	100		98.95	mg/L	99	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.6	0.6			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.6	0.6			
L62449-05AS	AS	11/07/20 4:42	II201027-3	100.0125	45.1	143.5	mg/L	98	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	100.0125	45.1	144.4	mg/L	99	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			.29	.27	mg/L				7	20	RA

Compass Land Group ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Sulfate (WET DI) SM4500 SO4-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509102													
WG509102PBW	PBW	11/06/20 9:58				U	mg/L		-60	60			
WG509102LCSW	LCSW	11/06/20 10:01	WC200903-3	100		100	mg/L	100	80	120			
WG508728PBS	PBS	11/06/20 10:04				U	mg/L		-60	60			
L62449-14DUP	DUP	11/06/20 10:54			1300	1284	mg/L				1	20	

Sulfur Organic Residual M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509802													
WG509802PBS	PBS	11/18/20 9:00				U	%		-0.03	0.03			
L62449-01DUP	DUP	11/18/20 9:00			.01	U	%				200	20	RA

Sulfur Pyritic Sulfide M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509802													
L62449-01DUP	DUP	11/18/20 9:00			.39	.41	%				5	20	
WG509802PBS	PBS	11/18/20 9:00				U	%		-0.03	0.03			

Sulfur Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509802													
L62449-01DUP	DUP	11/18/20 9:00			.05	.04	%				22	20	RA
WG509802PBS	PBS	11/18/20 9:00				U	%		-0.03	0.03			

Sulfur Total M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509802													
L62449-01DUP	DUP	11/18/20 9:00			.45	.45	%				0	20	
L62449-01MS	MS	11/18/20 9:00	PCN62541	1.3	.45	1.7	%	96	80	120			
WG509802LCSS	LCSS	11/18/20 9:00	PCN61785	4.01		4.41	%	110	80	120			
WG509802PBS	PBS	11/18/20 9:00				U	%		-0.03	0.03			

Thallium (WET DI) 6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509103													
WG509103ICV	ICV	11/06/20 10:30	MS201021-2	.05		.05024	mg/L	100	90	110			
WG509103ICB	ICB	11/06/20 10:31				U	mg/L		-0.0003	0.0003			
WG508728PBS	PBS	11/06/20 10:42				U	mg/L		-0.0003	0.0003			
L62449-04AS	AS	11/06/20 10:53	MS201020-4	.0501	U	.04723	mg/L	94	75	125			
L62449-04ASD	ASD	11/06/20 10:55	MS201020-4	.0501	U	.04742	mg/L	95	75	125	0	20	
L62449-14DUP	DUP	11/06/20 11:18			U	U	mg/L				0	20	RA

Total Sulfur Minus Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509802													
WG509802PBS	PBS	11/18/20 9:00				U	%		-0.03	0.03			
L62449-01DUP	DUP	11/18/20 9:00			.4	.41	%				2	20	

Compass Land Group

ACZ Project ID: ***L62449***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Vanadium (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.997	mg/L	100	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.03	0.03			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.03	0.03			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.4995	.132	.6448	mg/L	103	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.4995	.132	.652	mg/L	104	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Zinc (WET DI) 6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG509126													
WG509126ICV	ICV	11/07/20 3:50	II201022-1	2		1.948	mg/L	97	90	110			
WG509126ICB	ICB	11/07/20 3:54				U	mg/L		-0.06	0.06			
WG508728PBS	PBS	11/07/20 4:18				U	mg/L		-0.06	0.06			
L62449-05AS	AS	11/07/20 4:42	II201027-3	.50075	U	.537	mg/L	107	75	125			
L62449-05ASD	ASD	11/07/20 4:46	II201027-3	.50075	U	.534	mg/L	107	75	125	1	20	
L62449-14DUP	DUP	11/07/20 5:38			U	U	mg/L				0	20	RA

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-01	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	DJ	Sample dilution required due to insufficient sample.
			SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
			SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-02	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-03	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-04	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-05	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-06	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509265	Calcium (WET DI)	6010D ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-07	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-08	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-09	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-10	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-11	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-12	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-13	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
					analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L62449-14	WG509126	Aluminum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Antimony (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Arsenic (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Barium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Beryllium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Boron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Cadmium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509265	Calcium (WET DI)	6010D ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG509229	Chloride (WET DI)	SM4500Cl-E	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500Cl-E	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Chromium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Cobalt (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Copper (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509448	Fluoride (WET DI)	SM4500F-C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Iron (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Lead (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Magnesium (WET DI)	6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Manganese (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509202	Mercury (WET DI)	M7470A CVAA	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Molybdenum (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nickel (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509192	Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.

Compass Land Group ACZ Project ID: ***L62449***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Nitrite as N (WET DI)	M353.2 - Automated Cadmium Reduction	H3	Sample was received and analyzed past holding time.
			M353.2 - Automated Cadmium Reduction	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Potassium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509119	Residue, Filterable (TDS) @180C (WET DI)	SM2540C	N1	See Case Narrative.
	WG509103	Selenium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Silver (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sodium (WET DI)	M6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509802	Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509103	Thallium (WET DI)	6020B ICP-MS	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG509126	Vanadium (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
		Zinc (WET DI)	6010D ICP	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Metals Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Boron (WET DI)	6010D ICP

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Neutralization Potential as CaCO3	M600/2-78-054 3.2.3
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
Sulfur HCl Residue	M600/2-78-054 3.2.4-MOD
Sulfur HNO3 Residue	M600/2-78-054 3.2.4-MOD
Sulfur Organic Residual	M600/2-78-054 3.2.4-MOD
Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD
Sulfur Sulfate	M600/2-78-054 3.2.4-MOD
Sulfur Total	M600/2-78-054 3.2.4-MOD
Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Compass Land Group
S1832-05-02

ACZ Project ID: L62449
Date Received: 10/20/2020 11:32
Received By:
Date Printed: 10/27/2020

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?		X	
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples?		X	

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? [1]			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?		X	

Some parameters were received past hold time.

NA indicates Not Applicable

Chain of Custody Related Remarks

Samples were received with some water in bag.

Client Contact Remarks

Shipping Containers

Cooler Id	Temp(°C)	Temp Criteria(°C)	Rad(µR/Hr)	Custody Seal Intact?
NA33919	1.6	NA	15	N/A

Was ice present in the shipment container(s)?

Yes - Wet ice was present in the shipment container(s).

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Compass Land Group
S1832-05-02

ACZ Project ID: L62449
Date Received: 10/20/2020 11:32
Received By:
Date Printed: 10/27/2020

[1] The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na2S2O3 preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

ACZ Laboratories, Inc. L62449

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Andrew Kopania
Company: EMKO/Geocon
E-mail: akopania@sbcglobal.net
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916-718-5511

Copy of Report to:

Name: Yasha Saber
Company: Compass Land
E-mail: ysaber@compassland.net
Telephone:

Invoice to:

Name: Jeremy Zorne
Company: Geocon Consultants, INC
E-mail: Zorne@geoconinc.com
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916.852.9118

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☒

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☒

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: LE Short Sampler's Site Information State CA Zip code 94517 Time Zone PST

*Sampler's Signature: _____

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: Clayton-Quarry
PO#: S1832-05-02
Reporting state for compliance testing:
Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED *(attach list or use quote number)*

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	See Quote Attached								
KxF1	10/14 1430	Rock	1	☒	☐	☐	☐	☐	☐	☐	☐	☐
KxF2	10/14 1433	"	1	☒	☐	☐	☐	☐	☐	☐	☐	☐
KxF3	10/14 1443	"	1	☒	☐	☐	☐	☐	☐	☐	☐	☐
KxF4	10/14 1459	"	1	☒	☐	☐	☐	☐	☐	☐	☐	☐
KxF5	10/14 1511	"	1	☒	☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐	☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Additional copy of the report to Pat Mitchell pmitchell@mitchellchadwick.com
Log in receipt only to Lauren Short short@geoconinc.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	10/14/20 1900	FedEx	10/14/20 1900
		[signature] 10/20/20	11:32

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.

L62449 Chain of Custod

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Andrew Kopania
Company: EMKO/Geocon
E-mail: akopania@sbcglobal.net
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916-718-5511

Copy of Report to:

Name: Yasha Saber
Company: Compass Land
E-mail: ysaber@compassland.net
Telephone:

Invoice to:

Name: Jeremy Zorne
Company: Geocon Consultants, INC
E-mail: Zorne@geoconinc.com
Address: 3160 Gold Valley Drive, Suite 800, Rancho Cordova, California 95742
Telephone: 916.852.9118

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☒

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☒

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: LE Short Sampler's Site Information State CA Zip code 94517 Time Zone PST

*Sampler's Signature: _____

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: Clayton-Quarry
PO#: S1832-05-02
Reporting state for compliance testing:
Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED *(attach list or use quote number)*

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	See Quote Attached
Bench 1 A1	10/14 1100	Rock	1	☒
Bench 1 U1	10/14 1020		1	☒
Bench 1 A2	10/14 1130		1	☒
Bench 1 U2	10/14 1200		1	☒
Bench 2 A1	10/14 1320		1	☒
Bench 2 U1	10/14 1250		1	☒
Bench 2 A2	10/14 1340		1	☒
Bench 2 U2	10/14 1412		1	☒
Bench 3 A1	10/14 1425		1	☒
				☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Additional copy of the report to Pat Mitchell pmitchell@mitchellchadwick.com
Log in receipt only to Lauren Short short@geoconinc.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	10/19/20 1900	Fed Ex	10/20/20 0900
		[signature]	10/20/20 11:30

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Quote

9/16/2020

Quote Number: CLAYTON-QUARRY

Matrix: Soil Fourteen Total Samples

Parameter	Method	Detection Limit	Cost/Sample
Diskette/QC Summary			
Quality Control Summary			$0.00
Metals Analysis			
Metals by ICP			$75.00
Metals by ICP-MS			$75.00
Aluminum (WET DI)	6010D ICP	0.05 mg/L	$0.00
Antimony (WET DI)	6020B ICP-MS	0.0004 mg/L	$0.00
Arsenic (WET DI)	6020B ICP-MS	0.0002 mg/L	$0.00
Barium (WET DI)	6010D ICP	0.007 mg/L	$0.00
Beryllium (WET DI)	6020B ICP-MS	0.00008 mg/L	$0.00
Boron (WET DI)	6010D ICP	0.02 mg/L	$0.00
Cadmium (WET DI)	6020B ICP-MS	0.00005 mg/L	$0.00
Calcium (WET DI)	6010D ICP	0.1 mg/L	$0.00
Chromium (WET DI)	6010D ICP	0.01 mg/L	$0.00
Cobalt (WET DI)	6010D ICP	0.01 mg/L	$0.00
Copper (WET DI)	6010D ICP	0.01 mg/L	$0.00
Iron (WET DI)	6010D ICP	0.06 mg/L	$0.00
Lead (WET DI)	6010D ICP	0.03 mg/L	$0.00
Magnesium (WET DI)	6010D ICP	0.2 mg/L	$0.00
Manganese (WET DI)	6010D ICP	0.01 mg/L	$0.00
Mercury (WET DI)	M7470A CVAA	0.0002 mg/L	$26.75
Molybdenum (WET DI)	6010D ICP	0.02 mg/L	$0.00
Nickel (WET DI)	6010D ICP	0.008 mg/L	$0.00
Potassium (WET DI)	6010D ICP	0.2 mg/L	$0.00
Selenium (WET DI)	6020B ICP-MS	0.0001 mg/L	$0.00
Silver (WET DI)	6010D ICP	0.01 mg/L	$0.00
Sodium (WET DI)	M6010D ICP	0.2 mg/L	$0.00
Thallium (WET DI)	6020B ICP-MS	0.0001 mg/L	$0.00
Vanadium (WET DI)	6010D ICP	0.01 mg/L	$0.00
Zinc (WET DI)	6010D ICP	0.02 mg/L	$0.00
Misc.			
Electronic Data Deliverable			$0.00
Sample Preparation			
Air Dry at 34 Degrees C	USDA No. 1, 1972		$7.00

REPAD.09.06.05.01 S/ spl D/ 21 P/

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Quote

Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3		$12.25
Saturated Paste Extraction	USDA No. 60 (2)		$15.75
Waste Extraction Test - DI H2O	California Method, Title 22		$118.15
Soil Analysis			
Acid Generation Potential (calc)	M600/2-78-054 3.2.4	Calculation	$0.00
Acid Neutralization Potential (calc)	M600/2-78-054 3.2.3 NV Modified So	Calculation	$0.00
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	Calculation	$0.00
ANP to AGP Ratio (calc)	M600/2-78-054 NV Modified Sobek F	Calculation	$0.00
Neutralization Potential as CaCO3	M600/2-78-054 NV Modified Sobek F	0.1 %	$26.25
pH, (WET-DI)	M9045D/M9040C	0.1 C	$7.00
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2	0.1 units	$7.00
Sulfur Forms	M600/2-78-054 3.2.4 & 3.2.6 NV Mo	0.01 %	$85.85
Wet Chemistry			
Alkalinity (WET DI)	SM2320B - Titration	2 mg/L	$9.50
Chloride (WET DI)	SM4500Cl-E	0.5 mg/L	$9.50
Conductivity @25C (WET-DI)	SM2510B	1 umhos/cm	$7.00
Fluoride (WET DI)	SM4500F-C	0.11 mg/L	$9.00
Hardness as CaCO3 (WET-DI)	SM2340B - Calculation	Calculation	$0.00
Nitrate (WET-DI)	Calculation: NO3NO2 minus NO2	Calculation	$0.00
Nitrate/Nitrite as N (WET DI)	M353.2 - Automated Cadmium Redu	0.02 mg/L	$9.50
Nitrite as N (WET DI)	M353.2 - Automated Cadmium Redu	0.01 mg/L	$9.50
Residue, Filterable (TDS) @180C (WET DI)	SM2540C	20 mg/L	$11.50
Sulfate (WET DI)	SM4500 SO4-D	20 mg/L	$11.50
		Cost/Sample:	**$533.00**

This quote is based on a Standard Turn Around Time of approximately 21 days for soil and solid matrices (15 business days). TAT may vary with seasonal heavy workload. Please contact your PM if rush TAT is required. Rush TAT needs to be pre-approved prior to sample shipment to assure that due dates can be met. Pricing includes standard reporting formats and standard ACZ EDDs. All projects received are subject to a $125.00 Minimum Charge. Please note that method detection limits are estimates and may be elevated depending on sample matrix that require dilution. Pricing includes coolers, soil jars or bags, labels, COCs and ice-packs (if needed for your analysis), shipped to your site or office via UPS ground. Return shipping is the responsibility of the client. Please allow ample time for your bottles to arrive. Please note that soil preparation charges may change based on the condition and volume of sample(s) upon receipt. Wet samples may increase the TAT if air-drying is needed required. ACZ assigns a Project Manager to all of our clients. Your Project Manager is Max Janicek. Max will serve as your main point of contact for all bottle orders, report statuses, questions on your data and changes to your account, and can be reached at maxj@acz.com or 970-879-6590 ext 128.

Quote Number: CLAYTON-QUARRY

CONTRACT DETAILS
Pricing includes shipment of all standard sample containers and related paperwork by UPS Ground Service. Please allow three to five days for delivery when ordering containers. Please notify your Project Manager prior to sending any samples with special requests such as electronic data deliverables or special reporting requirements. Additional charges may apply for non-standard requests including special sample containers and express shipping.

This quotation is valid for six months from the bid date unless specified otherwise in the bid. All bids must be signed and returned to ACZ before the project is received. The authorized signature represents acceptance of the pricing as well as the general terms and conditions of ACZ Laboratories, Inc. which may be downloaded from our web site at https://acz.com/wp-content/uploads/2020/05/ACZ_Terms_Conditions.pdf. Please note that MDLs in this quote are not static and my change due to sample matrix or samples with high TDS.

All orders are subject to a minimum charge of $150.00. Samples may incur a $11.00/sample disposal fee for any samples deemed to be hazardous.

ACZ Representative (Authorized signature and date) _____

Client Representative (Authorized signature and date) _____

APPENDIX G-4
QUARRY LAKE WATER QUALITY ANALYSIS

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TECHNICAL MEMORANDUM

July 2, 2021

To: Steve Grace, CEMEX

Cc: Yasha Saber, Compass Land Group
Pat Mitchell, Mitchell Chadwick

From: Andy Kopania

Subject: Quarry Lake Water Quality and Aquatic Life Criteria
CEMEX CLAYTON QUARRY

On March 1, 2021, EMKO Environmental, Inc. completed the Technical Memorandum "Adaptive Management Program to evaluate water quality conditions after reclamation of the CEMEX Clayton Quarry" (EMKO, 2021) (referred to herein as the AMP Tech Memo). The AMP Tech Memo used laboratory analytical data from DI-WET leaching results on 14 rock samples collected from the Clayton Quarry to identify equilibrium water quality conditions in the future quarry lake once the mining excavation fills with water. The AMP Tech Memo was prepared to address specific peer review comments received from Contra Costa County's Environmental Impact Report (EIR) consultant team on the Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry, Clayton, Contra Costa County, California (EMKO, 2020a) (referred to herein as the May 2020 Hydrology Report). The basis for the AMP Tech Memo is described in the Technical Memorandum "Initial Sampling to Support Adaptive Management Plan, Clayton Quarry" (EMKO, 2020b) (referred to herein as the Initial Sampling Memo).

Based on the AMP Tech Memo (EMKO, 2021), the County's EIR consultant provided additional comments regarding the Quarry Lake water quality and potential effects on aquatic receptors. This technical memorandum has been prepared to evaluate how the water quality in the quarry lake will change after mining is completed and the excavation fills with water, in response to the comments from the County's EIR consultant. Concentrations of parameters detected in the DI-WET leachability testing described in the AMP Tech Memo (EMKO, 2021) are used in this evaluation as the basis for assessing the potential accumulation or dilution of each parameter in the quarry lake over time. As stated above, the DI-WET leaching procedure was used to represent equilibrium conditions in the water that comes in contact with the different geological formations and rock types in the reclaimed quarry.

Approach

The timeframes considered and water budget inputs and outputs used in this evaluation are based on those listed in Table 10 and depicted on Figure 3 of the May 2020 Hydrology Report (EMKO, 2020a). The standards used to evaluate whether or not water quality objectives may be exceeded include drinking water maximum contaminant levels (MCLs) (SWRCB, 2018a and 2018b), the water quality objectives listed in Chapter 3 of the San Francisco Bay Regional Water Quality Control Board's (RWQCB's) Basin Plan (RWQCB, 2017), and the U.S. EPA's Aquatic Life Criteria Table (U.S. EPA, 2021).

Attachment A contains summary tables presenting the results from the DI-WET laboratory analyses for the constituents listed in the EIR consultant's comments. Results are presented for the Knoxville Formation, altered diabase, and unaltered diabase, as discussed in the Initial Sampling Memo (EMKO, 2020b) and the AMP Tech Memo (EMKO, 2021).

As noted in the tables in Attachment A, there were no detections of barium or zinc in any of the DI-WET leachate samples. In cases where the laboratory results include both samples with detectable values of a specific analyte and samples in which the laboratory did not detect that analyte (referred to as a non-detect or ND result), the results for the non-detect samples are often presumed to be one-half of the laboratory detection limit so that statistical analyses can be performed on the entire sample set (U.S. EPA, 1991). However, in cases where an analyte is not detected in any of the samples collected for that study, the analyte is presumed to not be present in the samples. Thus, for barium and zinc no further evaluation is presented in this Tech Memo as they would not be expected to be present in the water that accumulates in the quarry lake since they were not detected in any of the 14 samples from the quarry.

In addition, pH and conductivity are water quality properties that are not directly related to a mass per volume concentration of a single analyte. The pH concentration will vary based not only on the nature of the rainfall running off the exposed geologic formations around the quarry but will also vary based on the amount of dissolved carbon dioxide and oxygen in the water. These latter two factors are dependent on the amount of carbon dioxide in the atmosphere, the extent of aquatic plant growth in the quarry lake, and the amount of decaying organic matter that accumulates in the quarry lake. As discussed in the May 2020 Hydrology Report (EMKO, 2020a), due to the steep sides of the quarry, it is not anticipated that appreciable aquatic plant growth would occur in the quarry lake. Thus, there would be little or no decaying organic matter in the lake that could affect pH. Furthermore, as discussed in the AMP Tech Memo (EMKO, 2021), the Knoxville Formation and the diabase both have a net acid neutralization potential, so acid rock drainage will not occur within the reclaimed quarry and pH levels will not fall below applicable water quality standards. Thus, pH is not evaluated further in this Tech Memo.

The conductivity is a function of the amount of Total Dissolved Solids (TDS) in the water.

Thus, if the TDS remains below applicable water quality standards, the conductivity will also typically remain below applicable standards. Since TDS concentrations would range from only 35% to 55% of the TDS regulatory threshold (see Tables 1 and 2 below), conductivity is not expected to be an issue and no separate evaluation of conductivity is necessary.

Findings

Based on the above discussion, the parameters that are evaluated in this Tech Memo are:

- TDS;
- Sulfate;
- Arsenic;
- Iron;
- Manganese;
- Selenium; and
- Vanadium.

Table 1 presents a summary of applicable water quality objectives based on the regulatory sources cited above. The water quality standards for TDS and sulfate are secondary drinking water standards based on aesthetic qualities (i.e. taste and odor), also referred to as "consumer acceptance levels" (SWRCB, 2018b). The Basin Plan (RWQCB, 2017) includes some MCLs as being applicable to certain beneficial uses that may apply to the quarry lake or to discharges from the quarry lake. Therefore, when the Basin Plan (RWQCB, 2017) does not include a specific freshwater criterion for a listed constituent, the secondary MCL is shown in Table 1 and is considered to be protective of aquatic life in the context of this analysis.

TABLE 1. Water Quality Standards

Constituent	MCL (mg/L)	Basin Plan (mg/L) (c)	EPA Aquatic (mg/L)
TDS	500-1,000 (a)	500-1,000 (a)	NA
Sulfate	250-500 (a)	250-500 (a)	NA
Arsenic	0.01	0.15/0.34 (b)	0.15/0.34 (b)
Iron	0.3 (a)	0.3 (a)	1.0
Manganese	0.05 (a)	0.05 (a)	NA
Selenium	0.05	0.005/0.02 (b)	0.0015 (d)
Vanadium	NA	NA	NA

NA = not available or not applicable
(a) secondary MCL
(b) 4-day average/1-hour average, also referred to as chronic and acute
(c) Table 3.5 of the Basin Plan includes MCLs for certain beneficial uses
(d) 30-day average based on U.S. EPA 2016

As requested by the County's EIR consultant and to maintain consistency with the hydrologic evaluations already conducted, the quarry lake hydrologic parameters used to develop Table 10 and Figure 3 in the May 2020 Hydrology Report (EMKO, 2020a) were used to calculate the concentration of each of the constituents listed in Table 1 over time in the quarry lake. For each constituent, the average concentration from the DI-WET leaching results were calculated for the Knoxville Formation, the altered diabase, and the unaltered diabase. As discussed above and described further in the AMP Tech Memo (EMKO, 2021), in cases where the laboratory results for a specific analyte include both samples with detectable values and samples in which the laboratory did not detect that analyte (referred to as a non-detect or ND result), the results for the non-detect samples were presumed to be one-half of the laboratory detection limit for this evaluation. To develop a useable input for the diabase highwall and the upper watershed areas, it was assumed based on field observations in the quarry that the altered diabase constitutes 10 percent of the diabase rock mass and the unaltered diabase constitutes 90 percent of the diabase rock mass.

Calculation sheets for each constituent are provided in Attachment B. The results from the calculation sheets are summarized in Table 2. Charts showing the incremental increase for each constituent over time, compared with the applicable water quality standards, are provided in Attachment C. The individual quarry lake water surface elevations shown in Table 2, in the calculation sheets in Attachment B, and on the charts in Attachment C are consistent with those used for Table 10 and Figure 3 of the May 2020 Hydrology Report (EMKO, 2020a).

As described above, the results from the DI-WET leaching procedure represent equilibrium conditions in the water that comes in contact with the different geological formations and rock types in the reclaimed quarry. Thus, the concentrations shown in Table 2 are the equilibrium concentrations that are predicted to occur at each quarry lake water elevation shown. Once the water level reaches an elevation of 735 feet, then any excess water would be discharged from the quarry lake. At that point, the volume of water entering the lake and the volume of water leaving the lake would be the same so that the constituent concentrations would remain constant from that time forward.

Comparing the information in Tables 1 and 2, all concentrations would remain well below the MCLs, the Basin Plan water quality objectives, and the U.S. EPA's Aquatic Life Criteria (U.S. EPA, 2021).

TABLE 2. Incremental Constituent Concentrations as Quarry Lake Fills				
Quarry Lake Water Elevation (feet above mean sea level)	410	530	630	735
Incremental Years to Fill	21	20	30	87
Cumulative Water Volume (acre-feet)	2184	3828	5679	8515
Constituent Concentrations (mg/L)				
TDS	174	186	206	274
Sulfate	95	102	113	150
Arsenic	0.0009	0.001	0.0012	0.0016
Iron	0.1195	0.1281	0.1421	0.1899
Manganese	0.0138	0.0148	0.0164	0.0218
Selenium	0.0005	0.0005	0.0006	0.0009
Vanadium	0.0129	0.014	0.0157	0.0215

Formal published and enforceable water quality standards have not been developed for vanadium at the time this evaluation was conducted. Certain reclamation activities and any discharge from the quarry lake will require that CEMEX apply for and receive Waste Discharge Requirements (WDRs) from the RWQCB. The WDRs will include a Monitoring and Reporting Program that will verify the concentrations of the constituents of concern listed in Tables 1 and 2 within the quarry lake remain below applicable water quality standards. If any water quality standards are modified, or a standard is developed for vanadium, then the WDR Monitoring and Reporting Program would continue to confirm that future standards are met.

Summary and Conclusions

The AMP Tech Memo (EMKO, 2021) describes the process that was developed to identify which constituents may leach into the quarry lake from the diabase, the altered diabase, and the Knoxville Formation. That information was then applied to a U.S. EPA procedure to determine how many samples would be appropriate to collect as part of a future monitoring program to assess whether or not water quality standards would be exceeded in the quarry lake, once it begins filling with water. However, the AMP evaluation process did not consider the volume of water entering and accumulating within the quarry lake and the resulting concentrations in the lake itself.

In contrast, the more detailed evaluations presented in this Technical Memorandum requested by the County's EIR consultant specifically address the concentrations of the identified constituents over time in the water within the quarry lake. The water volumes over time, and thus the mixing ratios for the leachate from the geologic formations, are based on the data and assessments presented in the May 2020 Hydrology Report (EMKO, 2020a), as specifically requested by the County's EIR consultant. Thus, the findings of this assessment provide substantial evidence from which conclusions regarding potential impacts can be made.

The findings of this Quarry Lake Water Quality and Aquatic Life Criteria evaluation indicate that applicable and enforceable water quality standards would not be exceeded in the quarry lake after mining ceases and the quarry fills with water. The WDRs that would be issued by the RWQCB include monitoring and reporting requirements that would verify that standards continue to be met in the future, including any new or revised standards. Thus, any potential impacts related to the CEQA Appendix G criterion for water quality[1] would be less than significant. These findings indicate that the AMP (EMKO, 2021) is unnecessary and there would be no benefit implementing that program. This analysis also demonstrates that U.S. EPA aquatic life criteria would not be exceeded so biological resources that may access the quarry lake would not be affected.

References Cited

California State Water Resources Control Board (SWRCB), 2018a, Maximum Contaminant Levels and Regulatory Dates for Drinking Water, U.S. EPA vs California, Last Updated October 2018, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/ccr/mcls_epa_vs_dwp.pdf (accessed July 1, 2021).

SWRCB, 2018b, Secondary Drinking Water Standards, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/ddw_secondary_standards.pdf (accessed July 1, 2021).

EMKO Environmental, Inc. (EMKO), 2020a, Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry, Clayton, Contra Costa County, California.

EMKO, 2020b, Technical Memorandum: Initial Sampling to Support Adaptive Management Plan, Clayton Quarry, August 13, 2020.

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San Francisco Bay Regional Water Quality Control Board (RWQCB), 2017, Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin, Chapter 3, Water Quality Objectives, https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/basinplan/web/bp_ch3.html (accessed June 29, 2021).

U.S. EPA, 1991, Regional Guidance on Handling Chemical Concentration Data Near the Detection Limit in Risk Assessments, Regional Guidance on Handling Chemical

1 The CEQA Appendix G criterion for water quality specifically refers to whether a project would violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

Concentration Data Near the Detection Limit in Risk Assessments | Risk Assessment | US EPA (accessed July 2, 2021).

U.S. EPA, 2016, Aquatic Life Ambient Water Quality Criterion for Selenium in Freshwater 2016 – Fact Sheet, https://www.epa.gov/sites/production/files/2016-06/documents/se_2016_fact_sheet_final.pdf (accessed July 2, 2021).

U.S EPA, 2021, National Recommended Water Quality Criteria – Aquatic Life Criteria Table, https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table (accessed July 1, 2021).

ATTACHMENT A

DI-WET LABORATORY RESULTS

SUMMARY TABLES

Metals Results from DI-WET Extraction

Wall Rock Samples Collected on October 14, 2020

CEMEX Clayton Quarry

KNOXVILLE FORMATION SAMPLES																						
ANALYTE	UNITS	KXF1		KXF2		KXF3		KXF4		KXF5		MDL	PQL	RT								
Arsenic (WET DI)	mg/L	0.0031		0.00307		0.00507		0.00181		0.02		0.0002	0.001	0.01								
Barium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.007	0.035	1								
Iron (WET DI)	mg/L	ND		0.105	B	0.101	B	ND		0.29		0.06	0.15	0.3								
Manganese (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.05	0.05								
Selenium (WET DI)	mg/L	0.00271		0.00195		0.00123		0.00471		0.0068		0.0001	0.00025	0.05								
Vanadium (WET DI)	mg/L	0.015	B	0.017	B	0.029		ND		0.132		0.01	0.025									
Zinc (WET DI)	mg/L	ND		ND		ND		ND		ND		0.02	0.05	5								
ALTERED DIABASE SAMPLES																						
ANALYTE	UNITS	BENCH 1 A1		BENCH 1 A2		BENCH 2 A1		BENCH 2 A2		BENCH 3 A1		MDL	PQL	RT								
Arsenic (WET DI)	mg/L	ND		ND		ND		ND		ND		0.0002	0.001	0.01								
Barium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.007	0.035	1								
Iron (WET DI)	mg/L	ND		ND		ND		0.062	B	ND		0.06	0.15	0.3								
Manganese (WET DI)	mg/L	0.028	B	0.015	B	0.334		0.011	B	0.019	B	0.01	0.05	0.05								
Selenium (WET DI)	mg/L	0.00199		0.00016	B	0.0003		0.00011	B	0.00014	B	0.0001	0.00025	0.05								
Vanadium (WET DI)	mg/L	ND		ND		ND		ND		ND		0.01	0.025									
Zinc (WET DI)	mg/L	ND		ND		ND		ND		ND		0.02	0.05	5								
UNALTERED DIABASE SAMPLES																						
ANALYTE	UNITS	BENCH 1 U1		BENCH 1 U2		BENCH 2 U1		BENCH 2 U2				MDL	PQL	RT								
Arsenic (WET DI)	mg/L	0.0004	B	ND		0.00035	B	0.00073	B			0.0002	0.001	0.01								
Barium (WET DI)	mg/L	ND		ND		ND		ND				0.007	0.035	1								
Iron (WET DI)	mg/L	0.124	B	ND		0.134	B	0.156				0.06	0.15	0.3								
Manganese (WET DI)	mg/L	ND		ND		ND		ND				0.01	0.05	0.05								
Selenium (WET DI)	mg/L	0.00027		0.00028		ND		ND				0.0001	0.00025	0.05								
Vanadium (WET DI)	mg/L	0.018	B	0.012	B	ND		ND				0.01	0.025									
Zinc (WET DI)	mg/L	ND		ND		ND		ND				0.02	0.05	5								

MDL = Method Detection Limit

PQL = Practical Quantitation Limit

ND = Not detected above the PQL

B = Concentration detected at a value between the MDL and PQL. Reported value is an estimated quantity.

RT = Regulatory Threshold, equivalent to primary or secondary maximum contaminant level, based on:

SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021

https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions

General Mineral Constituent Results from DI-WET Extraction

Wall Rock Samples Collected on October 14, 2020

CEMEX Clayton Quarry

KNOXVILLE FORMATION SAMPLES														
ANALYTE	UNITS	KXF1		KXF2		KXF3		KXF4		KXF5		MDL	PQL	RT
Conductivity @25C (WET-DI)	umhos/cm	108		86		76		177		202		1	10	900
Residue, Filterable (TDS) @180C (WET DI)	mg/L	66		52		52		104		120		20	40	500
Sulfate (WET DI)	mg/L	22	B	ND		ND		50		ND		20	50	250
pH, Saturated Paste	units	7.6		7.8		7.9		7.8		8.4		0.1	0.1	6.5 - 8.5
ALTERED DIABASE SAMPLES														
ANALYTE	UNITS	BENCH 1 A1		BENCH 1 A2		BENCH 2 A1		BENCH 2 A2		BENCH 3 A1		MDL	PQL	RT
Conductivity @25C (WET-DI)	umhos/cm	1770		522		650		177		1810		1	10	900
Residue, Filterable (TDS) @180C (WET DI)	mg/L	1910		390		528		102		2020		20	40	500
Sulfate (WET DI)	mg/L	1170		238		351		65		1300		20	50	250
pH, Saturated Paste	units	6.9		7.8		6.8		7.9		7.3		0.1	0.1	6.5 - 8.5
UNALTERED DIABASE SAMPLES														
ANALYTE	UNITS	BENCH 1 U1		BENCH 1 U2		BENCH 2 U1		BENCH 2 U2				MDL	PQL	RT
Conductivity @25C (WET-DI)	umhos/cm	90		121		95		105				1	10	900
Residue, Filterable (TDS) @180C (WET DI)	mg/L	54		78		60		66				20	40	500
Sulfate (WET DI)	mg/L	22	B	35	B	29	B	27	B			20	50	250
pH, Saturated Paste	units	8.9		9		8.8		8.9				0.1	0.1	6.5 - 8.5

MDL = Method Detection Limit

PQL = Practical Quantitation Limit

ND = Not detected above the PQL

B = Concentration detected at a value between the MDL and PQL. Reported value is an estimated quantity.

H = Hold time exceeded

RT = Regulatory Threshold, equivalent to primary or secondary maximum contaminant level, based on:

SWRCB, 2021, A Compilation of Water Quality Goals, accessed January 13, 2021

https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/#db_instructions

ATTACHMENT B

CALCULATIION SHEETS FOR CONSTITUENT ACCUMULATION OVER TIME IN THE QUARRY LAKE

TDS Accumulation Over Time

Reclaimed Quarry Lake

Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	TDS	mg/L	0	157	79	157	Total mg TDS				
		mg	0	19,403,039,507	828,225,144	2,071,981,265	468,368,164,237			174	174
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	TDS	mg/L	0	157	79	157	Total mg TDS				
		mg	0	17,602,158,595	828,225,144	2,071,981,265	410,047,300,074			202	186
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	TDS	mg/L	0	157	79	157	Total mg TDS				
		mg	0	15,917,463,548	828,225,144	2,071,981,265	564,530,098,699			247	206
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	TDS	mg/L	0	157	79	157	Total mg TDS				
		mg	0	13,651,839,174	789,249,843	2,071,981,265	1,436,637,114,546			411	274

Sulfate Accumulation Over Time

Reclaimed Quarry Lake

Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Sulfate	mg/L	0	88	20	88	Total mg Sulfate				
		mg	0	10,863,230,399	213,870,797	1,160,045,562	256,980,081,910			95	95
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Sulfate	mg/L	0	88	20	88	Total mg Sulfate				
		mg	0	9,854,966,500	213,870,797	1,160,045,562	224,577,657,165			111	102
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Sulfate	mg/L	0	88	20	88	Total mg Sulfate				
		mg	0	8,911,751,884	213,870,797	1,160,045,562	308,570,047,283			135	113
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Sulfate	mg/L	0	88	20	88	Total mg Sulfate				
		mg	0	7,643,290,850	203,806,289	1,160,045,562	783,621,414,902			224	150

Arsenic Accumulation Over Time

Reclaimed Quarry Lake

Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Arsenic	mg/L	0	0.0004	0.00661	0.0004	Total mg Arsenic				
		mg	0	45,727	69,298	4,883	2,518,073			0.0009	0.0009
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Arsenic	mg/L	0	0.0004	0.00661	0.0004	Total mg Arsenic				
		mg	0	41,483	69,298	4,883	2,313,283			0.0011	0.0010
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Arsenic	mg/L	0	0.0004	0.00661	0.0004	Total mg Arsenic				
		mg	0	37,512	69,298	4,883	3,350,815			0.0015	0.0012
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Arsenic	mg/L	0	0.0004	0.00661	0.0004	Total mg Arsenic				
		mg	0	32,173	66,037	4,883	8,969,123			0.0026	0.0016

Iron Accumulation Over Time											
Reclaimed Quarry Lake											
Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Iron	mg/L	0	0.1035	0.1112	0.1035	Total mg Iron				
		mg	0	12,796,119	1,165,806	1,366,452	321,895,907			0.1195	0.1195
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Iron	mg/L	0	0.1035	0.1112	0.1035	Total mg Iron				
		mg	0	11,608,455	1,165,806	1,366,452	282,814,256			0.1395	0.1281
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Iron	mg/L	0	0.1035	0.1112	0.1035	Total mg Iron				
		mg	0	10,497,415	1,165,806	1,366,452	390,890,175			0.1712	0.1421
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Iron	mg/L	0	0.1035	0.1112	0.1035	Total mg Iron				
		mg	0	9,003,258	1,110,944	1,366,452	998,816,849			0.2855	0.1899

Manganese Accumulation Over Time											
Reclaimed Quarry Lake											
Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Manganese	mg/L	0	0.0126	0.0050	0.0126	Total mg Manganese				
		mg	0	1,557,187	52,419	166,286	37,293,739			0.0138	0.0138
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Manganese	mg/L	0	0.0126	0.0050	0.0126	Total mg Manganese				
		mg	0	1,412,657	52,419	166,286	32,627,260			0.0161	0.0148
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Manganese	mg/L	0	0.0126	0.0050	0.0126	Total mg Manganese				
		mg	0	1,277,452	52,419	166,286	44,884,746			0.0197	0.0164
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Manganese	mg/L	0	0.0126	0.0050	0.0126	Total mg Manganese				
		mg	0	1,095,625	49,953	166,286	114,132,188			0.0326	0.0218

Selenium Accumulation Over Time

Reclaimed Quarry Lake

Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Selenium	mg/L	0	0.0002	0.00348	0.0002	Total mg Selenium				
		mg	0	24,717	36,484	2,639	1,340,652			0.0005	0.0005
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Selenium	mg/L	0	0.0002	0.00348	0.0002	Total mg Selenium				
		mg	0	22,423	36,484	2,639	1,230,929			0.0006	0.0005
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Selenium	mg/L	0	0.0002	0.00348	0.0002	Total mg Selenium				
		mg	0	20,277	36,484	2,639	1,782,010			0.0008	0.0006
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Selenium	mg/L	0	0.0002	0.00348	0.0002	Total mg Selenium				
		mg	0	17,391	34,767	2,639	4,767,365			0.0014	0.0009

Vanadium Accumulation Over Time

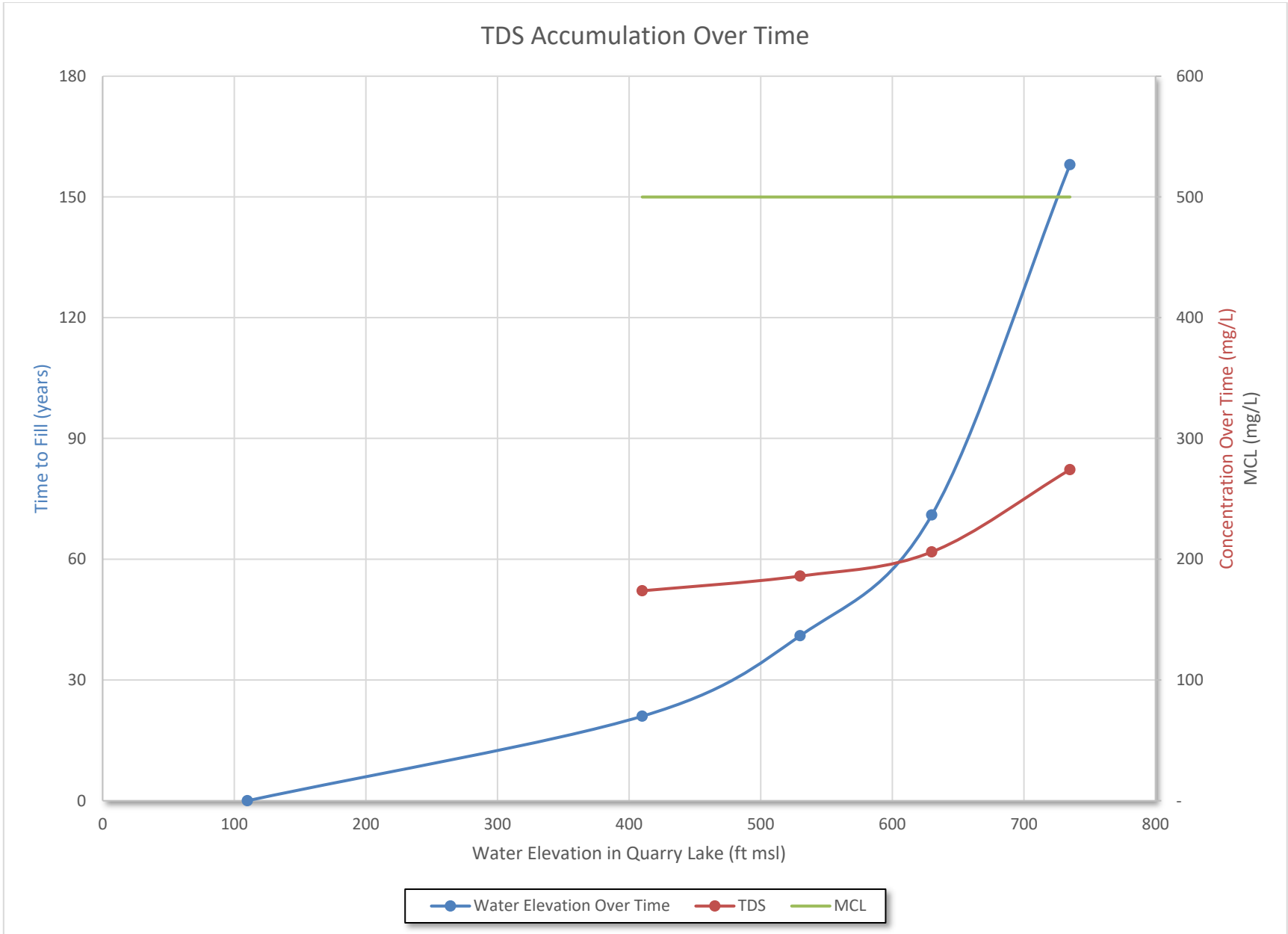
Reclaimed Quarry Lake

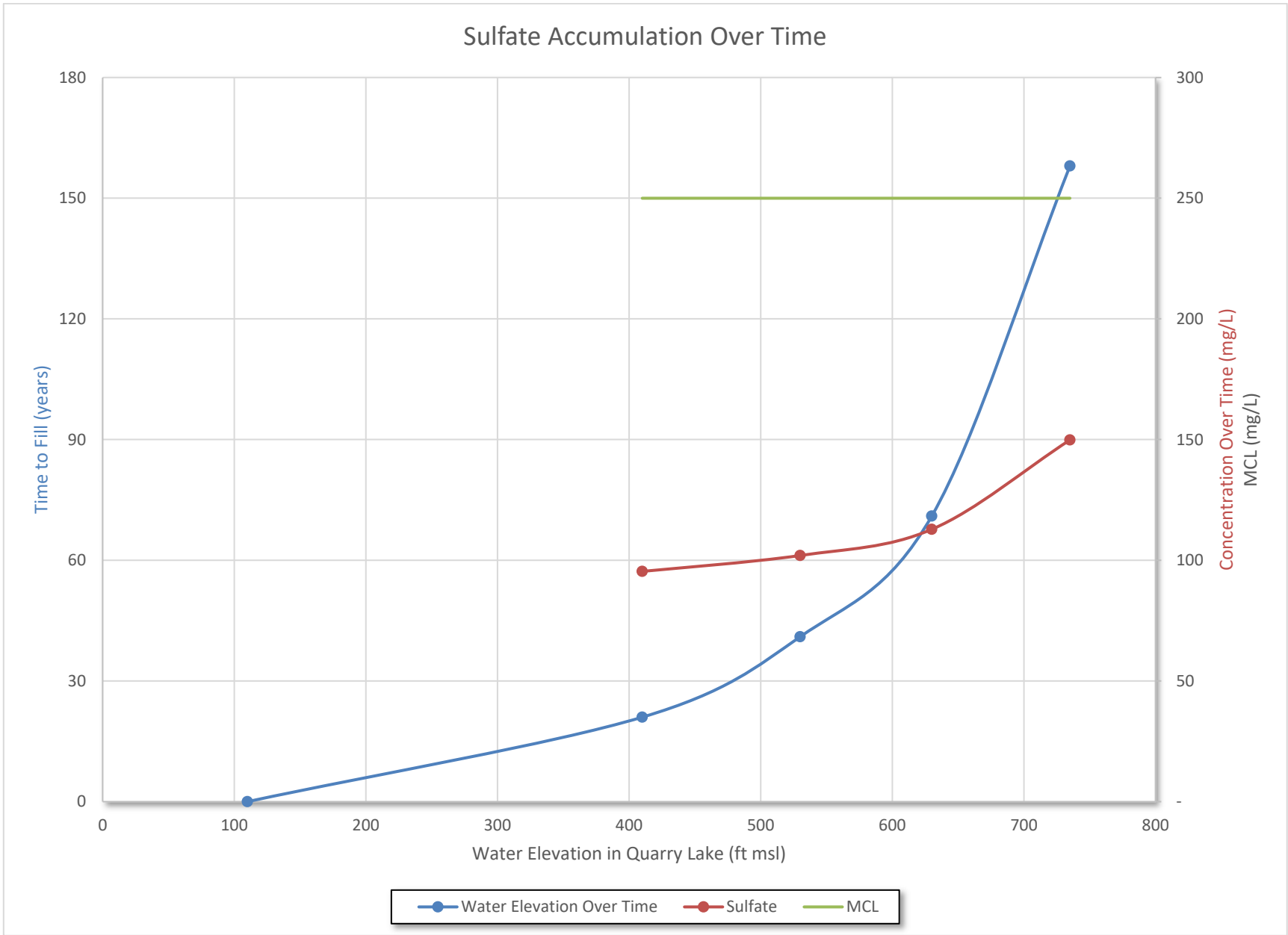
Period	Elevation Range	Duration	Inflow (AF/yr)				Inflow Volume	Evaporation (AF)		Net Volume (AF)	
	(ft msl)	(years)	Pond Surface	Diabase Highwall	Knoxville Formation	Upper Watershed	(AF)	Per Year	Total	Incremental	Total
1	110 - 410	21	11.5	100.2	8.5	10.7	2748.9	26.9	564.9	2184	2184
	Liters		14,184,049	123,586,239	10,483,863	13,197,333	3,390,481,159	33,178,342	696,745,173	2,693,735,986	2,693,735,986
	Vanadium	mg/L	0	0.0084	0.0486	0.0084	Total mg Vanadium				
		mg	0	1,038,124	509,516	110,858	34,828,452			0.0129	0.0129
2	410 - 530	20	21	90.9	8.5	10.7	2622	48.9	978	1644	3828
	Liters		25,901,308	112,115,660	10,483,863	13,197,333	3,233,963,257	60,313,045	1,206,260,895	2,027,702,363	4,721,438,348
	Vanadium	mg/L	0	0.0084	0.0486	0.0084	Total mg Vanadium				
		mg	0	941,772	509,516	110,858	31,242,897			0.0154	0.0140
3	530 - 630	30	29.9	82.2	8.5	10.7	3939	69.6	2088	1851	5679
	Liters		36,878,528	101,385,118	10,483,863	13,197,333	4,858,345,260	85,844,334	2,575,330,008	2,283,015,252	7,004,453,600
	Vanadium	mg/L	0	0.0084	0.0486	0.0084	Total mg Vanadium				
		mg	0	851,635	509,516	110,858	44,160,249			0.0193	0.0157
4	630 - 735	87	42.7	70.5	8.1	10.7	11484	99.4	8648	2836	8515
	Liters		52,665,992	86,954,390	9,990,504	13,197,333	14,164,315,045	122,599,522	10,666,158,451	3,498,156,595	10,502,610,194
	Vanadium	mg/L	0	0.0084	0.0486	0.0084	Total mg Vanadium				
		mg	0	730,417	485,539	110,858	115,432,729			0.0330	0.0215

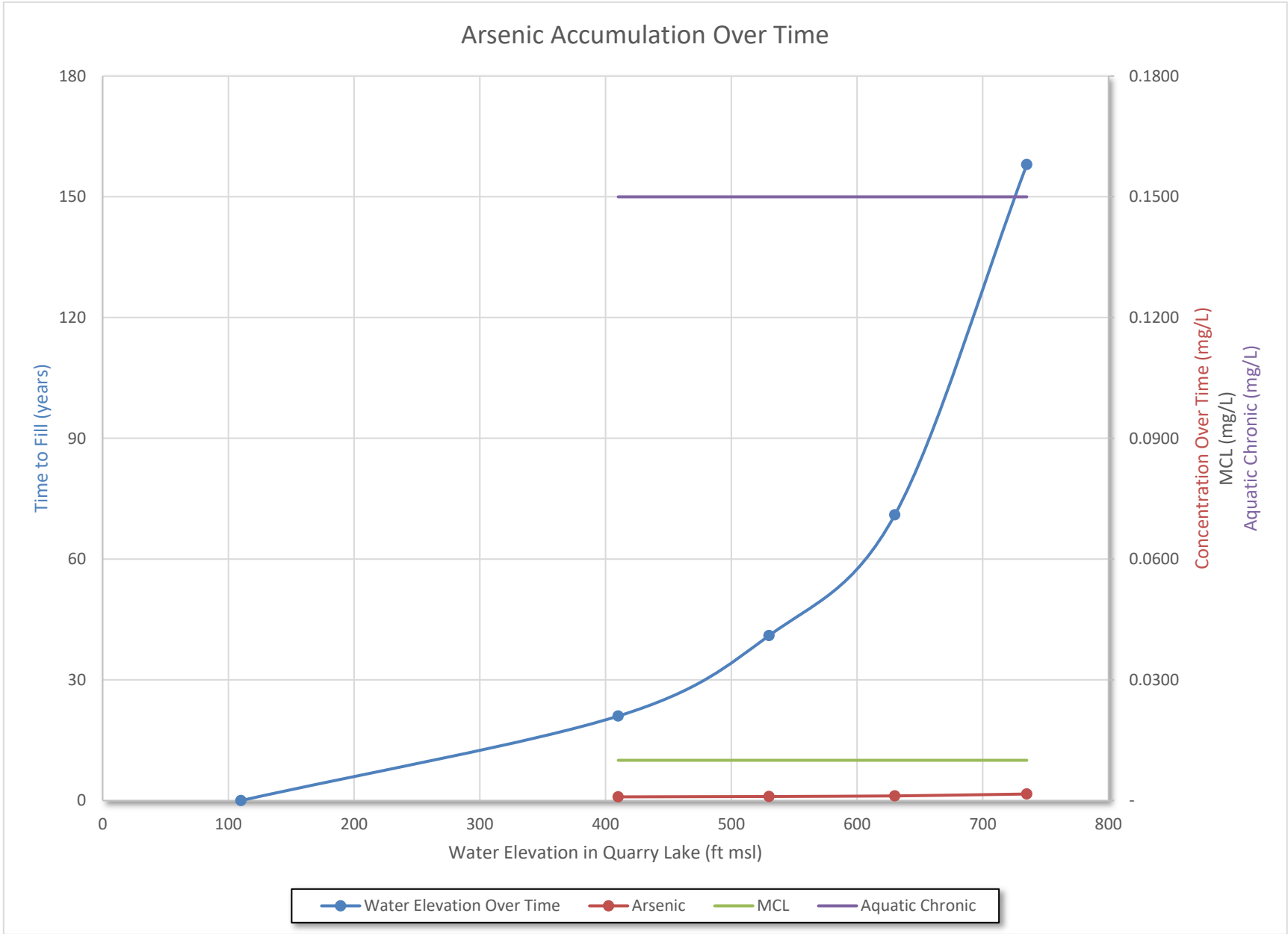
ATTACHMENT C

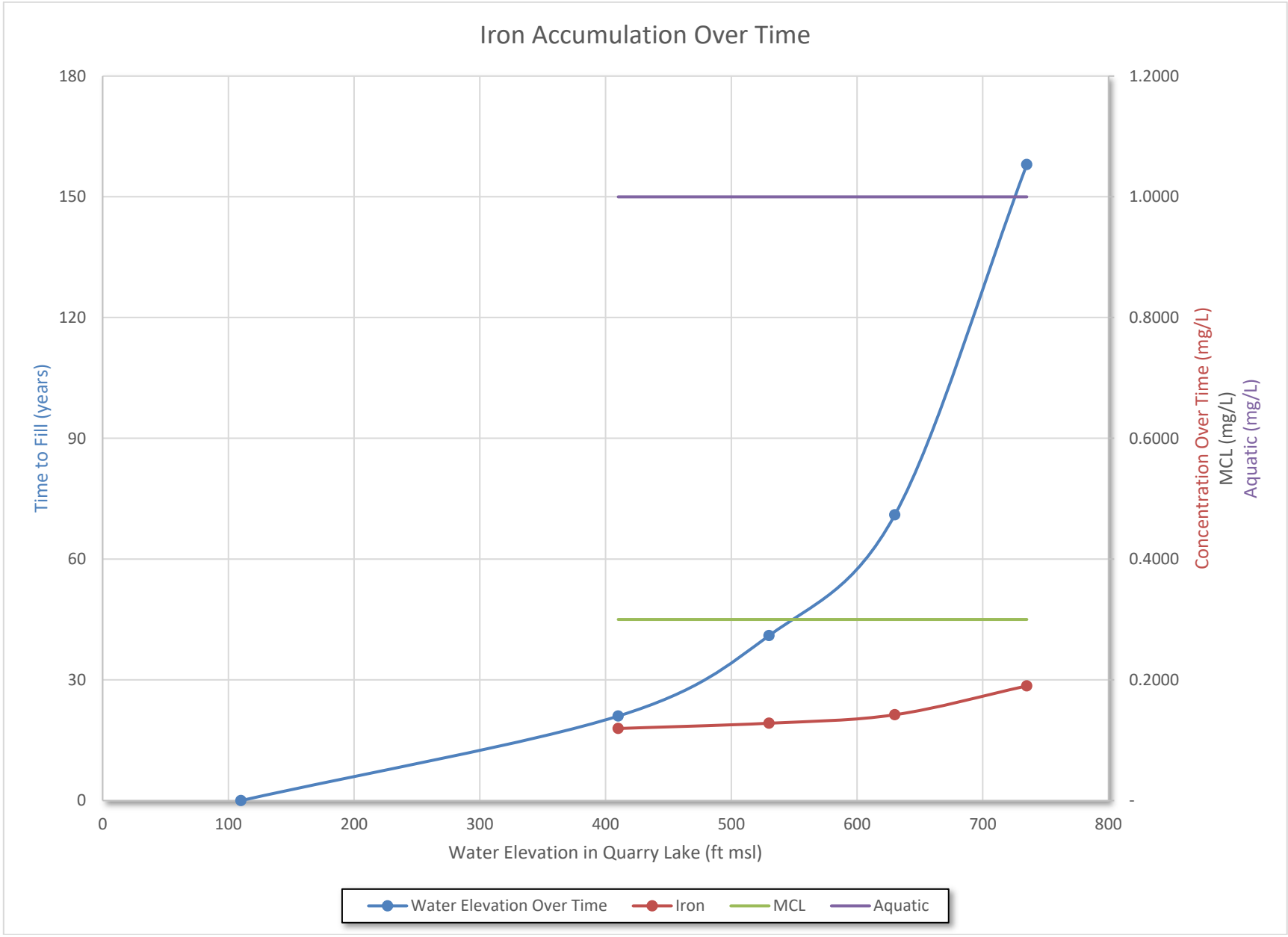
CHARTS SHOWING THE INCREMENTAL INCREASE

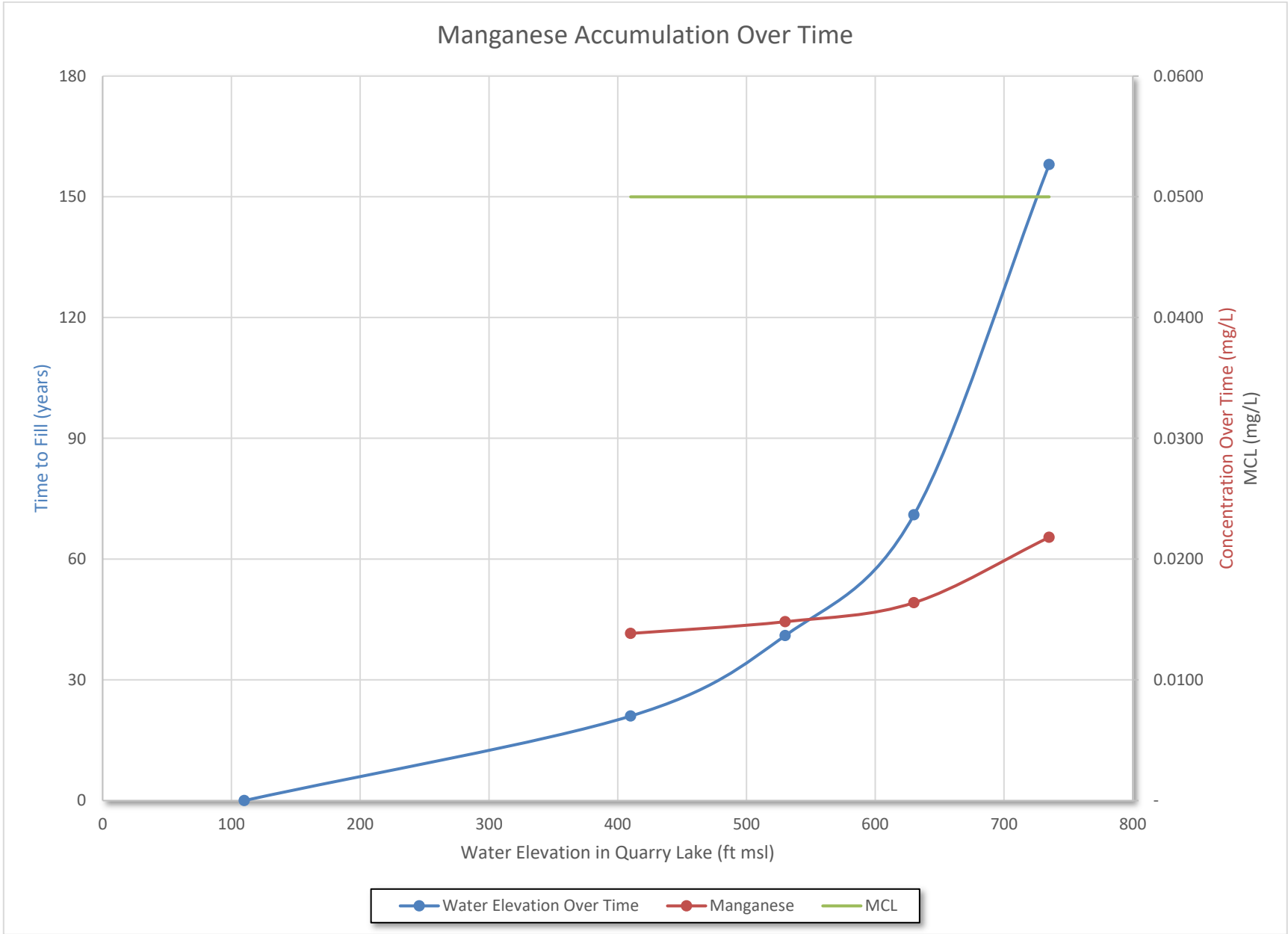
FOR EACH CONSTITUENT OVER TIME

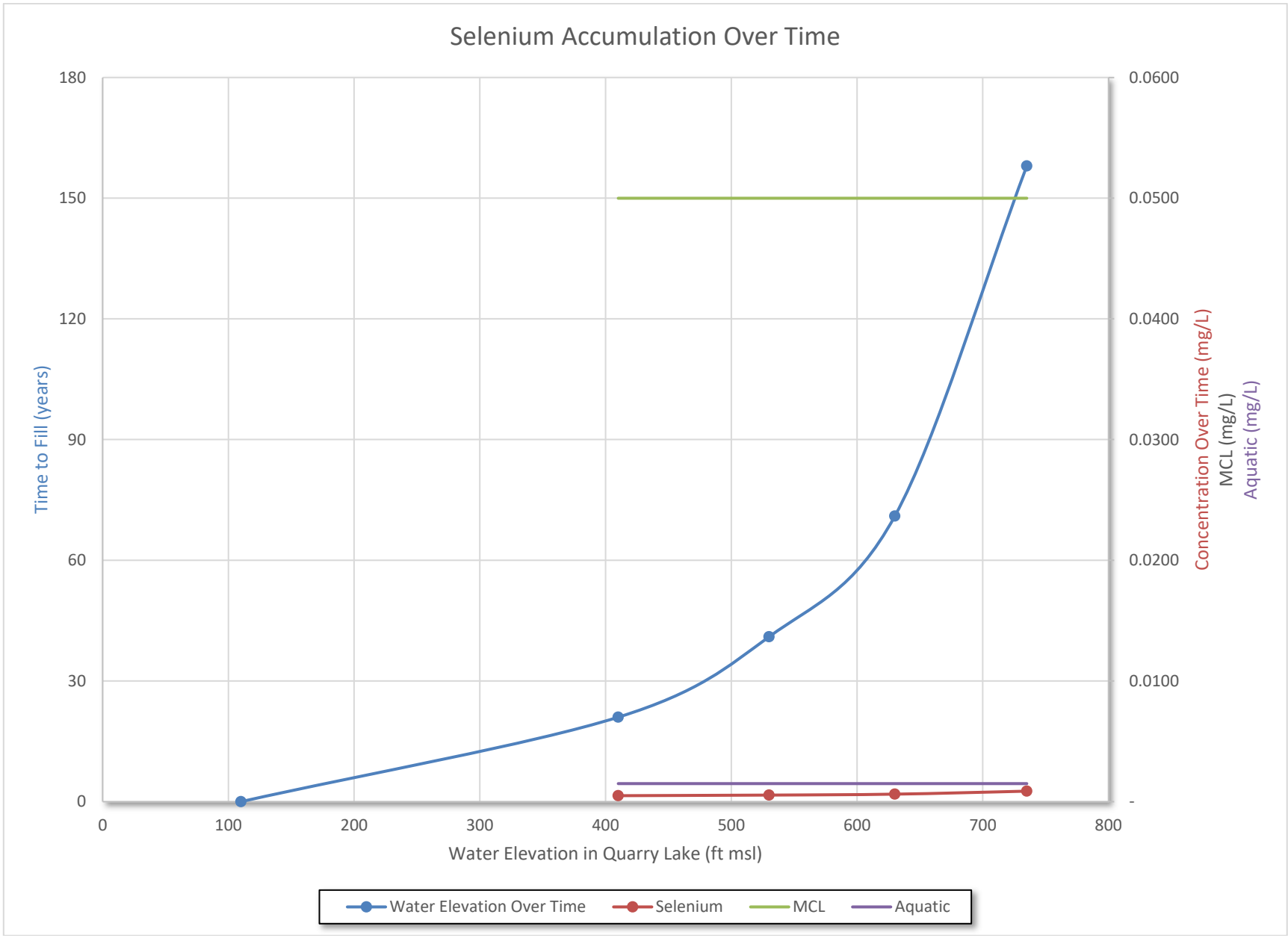

TDS Accumulation Over Time
Time to Fill (years)
Concentration Over Time (mg/L)
MCL (mg/L)
Water Elevation in Quarry Lake (ft msl)
0
30
60
90
120
150
180
-
100
200
300
400
500
600
0
100
200
300
400
500
600
700
800
Water Elevation Over Time
TDS
MCL

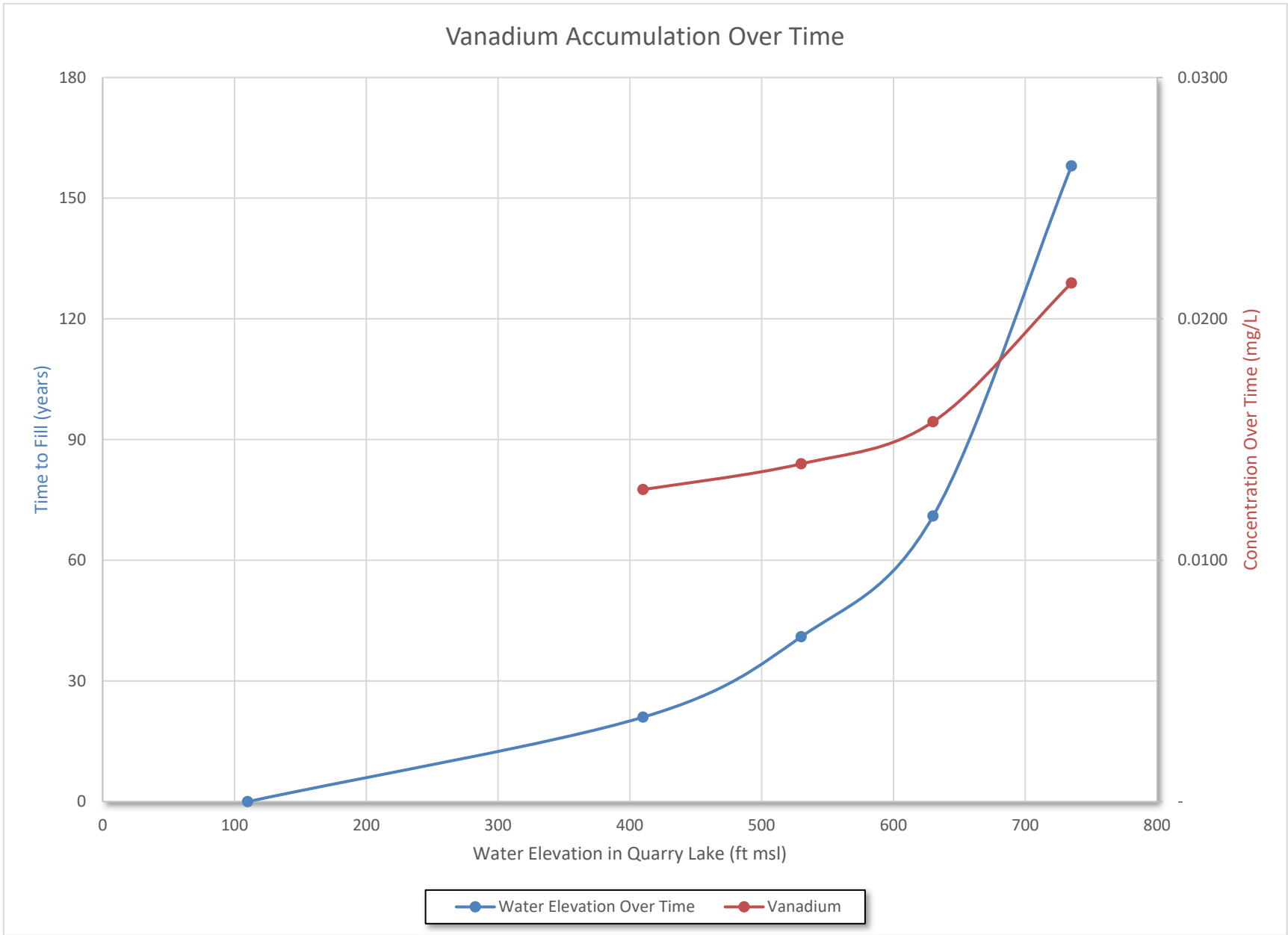

Sulfate Accumulation Over Time
180
150
120
90
60
30
0
Time to Fill (years)
300
250
200
150
100
50
-
Concentration Over Time (mg/L)
MCL (mg/L)
0
100
200
300
400
500
600
700
800
Water Elevation in Quarry Lake (ft msl)
Water Elevation Over Time
Sulfate
MCL


Arsenic Accumulation Over Time
Time to Fill (years)
Concentration Over Time (mg/L)
MCL (mg/L)
Aquatic Chronic (mg/L)
Water Elevation in Quarry Lake (ft msl)
0
30
60
90
120
150
180
0.0300
0.0600
0.0900
0.1200
0.1500
0.1800
-
0
100
200
300
400
500
600
700
800
Water Elevation Over Time
Arsenic
MCL
Aquatic Chronic


Iron Accumulation Over Time
180
150
120
90
60
30
0
Time to Fill (years)
1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
-
Concentration Over Time (mg/L)
MCL (mg/L)
Aquatic (mg/L)
0
100
200
300
400
500
600
700
800
Water Elevation in Quarry Lake (ft msl)
Water Elevation Over Time
Iron
MCL
Aquatic


Manganese Accumulation Over Time
Time to Fill (years)
Concentration Over Time (mg/L)
MCL (mg/L)
Water Elevation in Quarry Lake (ft msl)
0
30
60
90
120
150
180
0.0100
0.0200
0.0300
0.0400
0.0500
0.0600
-
0
100
200
300
400
500
600
700
800
Water Elevation Over Time
Manganese
MCL


Selenium Accumulation Over Time
Time to Fill (years)
Concentration Over Time (mg/L)
MCL (mg/L)
Aquatic (mg/L)
Water Elevation in Quarry Lake (ft msl)
0
30
60
90
120
150
180
0
100
200
300
400
500
600
700
800
0.0600
0.0500
0.0400
0.0300
0.0200
0.0100
-
Water Elevation Over Time
Selenium
MCL
Aquatic


Vanadium Accumulation Over Time
180
150
120
90
60
30
0
Time to Fill (years)
0.0300
0.0200
0.0100
-
Concentration Over Time (mg/L)
0
100
200
300
400
500
600
700
800
Water Elevation in Quarry Lake (ft msl)
Water Elevation Over Time
Vanadium

APPENDIX G-5

DA71A DRAINAGE AREA RUNOFF ESTIMATES

EMKO Environmental, Inc.
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akopania@sbcglobal.net

TECHNICAL MEMORANDUM

March 19, 2021

To: Steve Grace, CEMEX

CC: Jon Johnstone, CEMEX
Yasha Saber, Compass
Pat Mitchell, Mitchell Chadwick

From: Andy Kopania, PG No. 4711, CHG No. 31

Subject: Evaluation of Runoff from Mitchell Canyon Road to DA71A Storm Drains
Clayton Quarry

This technical memorandum provides a summary of additional hydrology calculations prepared to address questions from the County's EIR preparer regarding the potential impact to existing storm drains along Mitchell Canyon Road near Diablo Downs Drive from the proposed Reclamation Plan Amendment for the CEMEX Clayton Quarry in Contra Costa County, California. The specific CEQA Appendix G criterion addressed by this additional analysis is Hydrology and Water Quality criterion c(iii), which addresses whether the project would "*substantially alter the existing drainage pattern of the site or area, including through the alteration of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff*."

This technical memorandum presents a summary of the findings of the additional analysis. The approach and calculation methods used for this additional analysis are consistent with those presented in the Hydrology and Water Quality Evaluation Report, May 2020, CEMEX Clayton Quarry, Clayton, Contra Costa County, California, prepared by EMKO Environmental, Inc. (referred to herein as the "May 2020 Hydrology Report")

The stormwater conveyance features within County Drainage Area 71A (DA71A) are shown on Figure 1. They include several drop inlets on Mitchell Canyon Road that are connected by a 15-inch reinforced concrete pipe (RCP). The 15-inch RCP connects to an 18-inch RCP at the intersection of Diablo Downs Drive and Mitchell Canyon Road. The 18-inch RCP discharges to Mitchell Creek. Based on hydrology information and procedures developed

by the Contra Costa County Flood Control and Water Conservation District (CCCFCD), the design storm event for the relatively small watershed area of the DA71A stormwater conveyances has a 10-year frequency, as discussed in the May 2020 Hydrology Report. The existing capacity of the 15-inch RCP in DA71A is 18 cubic feet per second (cfs) based on the CCCFCD parameters and methods (see Section 4.1 of the May 2020 Hydrology Report). The capacity of the 18-inch RCP is much higher due to the larger diameter and the steeper slope along Diablo Downs Drive compared to Mitchell Canyon Road. Therefore, the 18 cfs capacity of the 15-inch RCP is the limiting factor in DA71A.

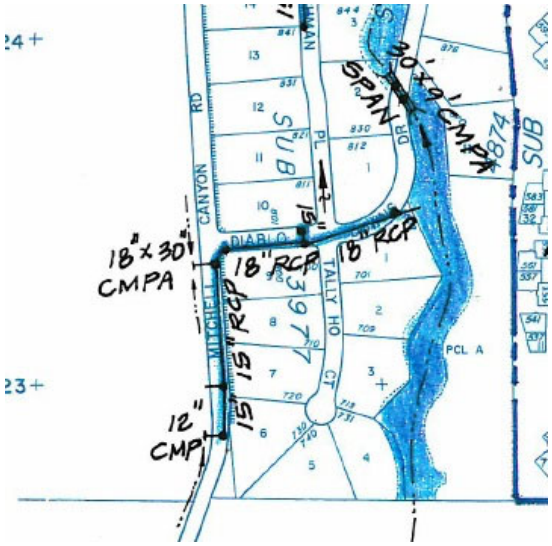


Figure 1. DA71 Storm Drains East of CEMEX Site

Under existing conditions, runoff to the drop inlets along Mitchell Canyon Road that enters the 15-inch RCP in DA71A, for a storm even with a 10-year recurrence interval, includes 9 cfs from watershed M2 on the project site, plus the runoff from Mitchell Canyon Road. The area of watershed M2 is shown on the CEMEX Clayton Quarry Reclamation Drainage Plan, prepared by Spinardi and Associates (May 2020). Under proposed project conditions, runoff to the 15-inch RCP in DA71A would include 9 cfs from watershed M2, the runoff from Mitchell Canyon Road, and 4.2 cfs from the outlet structure from the Quarry Lake. Outflow from the Quarry Lake would not occur until the reclaimed mining excavation fills with water, which is projected to occur 158 years after mining ceases (see Table 10 in the May 2020 Hydrology Report).

To assess whether the project would create or contribute runoff water which would exceed the capacity of existing stormwater drainage systems, per the CEQA Appendix G criterion, the runoff from Mitchell Canyon Road must be known. The runoff from Mitchell Canyon Road to the DA71A drop inlets for the 15-inch RCP is calculated using the same CCCFCD parameters and methods that were used for the calculations presented in the May 2020 Hydrology Report. The Spinardi and Associates Reclamation Drainage Plan identifies drainage divides on Mitchell Canyon Road approximately 175 feet north and 1,380 feet south

of Diablo Downs Drive. Thus, the total length of the contributing watershed on Mitchell Canyon Drive is approximately 1,555 feet.

The area of Mitchell Canyon Road that drains to the DA71A drop inlets for the 15-inch RCP includes the following:

- Approximately 175 feet of the west side of Mitchell Canyon Road and the drainage ditch on the west side of the road north of Diablo Downs Drive. The east side of this segment of the road drains to Diablo Downs Drive and does not contribute stormwater to the 15-inch RCP.
- Approximately 675 feet on both sides of Mitchell Canyon Road plus the drainage ditch on the west side to the south of Diablo Downs Drive; and
- Approximately 705 feet of the west side of Mitchell Canyon Road and the drainage ditch on the west side of the road located to the south of the Diablo Downs neighborhood. The east side of this segment of the road drains by sheet flow directly to Mitchell Creek and does not flow to the DA71A storm drains.

The total area of Mitchell Canyon Road that drains to the 15-inch RCP in DA71A is approximately 0.92 acres, as indicated on Figure 2. The maximum elevation of this segment of road is 604 feet above mean sea level (ft msl), at the southern drainage divide, and the minimum elevation is 556 ft msl at the lowest drop inlet. The time of concentration based on these values is 8.5 minutes.

Using the Rational Method as described by CCCFCD (see discussion in the May 2020 Hydrology Report), the total runoff from Mitchell Canyon Road from the design storm event is 1.8 cfs. Table 1 summarizes the parameters used in the Rational Method calculation.

TABLE 1

Peak Storm Runoff from Mitchell Canyon Road to 15-inch RCP

CCCFCD Rational Method Parameters

East Rim AccessRoad			Tc =	7.4	min
Runoff Calc		Q(cfs) = C x f x i(in/hr) x A(acres)			
	C	f	i	A	Q
10-yr	0.9	1	2.19	0.92	1.8

C = Runoff coefficient
F = Frequency factor
i = Rainfall intensity at time of concentration
A = Area of contributing watershed(s)
Q = Peak runoff at the time of concentration



Figure 2. Area of Mitchell Canyon Road Draining to 15-inch RCP in DA71A

Table 2 provides a comparison of the runoff components under existing conditions and project conditions relative to the capacity of the existing 15-inch RCP in DA71A.

TABLE 2

Comparison of Peak Runoff to 15-inch RCP

Existing vs Project Conditions

Area	Peak Runoff From 10-Year Storm Event	
	Existing Conditions	Project Conditions
M2 Watershed	9	9
Mitchell Canyon Road	1.8	1.8
Quarry Lake	0	4.2
Total	10.8	15
15-inch RCP Capacity	18	18

As shown in Table 2, the peak runoff from a 10-year storm event to the drop inlets that enter the 15-inch RCP in DA71A is 10.8 cfs under existing conditions and would be 15 cfs under Project conditions. While the peak runoff from the Project is higher than that under current conditions, it is less than the 18 cfs capacity of the 15-inch RCP. The comparison provided in Table 2 demonstrates that the Project would not create or contribute runoff water which

would exceed the capacity of the existing stormwater drainage systems. Furthermore, the additional flow from the Quarry Lake would not provide an additional source of polluted runoff because CEMEX would be obligated to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board, which would require that the discharge meet applicable water quality standards, or otherwise demonstrate through a Report of Waste Discharge that the flow from the Quarry Lake would not violate water quality standards. Therefore, routing the outflow from the Quarry Lake, once the reclaimed mining excavation fills with water, to DA71A would not result in a potentially significant impact, per the applicable CEQA Appendix G criterion.

APPENDIX G-6
QUARRY ROAD RUNOFF MANAGEMENT

EMKO Environmental, Inc.
551 Lakecrest Dr.
El Dorado Hills, CA 95762-3772
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akopania@sbcglobal.net

MEMORANDUM

April 18, 2017

To: Debbie Haldeman, CEMEX

Cc: Pat Mitchell, Mitchell Chadwick
Yasha Saber, Compass Land Group
Karen Spinardi, Spinardi Associates

From: Andy Kopania

Subject: Runoff from East Rim Access and Upper Quarry Haul Roads
CEMEX Clayton Quarry

At your direction, I have prepared an evaluation of the potential runoff from the East Rim Access Road that will exist along the crest of the east rim of the excavation after mining is completed at the Clayton Quarry and the upper part of the Quarry Haul Road where it is located on the Knoxville Formation. The location of the East Rim Access Road and the Quarry Haul Road is shown Sheet Number 4 of the Reclamation Plan Amendment application. Roadway details are shown on Sheet Number 11. The general parameters for both road segments are comparable. Therefore, an analysis of the East Rim Access Road was conducted and the findings were then applied to the upper part of the Quarry Haul Road over the Knoxville Formation.

The general parameters for the East Rim Access Road include:

- Roadway width (including crest of safety berms) = 66 ft[1]
- Roadway length south of haul road = 2,250 ft
- Maximum elevation = 950 feet above mean sea level (ft msl)
- Minimum elevation = 750 ft msl
- Area = 3.41 acres

The peak runoff for the East Rim Access Road was calculated based on the standards and other information developed by Contra Costa County Flood Control and Water Conservation District (CCCFCD) (http://ca-contracostacounty2.civicplus.com/2455/Hydrology-Standards and

1 While the total roadway width will be 75 feet, the outer four to five feet of each safety berm will be sloped to drain away from the roadway. Thus, the width of the roadway that drains internally will be 66 feet, per Sheet Number 8.

http://www.cccounty.us/530/Documents-and-Standards). The standards and methods used for this evaluation are consistent with those described in the *Hydrology Analysis Report, April 2017, CEMEX Clayton Quarry, Clayton, Contra Costa County, California*, prepared by EMKO Environmental, Inc. Runoff from the East Rim Access Road will not be retained onsite, but will be conveyed to the reclaimed quarry pit. Therefore, CCCFCD recommendations for detention basin sizing are not applicable and the design storm is the 20-yr, 1-hr event in accordance with SMARA Section 3706(d).

Peak runoff at the time of concentration for the 20-yr, 1-hr storm event was calculated based on an average annual rainfall of 19.00 inches, identified from CCCFCD Drawing B-166. Rainfall intensities were obtained from CCCFCD Precipitation-Frequency-Duration-Depth curves for recurrence intervals of 10 years, 25 years, and 100 years (Drawings B-159, B-160, and B-162, respectively) and interpolated to identify the appropriate conditions for the 20-yr, 1-hr storm event at the quarry site. CCCFCD documents, as cited above, were used to select the runoff coefficient (C), to determine the adjusting factor (f), to calculate the time of concentration (Tc), and to estimate rainfall intensity at the time of concentration (i). The parameters used are shown in Table 1.

TABLE 1

Peak Storm Runoff from East Rim Access Road Above 750 ft msl

CCCFCD Rational Method Parameters

East Rim AccessRoad			Tc =	7.4	min
Runoff Calc		Q(cfs) = C x f x i(in/hr) x A(acres)			
	C	f	i	A	Q
10-yr	0.8	1	2.27	3.41	6
20-yr	0.8	1.07	2.54	3.41	7
25-yr	0.8	1.1	2.68	3.41	8
100-yr	0.8	1.25	3.32	3.41	11

As indicated in Table 1, the peak runoff from a 20-yr, 1-hr storm event from the entire length of the East Rim Access Road would be approximately seven cubic feet per second (cfs). While the average slope of the roadway is 10 percent, the slope varies from four percent to 14 percent locally. As indicated on Sheet Number 11, the roadway surface would have a one-percent cross slope toward the west (quarry pit side) with a drainage ditch located along the west side of the roadway, adjacent to the safety berm.

A one-foot deep, rock-lined v-ditch with 2:1 side slopes, with an average slope of 10 percent, will convey up to 11 cfs at a flow velocity of 5.5 feet per second, which is more than adequate to convey the runoff from the roadway without the potential for erosion within the ditch. Due to the variation in slope along the East Rim Access Road, it is recommended that culverts or side channels be located every ±500 feet along the roadway to divert the flow into the quarry pit. The culverts or channels should extend

downward across the exposed Knoxville Formation in the east wall of the quarry and discharge onto the diabase, at an elevation of approximately 625 ft msl or lower, to prevent erosion of the Knoxville Formation below the roadway.

The upper part of the Quarry Haul Road has a slope of 10 percent and a width that is comparable to the East Rim Access Road, as indicated on Sheet Number 4. Therefore, the drainage structures, dimensions, and spacing discussed above are also appropriate for the upper part of the Quarry Haul Road, where Knoxville Formation is present. Where the Quarry Haul Road is located on diabase, the potential for erosion is effectively non-existent, so specific drainage features are not needed.

Actual runoff conveyance facilities will be designed and constructed to the physical extents and dimensions of the East Rim Access Road at the time of their construction, and therefore may vary from the concept outlined in this memorandum. However, the information provided in this memorandum is sufficient to support the environmental review of the Reclamation Plan Amendment, and to demonstrate that the roadway features, as shown on Sheet Numbers 4 and 8, meet the requirements of SMARA Section 3706(d).

APPENDIX H

DRAFT MITIGATION MONITORING AND REPORTING PROGRAM

CLAYTON QUARRY
CEMEX CONSTRUCTION MATERIALS PACIFIC, LLC

DRAFT MITIGATION MONITORING AND REPORTING PROGRAM

COUNTY FILE # CDLP15-2030/31

515 MITCHELL CANYON ROAD
CLAYTON, CA 94517

ASSESSORS PARCEL NUMBER(S):
122-020-007 & 122-020-013

FEBRUARY 2022

CLAYTON QUARRY
DRAFT MITIGATION MONITORING AND REPORTING PROGRAM

INITIAL STUDY

CULTURAL RESOURCES AND TRIBAL CULTURAL RESOURCES	
Impact 5b: Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 **Impact 5c: Disturb any human remains, including those interred outside of formal cemeteries** **Impact 18a: Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)** **Impact 18b: A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1**	
Mitigation Measure(s):	
Mitigation Measure CUL-1: The following Mitigation Measures shall be implemented during project demolition/construction activities. 1. A program of on-site education to instruct all demolition/construction personnel in the identification of prehistoric and historic deposits shall be conducted prior to the start of any grading or construction activities. 2. If archaeological materials are uncovered during grading, trenching, or other onsite excavation, all work within 30 yards of these materials shall be stopped until a professional archaeologist who is certified by the Society for California Archaeology (SCA), and/or Society of Professional Archaeology (SOPA), and the Wilton Rancheria Tribe, have had an opportunity to evaluate the significance of the find and suggest appropriate mitigation(s) if deemed necessary.	
Monitoring Responsibility:	Lead Agency, Operator and, if needed, professional archaeologist.
Implementation Schedule:	Prior to the start of any grading or construction activities. If any archaeological materials are uncovered during earthmoving reclamation activities.
Compliance Verification:	
Mitigation Measure CUL-2: Should human remains be uncovered during grading, trenching, or other on-site excavation(s), earthwork within 30 yards of these materials shall be stopped until the County coroner has had an opportunity to evaluate the significance of the human remains and determine the proper treatment and disposition of the remains. Pursuant to California Health and Safety Code Section 7050.5, if the coroner determines the remains may be those of a Native American, the coroner is responsible for contacting the Native American Heritage Commission (NAHC) by telephone within 24 hours. Pursuant to California Public Resources Code Section 5097.98, the NAHC will then determine a Most Likely Descendant (MLD)	

tribe and contact them. The MLD tribe has 48 hours from the time they are given access to the site to make recommendations to the land owner for treatment and disposition of the ancestor's remains. The land owner shall follow the requirements of Public Resources Code Section 5097.98 for the remains.	
Monitoring Responsibility:	Lead Agency and Operator.
Implementation Schedule:	If any human remains are uncovered during earthmoving reclamation activities.
Compliance Verification:	

DRAFT ENVIRONMENTAL IMPACT REPORT

SECTION 4.1: AESTHETICS AND VISUAL RESOURCES	
Impact 4.1-4: Creation of a New Source of Substantial Light and Glare That Would Adversely Affect Day or Nighttime Views in the Area	
Mitigation Measure(s):	
Mitigation Measure 4.1-4: Daily Limitation of Reclamation-Related Construction Activities All reclamation-related construction activities shall be limited to the hours of 7 a.m. to 7 p.m. Monday through Friday.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	During reclamation-related activities.
Compliance Verification:	

SECTION 4.3: BIOLOGICAL RESOURCES
Impact 4.3-1: Have an Adverse Effect, Directly or Indirectly, on Habitat for Special-Status Plant or Wildlife Species due to Ground Surface Disturbance and Vegetation Removal
Mitigation Measure(s):
Mitigation Measure 4.3-1a: Conduct Botanical Surveys To avoid and minimize potential impacts to special status plants, the following shall apply: 1. Prior to the commencement of reclamation-related ground disturbing activity (which includes clearing, grubbing, or grading) in previously undisturbed areas identified as having potential special status plant species in the project biological resources assessment report, a qualified botanist or biologist shall conduct a pre-construction survey for special status rare plant species. The survey shall occur within 30 days prior to commencement of ground-disturbing activity. If a special-status species is detected, the applicant shall avoid activity in the area if doing so is feasible in conjunction with meeting project objectives.

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

2. If rare plant species are found and avoidance is not feasible, and the plant is listed under CESA, then the applicant shall mitigate on a 1:1 ratio and obtain and comply with necessary permits from CDFW.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	30-days prior to the commencement of reclamation-related ground disturbing activity.
Compliance Verification:	

Mitigation Measure 4.3-1b: Conduct Special-status Vertebrates Surveys, Personnel Training, and Avoidance

To avoid and minimize impacts to special status vertebrates, the following shall apply.

1. No more than 48 hours prior to the commencement of reclamation-related ground disturbing activity (i.e,. clearing, grubbing, or grading) associated with the overburden fill areas, tree screen, diversion outlet structure, or other areas, a qualified biologist shall conduct a pre-construction survey of suitable habitat in the project reclamation area.
2. The biologist shall supply a brief written report (including date, time of survey, survey method, name of surveyor, and survey results) to the Department of Conservation and Development prior to the commencement of ground disturbing activity.
3. Construction personnel shall receive worker environmental awareness training prior to the commencement of ground disturbing activity. This training instructs workers how to recognize special status vertebrate species and their habitat.
4. If a special-status species is detected, all work will be halted until the animal has left the work area or, if necessary, has been relocated by a qualified biologist with applicable authorizations.

Monitoring Responsibility:	Operator.
Implementation Schedule:	No more than 48 hours prior to the commencement of reclamation-related ground disturbing activity.
Compliance Verification:	

Mitigation Measure 4.3-1c: Conduct Bat Surveys, Avoidance, and Employ Approved Eviction When Necessary

To avoid and minimize potential impacts to special status bats, the following shall apply:

1. If reclamation-related ground disturbing activity (which includes clearing, grubbing, or grading) is to commence within 50 feet of suitable bat habitat, including structures and trees with large cavities, during the winter hibernaculum season (e.g., November 1 through March 31), then a qualified biologist shall conduct a pre-construction survey within 50 feet of the

Abbreviations:
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Community Development Division (CDD)

reclamation project footprint on the CEMEX property to determine if a potential winter hibernaculum is present, and to identify and map potential hibernaculum sites.

2. The biologist shall supply a brief written report (including date, time of survey, survey method, name of surveyor and survey results) to the Department of Conservation and Development prior to the commencement of ground disturbing activity. If no winter hibernaculum sites are found during the survey, then no further mitigation would be required.
3. If potential hibernaculum sites are found, then the applicant shall avoid all areas within a 50-foot buffer around the potential hibernaculum sites until bats have vacated the hibernaculum. Winter hibernaculum habitat shall be considered fully avoided if reclamation-related activities do not impinge on a 50-foot buffer established by the qualified biologist around an existing or potential winter hibernaculum site. The qualified biologist will determine if non-maternity and nonhibernaculum day and night roosts are present on the project site. If necessary, a qualified biologist will use safe eviction methods to remove bats if direct impacts to non-maternity and non-hibernaculum day and night roosts cannot be avoided. If a winter hibernaculum site is present, then reclamation activities shall not occur within 50 feet until the hibernaculum is vacated, or, if necessary, safely evicted using methods acceptable to CDFW.

Monitoring Responsibility:	Lead Agency and Operator.
Implementation Schedule:	If reclamation-related ground disturbing activity (which includes clearing, grubbing, or grading) is to commence within 50 feet of suitable bat habitat, including structures and trees with large cavities, during the winter hibernaculum season; If potential hibernaculum sites are found, then the applicant shall avoid all areas within a 50-foot buffer around the potential hibernaculum sites until bats have vacated the hibernaculum.
Compliance Verification:	

Mitigation Measure 4.3-1d: Wildlife Exclusion Fence
A temporary wildlife exclusion fence shall be installed around the perimeter of any previously undisturbed area prior to the initiation of new ground-disturbing activities to discourage small wildlife from entering the site. The fence shall have escape funnels pointing outwards to allow small wildlife to exit the work area.

Monitoring Responsibility:	Operator.
Implementation Schedule:	Prior to the initiation of new ground-disturbing activities.
Compliance Verification:	

Mitigation Measure 4.3-1e: Biologist Presence
A qualified biologist shall be present for all initial reclamation-related ground-disturbing activities in areas that have not been previously disturbed.

Monitoring Responsibility:	Operator.

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Implementation Schedule:	Prior to all initial reclamation-related ground-disturbing activities.
Compliance Verification:	

Mitigation Measure 4.3-1f: No Monofilament Plastics
To prevent the entrapment of Alameda striped racers and other wildlife, monofilament plastics shall not be used for erosion control.

Monitoring Responsibility:	Operator.
Implementation Schedule:	At all times.

Mitigation Measure 4.3-1g: Conduct Nesting Bird Surveys and Avoidance
To avoid and minimize impacts to nesting birds, the following shall apply:

1. If reclamation-related ground disturbing activity is to commence within 50 feet of nesting habitat between February 1 and August 31, then a qualified biologist shall conduct a pre-construction survey for active migratory nests within 5 days prior to the commencement of ground disturbing activity. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.
2. The biologist shall supply a brief written report (including date, time of survey, survey method, name of surveyor and survey results) to the Department of Conservation and Development prior to the commencement of ground disturbing activity. If no active nests are found during the survey, then no further mitigation would be required.
3. If active nests are found in the survey area, then a non-disturbance buffer centered on the nest and of a size determined by a qualified biologist shall be established and maintained around the nest to prevent nest failure. Active nests shall be monitored weekly to ensure that the exclusion zones are intact and that the young are developing. All construction activities shall be avoided within this buffer area until a qualified biologist determines that nestlings have fledged and are foraging independently as determined by a qualified biologist, unless otherwise approved by the Conservation and Development Department and CDFW.

Monitoring Responsibility:	Operator.
Implementation Schedule:	If reclamation-related ground disturbing activity is to commence within 50 feet of nesting habitat between February 1 and August 31, then a qualified biologist shall conduct a pre-construction survey for active migratory nests within 5 days prior to the commencement of ground disturbing activity.
Compliance Verification:	

Mitigation Measure 4.3-1h: Burrowing Owl Protection
To avoid and minimize potential impacts to western burrowing owl, the following shall apply:

1. If reclamation-related ground disturbing activity is to commence in previously undisturbed areas within 500 feet of suitable owl burrow habitat, then a qualified biologist shall conduct a

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pre-construction survey for burrowing owl. The survey shall occur within 30 days prior to the date that reclamation activities will encroach within 500 feet of suitable habitat. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Surveys shall be conducted in accordance with the following:

a. A survey for burrows and owls shall be conducted by walking through suitable habitat over the proposed reclamation construction site and in areas within 500 feet of the project disturbance area.
b. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters, and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. Surveyors should maintain a minimum distance of 50 meters from any owls or occupied burrows.
c. If no occupied burrows or burrowing owls are found in the survey area, then the biologist shall supply a brief written report (including date, time of survey, survey method, name of surveyor and survey results) to the Conservation and Development Department and no further mitigation is necessary.
d. If occupied burrows or burrowing owls are found, then a complete burrowing owl survey is required. This consists of a minimum of four site visits conducted on four separate days, which must also be consistent with the Survey Method, Weather Conditions, and Time of Day sections of Appendix D of the California Department of Fish and Wildlife (CDFW) "Staff Report on Burrowing Owl Mitigation" (March 2012). The applicant shall then submit a survey report to the Planning Division which is consistent with the CDFW 2012 Report.
e. If occupied burrows or burrowing owls are found during the complete burrowing owl survey, then the applicant shall contact the Planning Division and consult with CDFW prior to construction, and will be required to submit a Burrowing Owl Mitigation Plan (subject to the approval of the Planning Division and CDFW). This plan must document all proposed measures, including avoidance, minimization, exclusion, relocation, or other measures, and include a plan to monitor mitigation success. The CDFW "Staff Report on Burrowing Owl Mitigation" (March 2012) should be used in the development of the mitigation plan.

2. Comply with the mitigation requirements and conditions of any Section 1600 Streambed Alteration Agreement (Agreement), if any, with CDFW for project reclamation activities, as applicable to burrowing owl. If there is a conflict between the terms of mitigation item 1 above and the Agreement, then the Applicant shall abide by the terms of the Agreement.

Monitoring Responsibility:	Operator.
Implementation Schedule:	If reclamation-related ground disturbing activity is to commence in previously undisturbed areas within 500 feet of suitable owl burrow habitat;
Compliance Verification:	

Mitigation Measure 4.3-1i: Bumblebee Protection

To minimize the take of Crotch's and western bumblebee species, a qualified entomologist shall conduct a take avoidance survey for active bumblebee colony nesting sites in any previously undisturbed area prior to each phase of reclamation-related construction, if the work will occur during the flying season.

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Survey results, including negative findings, shall be submitted to CDFW prior to implementing reclamation-related ground-disturbing activities. Surveys shall take place during flying season when the species is most likely to be detected above ground, between March 1 and September 1. The surveys shall occur when temperatures are above 60 degrees Fahrenheit (°F), on sunny days with wind speeds below 8 miles per hour, and at least 2 hours after sunrise and 3 hours before sunset. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as binoculars. At minimum, a survey report should provide the following: If no Crotch's or western bumble bees or potential Crotch's or western bumble bees are detected, no further mitigation is required. If potential Crotch's or western bumble bees are seen but cannot be identified, the applicant shall obtain authorization from CDFW to use nonlethal netting methods to capture bumble bees to identify them to species. If protected bumble bee nests are found, a plan to protect bumble bee nests and individuals to ensure no take of Crotch's and western bumblebee species shall be developed by a qualified entomologist in consultation with the Conservation and Development Department. The Conservation and Development Department shall approve the plan prior to implementation.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Prior to each phase of reclamation-related construction, if the work will occur during the flying season; between March 1 and September 1.
Compliance Verification:	
Mitigation Measure 4.3-1j: Take Coverage for Federally Listed Species If required by the USFWS for certain previously undisturbed areas to support reclamation-related construction activity, the applicant shall obtain take coverage for federally listed species (Alameda striped racer and California red-legged frog). This may be from a Section 7 Consultation resulting in a Biological Opinion (BO) or a Section 10 consultation resulting in a Habitat Conservation Plan (HCP). All avoidance, minimization, and mitigation measures in the BO or HCP shall be implemented as a condition for operating in that area.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	
Mitigation Measure 4.3-1k: Trapping Federally Listed Species If necessary, a qualified biologist approved under an active BO or HCP will be contracted to trap and move federally listed species (Alameda striped racer and California red-legged frog) to nearby suitable habitat.	
Monitoring Responsibility:	Operator and qualified biologist.
Implementation Schedule:	Ongoing
Compliance Verification:	

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Mitigation Measure 4.3-1l: Take Permit for State Listed Species If required by CDFW, the applicant shall obtain a California Endangered Species Act Section 2081 Incidental Take Permit (ITP) for the Alameda striped racer associated with new reclamation-related disturbances in previously undisturbed areas. If further future information warrants their inclusion, the permit shall cover Crotch's and/or western bumble bee as well. All avoidance, minimization, and mitigation measures in the ITP shall be implemented as a condition for operating in that area.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	
Impact 4.3-3: Have an Adverse Effect on Riparian Habitat or Other Sensitive Natural Communities	
Mitigation Measure(s):	
Implement Mitigation Measures 4.3-1a, 4.3-1b, 4.3-1c, 4.3-1d, 4.3-1e, 4.3-1f, 4.3-1g, 4.3-1j, 4.3-1k, and 4.3-1l (see Impact 4.3-1). **Mitigation Measure 4.3-3: Acquire Necessary Permits for Jurisdictional Features** The applicant shall mitigate these impacts at an approved ratio and shall obtain required permits to impact the jurisdictional ephemeral stream from the relevant regulatory agencies, including the USACOE, CDFW, and RWQCB, as applicable. These permits will include conditions and Best Management Practices (BMPs) that the quarry shall implement during construction. These permits may also specify mitigation, which the quarry shall provide as specified by the agencies. All terms of the permits shall be implemented as a condition of the project. If permits require mitigation at a higher ratio than 1:1, that requirement will be met.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	These permits will include conditions and Best Management Practices (BMPs) that the quarry shall implement during construction.
Compliance Verification:	
Impact 4.3-6: Conflict with Local Policies or Ordinances Protecting Biological Resources	
Mitigation Measure(s):	
Mitigation Measure 4.3-6a: Tree Avoidance The project reclamation plan shall avoid as many protected trees as feasible. The project plan shall incorporate placement of tree protection fencing outside of the avoided trees' drip line, which shall be determined by the diameter of each tree trunk in inches at breast height and multiplied by 12. Preserved trees on the project site shall be avoided during construction by following best management practices as outlined in the following measures.	
Monitoring Responsibility:	Lead agency and Operator.

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Implementation Schedule:	During Construction; Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6b: Tree Maintenance During Construction, Root Zones Tree roots often extend far beyond the canopy drip line, which shall be determined by the diameter of each tree trunk in inches at breast height and multiplied by 12. Excavation work within the drip line of avoided trees shall not be allowed.	
Monitoring Responsibility:	Lead agency and Operator.
Implementation Schedule:	During Construction; Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6c: Tree Protection Fencing Prior to the start of fill disposal, Tree Protection Fencing (TPF) shall be installed. The TPF shall be maintained during the entire fill disposal process to prevent direct damage to trees and their growing environment. The TPF shall consist of blaze orange barrier fencing supported by metal "Trail" fence posts, unless wildlife exclusion fencing is in place. The TPF shall be placed at a distance that is at or outside of the drip lines, which shall be determined by the diameter of each tree trunk in inches at breast height and multiplied by 12, of avoided trees. The TPF shall be installed as part of the site preparation before fill disposal or tree removal/trimming begins and shall be installed under the supervision of a qualified arborist. The TPF shall not be altered in any way that would increase the encroachment on the avoided trees during fill activities.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Prior to the start of fill disposal; Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6d: Use of Heavy Equipment Heavy machinery shall not be allowed to operate (excavation, grading, drainage and leveling) or park within the drip line, which shall be determined by the diameter of each tree trunk in inches at breast height and multiplied by 12, of avoided trees unless approved by a qualified arborist.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6e: Storage of Construction Materials and Debris Fill materials shall not be placed against the trunks of avoided trees. Disposal or depositing of oil, gasoline, chemicals or other harmful materials within the drip line, which shall be determined by the diameter of each tree trunk in inches at breast height and multiplied by 12, is prohibited.	
Monitoring Responsibility:	Operator.

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Implementation Schedule:	Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6f: Incidental Damage to Protected Trees The attachment of wires, signs, and ropes to any protected tree is strictly prohibited. Workers may be allowed to rest under trees, but they must not injure trees by any means. The County shall be notified if any damage occurs to a retained tree during fill disposal so that proper treatment may be administered.	
Monitoring Responsibility:	Lead agency and Operator.
Implementation Schedule:	During fill disposal; Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6g: Trimming All pruning of protected trees shall be performed by a licensed contractor familiar with International Society of Arboriculture pruning guidelines and shall comply with the guidelines established by the International Society of Arboriculture, Best Management Practices, Tree Pruning, and any special conditions as determined by a certified arborist or the County's Director. A certified arborist shall coordinate all activities involving protected trees near the construction zone that are not permitted for removal.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	
Mitigation Measure 4.3-6h: Tree Planting Monitoring and Establishment Tree planting shall be monitored according to the methods outlined in Section 2.9.6 of the Reclamation Plan for successful establishment of installed trees. Establishment will be considered successful if 50 percent of the number of plantings required by the County have become established with no significant intervention for at least two years.	
Monitoring Responsibility:	Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Mitigation Measure 4.3-6i: Oak Tree Plan
The operator of the Clayton Quarry shall consult with an arborist to develop a plan that identifies where oak trees can be planted within the project site upon the completion of mining without substantially exacerbating wildfire risk on the site. The oak tree plan shall be provided to the Contra Costa County Fire Protection District and to the Planning Division for review and comment, to confirm that the additional oaks would not substantially exacerbate wildfire risk by connecting the two very high fire hazard severity zones on the project site. Oak trees shall be planted on the site during final reclamation activities as indicated in the final oak tree plan. Tree planting shall be monitored according to the methods outlined in Section 2.9.6 of the Reclamation Plan for the successful establishment of installed trees. The monitoring shall verify that the following performance standard is met: the planted trees must be healthy and must survive three years without intervention to be considered established. If the survival rate is less than 80 percent after three years, the trees that did not survive shall be replaced. The verification monitoring shall continue until the 80 percent survival rate of the trees planted under the oak tree plan has been achieved for three consecutive years.

Monitoring Responsibility:	Operator.
Implementation Schedule:	Upon the completion of mining.
Compliance Verification:	

SECTION 4.4: GEOLOGY AND SOILS

Impact 4.4-4: Exposure of People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, as a Result of Rockfalls and Landslides within the Quarry

Mitigation Measure(s):

Mitigation Measure 4.4-4: Slope Stability Monitoring
The operator of the Clayton Quarry (Operator) shall retain a County-approved qualified engineering geologist or geotechnical engineer experienced in evaluating the stability of slopes within the Knoxville formation at the diabase/Knoxville contact. These slopes shall be inspected every 5 years, or at an alternative frequency, if recommended by the engineering geologist or geotechnical engineer and approved by the County. The results of the inspection and any recommendations by the engineering geologist or geotechnical engineer shall be documented and submitted to the County within 30 days following the inspection. The report shall be accompanied with the Board of Supervisor's approved fee for review by the County Geologist. Inspections shall summarize the rock types observed, provide detailed rock mass descriptions and measured discontinuity orientations, observed seepage conditions, and compare the observed conditions relative to those identified in the project geotechnical evaluation completed for the revised reclamation plan by Golder Associates Inc. [Golder] in 2017 ("Geotechnical Evaluations for Revised Reclamation Plan, Clayton Quarry, Clayton, California"). The geotechnical evaluation shall be appended to the Mitigation Monitoring and Reporting Program and shall be incorporated into the conditions of approval for the project. If the conditions vary from the geotechnical evaluation document characterization, the engineering geologist or geotechnical engineer shall evaluate whether the changes have an adverse impact on slope stability, and, if so, provide feasible recommendations to mitigate the slope stability concerns to achieve a minimum static factor of safety of

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Community Development Division (CDD)

1.3 and a pseudo-static factor of safety greater than 1.0. Recommendations shall be implemented within 6 months by the Operator, if feasible, otherwise as soon as practicable thereafter, upon approval by the County.	
Monitoring Responsibility:	A County-approved qualified engineering geologist or geotechnical engineer experienced in evaluating the stability of slopes within the Knoxville formation at the diabase/Knoxville contact.
Implementation Schedule:	These slopes shall be inspected every 5 years, or at an alternative frequency, if recommended by the engineering geologist or geotechnical engineer and approved by the County; The results of the inspection and any recommendations by the engineering geologist or geotechnical engineer shall be documented and submitted to the County within 30 days following the inspection; Recommendations shall be implemented within 6 months by the Operator, if feasible, otherwise as soon as practicable thereafter, upon approval by the County.
Compliance Verification:	
Impact 4.4-11: Directly or indirectly Destroy a Unique Paleontological Resource	
Mitigation Measure(s):	

Mitigation Measure 4.4-11: Paleontological Resources

The operator of the Clayton Quarry (Operator) shall inform its employees and contractors involved in ground disturbing activities associated with reclamation of the sensitivity of the project area for paleontological resources and shall include the following directive in employee and contractor training materials:

> "The subsurface of the quarry may be sensitive for paleontological resources in the Knoxville formation (the east side of the quarry pit) and in the alluvium (east side of the Clayton Quarry property). If paleontological resources are encountered during subsurface disturbance, all ground disturbing activities within 100 feet of the find shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Employees and contractors shall not collect or move any paleontological materials. Paleontological resources include fossil plants and animals, and such trace fossil evidence of past life as animal tracks. Employee/contractor acknowledges and understands that excavation or removal of paleontological material is prohibited by law and constitutes a misdemeanor under California Public Resources Code, Section 5097.5."

A copy of the training materials and documentation of completed training shall be provided to the County for review upon request.

If a paleontological resource is encountered during implementation of the revised reclamation plan, the Operator shall notify the County and all activity within 100 feet of the find shall halt until it can be

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Condition of Approval (COA)
Community Development Division (CDD)

evaluated by a qualified paleontologist. The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the County and the Operator, in consultation with the County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the County and Operator prior to allowing work in the 100-foot radius to resume.	
Monitoring Responsibility:	Lead Agency, Operator or, if needed, a qualified paleontologist
Implementation Schedule:	Ongoing; If a paleontological resource is encountered during implementation of the revised reclamation plan, the Operator shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified paleontologist.
Compliance Verification:	

SECTION 4.5: GREENHOUSE GAS EMISSIONS
Impact 4.5-1: Gas emissions generated by reclamation activities could have a significant impact on global climate change.
Mitigation Measure(s):
Mitigation Measure 4.5-1a: Idling Times Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure CCR Title 13, Section 2485). Clear signage shall be provided for construction workers at all access points. [Measure applies to idling times for all equipment other than diesel-powered equipment]. **Mitigation Measure 4.5-1b: Idling Times for Diesel-powered Equipment** Minimize the idling time of diesel-powered construction equipment to two minutes. [Measure applies to idling times for diesel-powered equipment only]. **Mitigation Measure 4.5-1c: Equipment Maintenance** All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. **Mitigation Measure 4.5-1d: Alternative Fuel Plan** Prior to construction, develop a plan demonstrating that alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment will represent at least 15 percent of the construction fleet if commercially available. **Mitigation Measure 4.5-1e: Local Building Materials** Use at least 10 percent local building materials in construction (e.g., construction aggregates, concrete pipe).

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Mitigation Measure 4.5-1f: Recycle or Reuse Construction and Demolition Materials Recycle or reuse at least 50 percent of construction waste or demolition materials (e.g., during decommissioning and removal of processing plant facilities). **Mitigation Measure 4.5-1g: Generator Alternative Fuel** Use alternative fuels for generators at construction sites such as propane or solar, or use electrical power, as feasible for each construction site.	
Monitoring Responsibility:	Lead Agency and Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	

SECTION 4.6: HYDROLOGY AND WATER QUALITY	
Impact 4.6-1: Violate Water Quality Standards or Waste Discharge Requirements or Substantial Degradation of Surface Water or Groundwater Quality	
Mitigation Measure(s):	
Mitigation Measure 4.6-1a: Compliance with General Permit Requirements Compliance with requirements set forth in applicable NPDES and SWPPP. The operator of the Clayton Quarry (Operator) shall comply with the requirements set forth in any applicable NPDES program or SWPPP requirements, including, but not limited to, submitting a Notice of Intent prior to the start of activities under the Construction General Permit, updating the existing SWPPP as required by the Industrial General Permit based on changes to site conditions, and implementing typical BMPs for the protection of water quality.	
Monitoring Responsibility:	Operator and RWQCB.
Implementation Schedule:	Ongoing
Compliance Verification:	
Mitigation Measure 4.6-1b: RWQCB Discharge Approvals The operator of the Clayton Quarry (Operator) shall submit a Report of Waste Discharge to the San Francisco Regional Water Quality Control Board (RWQCB) prior to discharging any pit lake water. The report shall include information on the estimated characteristics of the quarry pit lake water quality as described in the "Quarry Lake Water Quality and Aquatic Life Criteria" Technical Memorandum, prepared by EMKO Environmental, Inc., July 2, 2021. The Operator shall implement any WDRs issued by the RWQCB in response to the Report of Waste Discharge. The Operator shall inform the County that a Report of Waste Discharge has been submitted, and shall provide the County with evidence of NPDES coverage and WDR compliance prior to any off-site discharge and at any time thereafter upon County request.	
Monitoring Responsibility:	Operator and RWQCB
Implementation Schedule:	Prior to discharging any pit lake water; Ongoing

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Compliance Verification:	

Mitigation Measure 4.6-1c: Funding Mechanism
Within 30-days after the effective date of this permit, the Operator shall submit for review and approval by the Director of Conservation and Development, or designee, ("Director") a proposed funding mechanism (e.g., a bond) and cost basis to secure costs related to the required post-reclamation activities. The funding mechanism shall be in a form and an amount reasonably acceptable to the Director and shall be sufficient to cover costs associated with those post-reclamation activities described in Table 1 below, including the activities required by Mitigation Measure 4.6-7. The funding mechanism shall be held by the County, or held and managed by a third party approved by the Operator and County, as determined by the Director. On the fifth anniversary of this permit's effective date, and at five-year intervals thereafter, the Operator shall submit an updated post-reclamation activity funding mechanism and cost basis to the Director for review and approval. The updated cost basis must be calculated to account for inflation and updated materials, construction, and maintenance costs, sufficient for the Director to determine whether the funded amount sufficiently secures anticipated costs related to the required post-reclamation activities. The Operator shall submit a Condition of Compliance review application (or equivalent) and associated deposit with each 5-year review to cover County time and material costs related to the Director's review of the updated funding mechanism and cost basis.

Table 1
Clayton Quarry Lake Drainage Post-Reclamation Inspection and Maintenance Activities

Item	Description	Implementation Timing
Inspection Items		
1	Quarry pit drainage outlet structure, including: a. Condition of concrete bulkhead (e.g., spalling, exposed reinforcing, cracks, joint openings) b. Condition of steel plate (e.g., abrasion, rust) c. Condition of debris screen (e.g., abrasion, rust, connection to steel plate)	Annual inspection
2	24-inch HDPE drainage pipe (culvert), including: a. Condition of pipe at inlet b. Condition of pipe at manholes (2) c. Condition of pipe connection at Mitchell Canyon Rd.	Annual inspection
3	Rip-rap mound above drainage outlet (e.g., scour, undermining, washout, or other damage)	Annual inspection
4	Quarry lake perimeter fencing	Annual inspection

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

Maintenance Items		
5	Repairs to quarry pit drainage outlet structure (e.g., concrete facing and reinforcement)	Deficiencies to be addressed prior to next inspection; immediate repair if structural integrity of drainage outlet is in jeopardy
6	Clean-out of 24-inch HDPE drainage pipe (culvert)	Deficiencies to be addressed prior to next inspection; clean out sediment and debris prior to onset of rainy season, if needed
7	Maintenance of rip-rap mound (e.g., clean-out of sediment and debris and replacement of rip- rap rock)	Deficiencies to be addressed prior to next inspection; clean out sediment and debris and re-establish rip-rap protection prior to onset of rainy season, if needed
8	Repair damaged quarry lake perimeter fencing	Deficiencies to be addressed prior to next inspection; repair wire mesh and barbed wire, if needed

Monitoring Responsibility:	Contra Costa County Director of Conservation and Development, or designee, and Operator.
Implementation Schedule:	Within 30-days after the effective date of this permit, the Operator shall submit for review and approval by the Director of Conservation and Development, or designee, ("Director") a proposed funding mechanism (e.g., a bond) and cost basis to secure costs related to the required post-reclamation activities; Ongoing
Compliance Verification:	

Impact 4.6-4: Substantially Alter Drainage Patterns in a manner which would result in Erosion or Siltation within the Quarry, Mitchell Creek, and Transitional Watershed Areas

Mitigation Measure(s):

Mitigation Measure 4.6-4a: Incorporate Haul Road Erosion Control Measures
Incorporate erosion control measures into the revised reclamation plan consistent with recommendations of the "Runoff from East Rim Access and Upper Quarry Haul Roads" Memorandum, prepared by EMKO Environmental, Inc., April 18, 2017. The memorandum shall be appended to the Mitigation Monitoring and Reporting Program and shall be incorporated into the conditions of approval for the project. Erosion control measures include, but are not limited to the installation of drainage controls such as cross slopes and rock-lined ditches along the portion of east rim haul road located in the Knoxville formation.

Monitoring Responsibility:	Lead Agency and Operator.
Implementation Schedule:	Ongoing

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Condition of Approval (COA)
Community Development Division (CDD)

Compliance Verification:	
Mitigation Measure 4.6-4b: Incorporate Quarry Pit and Overburden Fill Area Erosion Control Measures Incorporate erosion control measures into the revised reclamation plan consistent with recommendations of the "Geotechnical Evaluations for Revised Reclamation Plan, Clayton Quarry, Clayton, California" Report, prepared by Golder Associates, May 2017. The geotechnical evaluation shall be appended to the Mitigation Monitoring and Reporting Program and shall be incorporated into the conditions of approval for the project. These erosion control measures include, but are not limited to, the placement of rip-rap and vegetation along the quarry pit lake shore, as well as the following measures to be implemented within the overburden fill areas: • 2.5H:1V or flatter slopes with wheel and track rolling compactive effort; • Slope heights under 50 feet vertical, unless interim benches are used for drainage control; • Use of "J-ditches" or functional equivalent where beneficial to direct drainage horizontally across fill areas to designated drainage channels; • Fill slopes revegetated with appropriate erosion control seed mix; and • Erosion control fabric, wattles and other BMPs implemented as needed to reduce erosion and improve stability of the surficial layer of soil.	
Monitoring Responsibility:	Lead Agency and Operator.
Implementation Schedule:	Ongoing
Compliance Verification:	
Impact 4.6-7: Substantially Alter Drainage Patterns in a manner which would result Uncontrolled Discharges from the Quarry Pit Lake and Thereby result in On- Or Off-Site Flooding or Exceed the Capacity of the Existing Storm Drainage System	
Mitigation Measure(s):	
Mitigation Measure 4.6-7: Quarry Pit Lake Outlet Structure and Pipeline Maintenance. Following the construction of the quarry pit lake outlet structure and drainage pipeline, the operator of the Clayton Quarry shall retain a qualified professional engineer approved by the County to conduct inspection and as-needed repair of the drainage pipeline annually, in the late summer/early fall, and after any earthquake in Contra Costa County that generates strong (modified Mercalli Intensity VI) or greater ground shaking. Reports documenting inspection findings and any repair completed shall be submitted to the County after each inspection.	
Monitoring Responsibility:	Operator and qualified professional engineer.
Implementation Schedule:	Following the construction of the quarry pit lake outlet structure and drainage pipeline
Compliance Verification:	

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

SECTION 4.8: NOISE	
Impact 4.8-1: Generation of a Substantial Temporary or Permanent Increase in Ambient Noise Levels in the Vicinity of the Project Site in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies	
Mitigation Measure(s):	
Mitigation Measure 4.8-1: Noise Reduction During Removal of Processing Plant and Support Structures To reduce potential construction-equipment reclamation-related noise impacts associated with the removal of processing plant and support structures on the project site, the following multi-part mitigation measure shall be implemented during the removal of the processing plant and support structures: • The operator of the Clayton Quarry (Operator), employees, and the demolition contractor shall ensure that all internal combustion engine-driven equipment are equipped with mufflers that are in good condition and appropriate for the equipment. • The demolition contractor shall locate stationary noise-generating equipment as far as feasible from sensitive receptors. In addition, the construction contractor shall place such stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site. • The demolition contractor shall locate, to the maximum extent practical, on-site equipment in staging areas to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site. • The demolition contractor shall prohibit unnecessary idling of internal combustion engines. • An on-site complaint and enforcement manager (manager) shall be available to respond to and track noise complaints. The telephone number of the manager shall be posted at the entrance to the quarry site. The manager shall be trained to use a sound level meter and should be available during all construction hours to respond to noise complaints. The manager shall be responsible for responding to any noise complaints regarding construction noise and for coordinating with the adjacent land uses. The manager will determine the cause of any complaints and coordinate with the demolition team to implement effective measures (considered technically and economically feasible, such as noise curtains, temporary sound walls, berms, etc.) to correct the problem. The complaints and noise reduction measures shall be documented and provided to the County upon request. • At least one week prior to commencement of the removal of the processing plant and supporting structures, the Operator shall prepare a notice that the demolition work will commence. The notice shall be posted at the site and mailed to all the owners and occupants of property within 300 feet of the exterior boundary of the project site as shown on the latest equalized assessment roll. The notice shall include the telephone number of the complaint and enforcement manager. A copy of the notice shall be mailed to Contra Costa County Department of Conservation and Development. • This mitigation measure 4.8-1 only applies to reclamation activities, not to operational activities.	
Monitoring Responsibility:	Operator.

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Condition of Approval (COA)
Community Development Division (CDD)

Implementation Schedule:	During the removal of the processing plant and support structures; At least one week prior to commencement of the removal of the processing plant and supporting structures, the Operator shall prepare a notice that the demolition work will commence.
Compliance Verification:	

Abbreviations:
Condition of Approval (COA)
Community Development Division (CDD)

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