PRELIMINARY SUSMP REPORT

for

Torrance Industrial
Torrance, CA

September 2024

Prepared for:
Prologis
3546 Concours St, Suite 100
Ontario, CA 91764

Prepared by:
Kimley-Horn and Associates, Inc.
245 E Third Street
Long Beach, CA 90802
© Kimley-Horn and Associates, Inc. 2024

Kimley»Horn

TABLE OF CONTENTS

SECTION PAGE

I. INTRODUCTION 1

II. EXISTING SITE CONDITIONS 3

III. PROPOSED SITE CONDITIONS 4

IV. SITE SPECIFIC BMP SUMMARY 7

SOURCE CONTROL BMPS 7

V. STORMWATER QUALITY DESIGN VOLUME 9

VI. STORMWATER QUALITY DESIGN MEASURES 9

LID SITE DESIGN BMPS 9

LID TREATMENT CONTROL BMPS 10

IX. HYDROMODIFICATION DISCUSSION 14

X. INSPECTION/MAINTENANCE RESPONSIBILITY 15

LONG-TERM FUNDING FOR BMP MAINTENANCE 15

RESPONSIBLE PARTY CONTACT INFORMATION 15

XI. OPERATION & MAINTENANCE PLAN 16

XI. APPENDICES 17

Appendix A: As-Builts

Appendix B: Torrance Industrial Preliminary Hydrology and Hydraulics Report

Appendix C: Psomas Due Diligence Report

Appendix D: BMP Fact Sheets

Appendix E: Stormwater Quality Calculations

Appendix F: Operations and Maintenance Plans

OWNER CERTIFICATION

STANDARD URBAN STORMWATER MITIGATION PLAN

This Preliminary Standard Urban Stormwater Mitigation Plan has been prepared for Prologis by Kimley-Horn and Associates, Inc. It is intended to comply with the requirements of the County of Los Angeles National Pollution Discharge Elimination Permit (Order No. R4-2021-0105, NPDES Permit No. CAS004004) issued by the Los Angeles Regional Water Quality Control Board. The undersigned is authorized to approve implementation of the provisions of this plan as appropriate and will strive to have the plan carried out by successors consistent with the County of Los Angeles SUSMP for Stormwater Management and the intent of the NPDES storm water program requirements.

Signature	Date
Name	Title

Prologis
2141 Rosecrans Ave, Suite 300
El Segundo, CA 90245

I. INTRODUCTION

The purpose of this report is to show the Torrance Industrial preliminary design complies with the requirements of the County of Los Angeles Standard Urban Stormwater Mitigation Plan (SUSMP) and Low Impact Development (LID) Guidelines. The calculations presented in this report were based on the County of Los Angeles Department of Public Works Low Impact Development Standards Manual dated February 2014 and County of Los Angeles Department of Public Works Hydrology Manual dated January 2006. The SUSMP calculations were used to size Best Management Practices (BMPs) to mitigate the impacts of increases in runoff and storm water pollution as outlined in the LID manual.

This SUSMP covers the post-construction Best Management Practices operations on Torrance Industrial, in the City of Torrance, California (see Figure 1, Vicinity Map). It has been developed as required under State Water Resources Control Board (SWRCB) Municipal NPDES Storm Water Permit for the County of Los Angeles and the Incorporated Cities of Los Angeles County, and in accordance with good engineering practices. This report will include:

- Identification of whether the proposed project is a Designated or Non-Designated Project. If the proposed project is a Designated Project, identification of the project category.
- Feasibility of infiltration
- Source control measure(s) proposed to be implemented
- Calculation of the Stormwater Quality Design Volume (SQWDv)
- Discussion on whether stormwater runoff harvest and use is feasible
- Stormwater quality control measure(s) proposed to be implemented
- Proposed hydromodification controls and calculations
- Proposed maintenance plan

This Preliminary SUSMP shall identify, at a minimum, the routine resources specified in the Countywide Development Planning for Stormwater Management, which details the implementation of BMP's whenever they are applicable to a project; the assignment of long-term maintenance responsibilities; and show the Design Plan that will be implemented in order to mitigate post-construction stormwater runoff pollution.

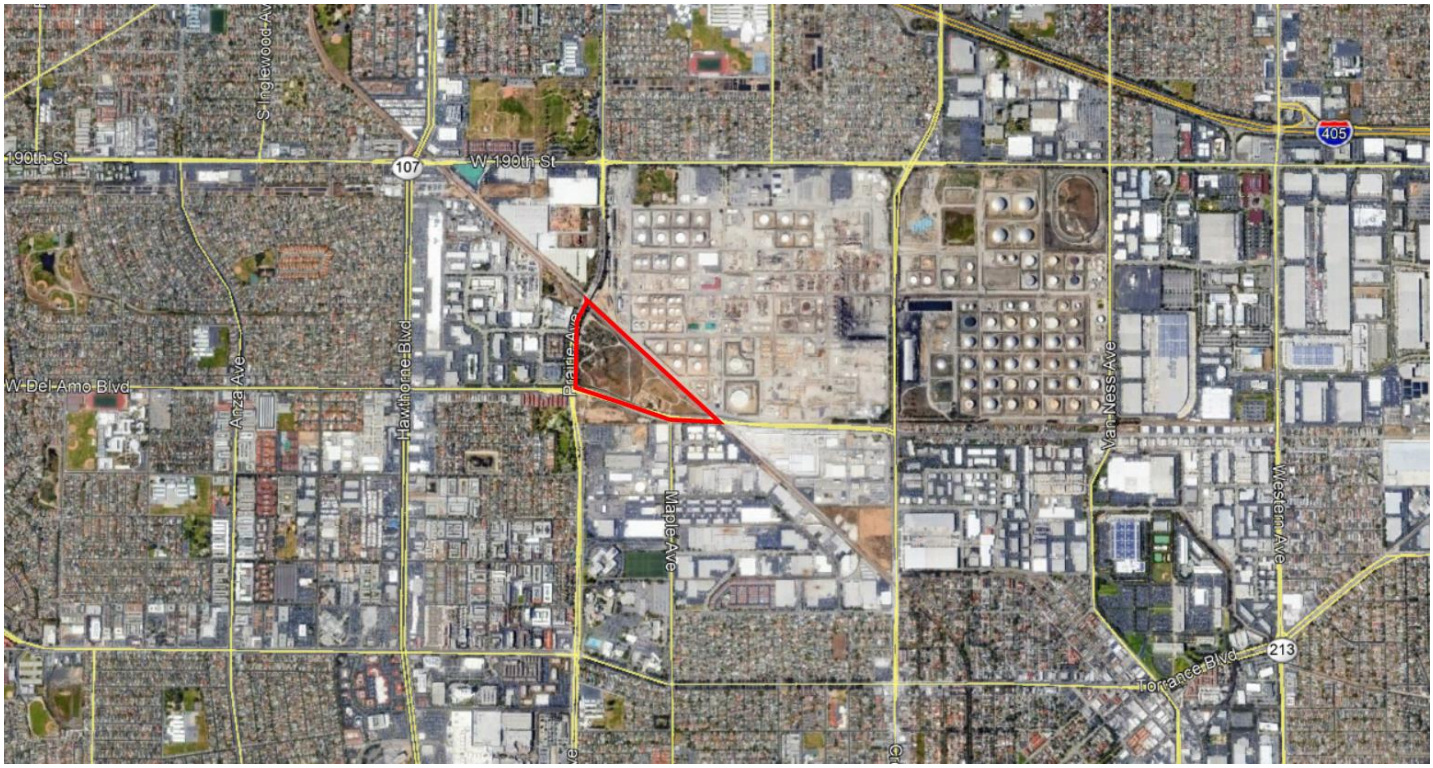


Figure 1 Vicinity Map

Kimley»Horn

II. EXISTING SITE CONDITIONS

The Torrance Industrial site is located in the City of Torrance in Los Angeles County. The 31.32 acre site is located southwest of the ExxonMobil Refinery. The site is bounded by Madrona/Prairie Avenue to the west, Del Amo Boulevard to the south, and railroad tracks from Northwest to Southwest, forming a triangularly shaped project site.

The proposed Torrance Industrial site will ultimately include an Industrial Building, parking spaces, proposed utilities including water, sewer and storm, and various site improvements. The existing project site is largely undeveloped with various paths and a few administrative buildings towards the southwest portion of the site. The majority of the site is vegetated with moderate slopes that generally slope from west to east.

The project site is located in the Dominguez channel watershed and discharges to the Lower Dominguez Channel and ultimately to the Los Angeles Harbor. Indicator Bacteria is listed on the 303(d) list for the Lower Dominguez Channel for impaired water bodies in Los Angeles.

Existing Drainage Facilities:

The project site is located in an area that drains to one of the 17 sumps in the City of Torrance. The Pioneer sump is located west of the site, the Mobil Sump is located in the Exxon Mobil Refinery to the northwest, and the Amie Sump is located southwest of the site.

Existing stormwater facilities near the site are owned and maintained by Los Angeles County's Department of Public Works and City of Torrance. The City of Torrance owns and maintains the storm drains in Prairie Avenue and Del Amo Boulevard. Stormwater from Prairie Avenue and Del Amo Boulevard are routed to the Amie Sump. Additionally, a storm drain system was assumed to be previously constructed by the City of Torrance for the Grade Separation at Prairie Avenue. Drains and headwalls were extended to the east (24" Drain) and west (30" drain) sides of the south bridge abutment from a 36" drain that was tunneled under the railroad tracks. This storm drain system was not located during multiple site investigations.

The existing site currently discharges into the existing railroad tracks and it is assumed that the flows eventually make it's way towards the Pioneer Sump

The sizing of the existing and proposed facilities is explored more in depth in the Preliminary Hydrology and Hydraulics Report (Appendix B).

Geotechnical Conditions

The underlying expected soil type is expected to be Type 10 per the County of Los Angeles Hydrology Map (2004). A Geotechnical Feasibility Study was performed by Southern California Geotechnical for Psomas' July 2018 Due Diligence Report (Appendix C) of the proposed site. Borings encountered artificial fill of loose to medium dense silty fine to coarse sands, clayey sands and medium stiff to stiff fine sandy clays and silty clays to clayey silts, extending to depths of 12' to 22.' Native alluvium was encountered beneath the fill soils or at the ground surface at all the boring and trench locations and extending to at least the maximum depth explored of 30± feet

below existing site grades. Further, the Psomas Due Diligence Report noted that the Soils investigation concluded that infiltration was not a feasible option at the project site.

During boring and trenching free water was not encountered. Lack of free water and the moisture level of the samples lead the investigators to estimate that the groundwater at the site is more than 30 feet below ground surface. Further, historically the groundwater levels typically read between 48 feet and 77 feet below ground surface from 2005-2017 (http://geotracker.waterboards.ca.gov).

III. PROPOSED SITE CONDITIONS

Per the County of Los Angeles Low Impact Development Standards Manual (2014), Designated Projects include meeting criteria such as the following:

- All development projects equal to one acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area;
- Industrial parks with 10,000 square feet or more of surface area;
- Parking lots with 5,000 square feet or more of impervious surface area

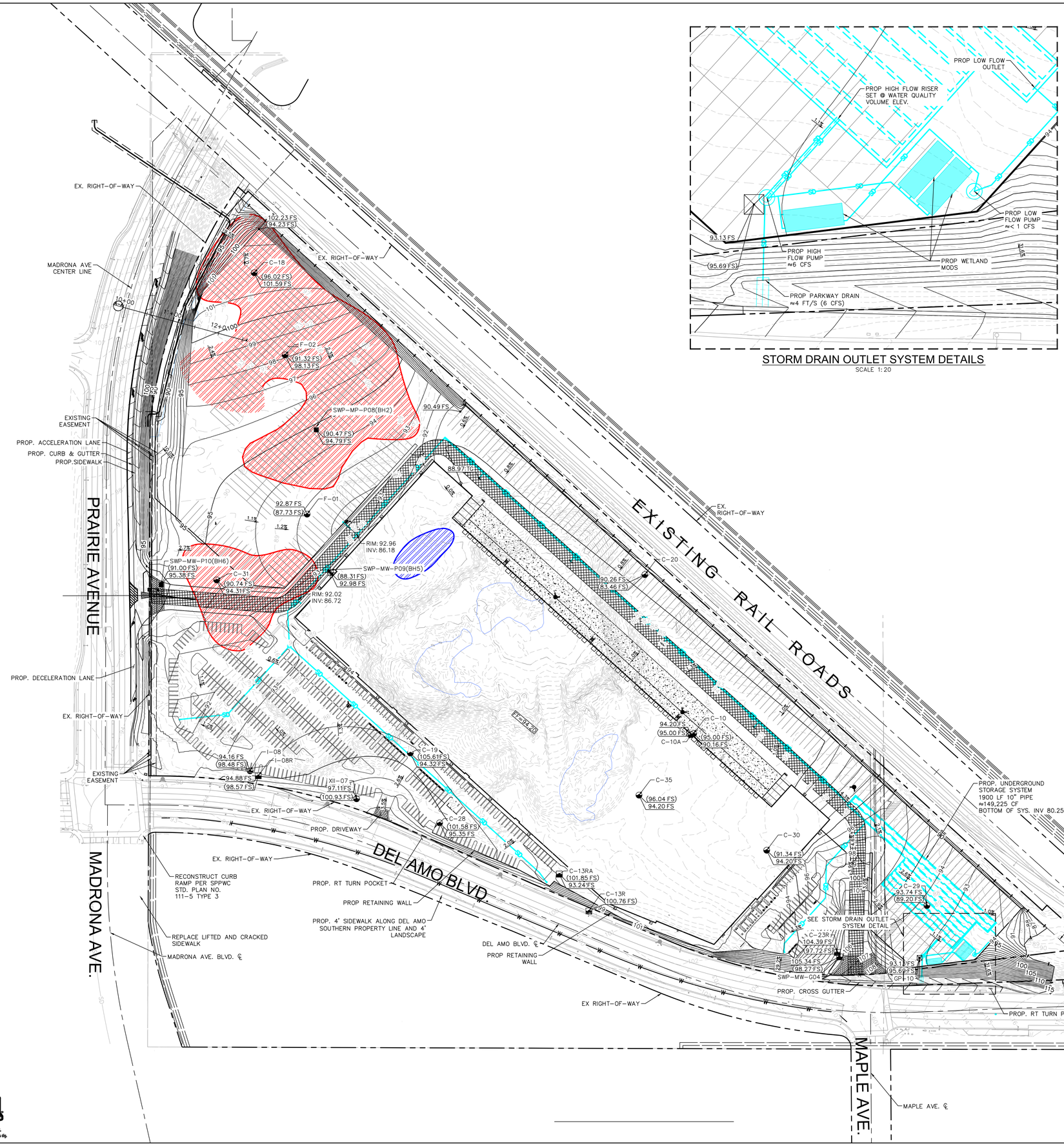
The Torrance Industrial project will develop the predominantly undeveloped site with an industrial building, parking lot, proposed utilities including stormwater, and hardened improvements such as curb extensions as well as curb and gutter. The proposed site is displayed in Figure 2 below. The Torrance Industrial project meets all of the above criteria. As a result, the Project will be designed to meet Designated Project requirements. Requirements for Designated projects include:

- Conduct site assessment and identify design considerations, including determining the feasibility of on-site infiltration;
- Apply site-specific source control measures;
- Calculate the Stormwater Quality Design Volume;
- Implement stormwater quality control measures;
- Implement alternative compliance measures, if necessary;
- Implement hydromodification requirements, if necessary; and
- Develop a Maintenance plan, if necessary.

Since infiltration is considered infeasible at the site per the Geotechnical investigation of the Psomas Due Diligence report (Appendix C), infiltration and biofiltration features were not considered as part of the design. The size of using infiltration or biofiltration features required to treat water quality would not be practical for the proposed size. Instead, wetland mods are proposed.

Under the proposed conditions, the drainage patterns will be altered for the proposed site layout. The preliminary design involves routing flow to a series of inlets and wetlands mods through HDPE storm drain pipes sized between 18” and 48.” The storm drain pipes would drain to a proposed detention system, preliminarily sized for a 50-year storm event as 1900 linear feet (LF) of 120” diameter pipe. The hydrology and hydraulics of the site are explored more in-depth in the preliminary H&H report (Appendix B). Flow from the site will discharge to a diversion manhole with a low-flow pump sized to discharge into a series of wetland mods sized to treat the 85th percentile volume.

The impervious area is minimized by installing landscaping area around the project perimeter as well as islands in the parking lot. maximized wherever feasible. Since the fully developed site will be industrial, it is assumed that 87.7% of the site will be impervious.



STORM DRAIN OUTLET SYSTEM DETAILS

SCALE 1:20

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTER LINE
- EASEMENT LINE
- LIMITS OF GRADING
- PROPOSED STORM DRAIN PIPE
- FLOW LINE
- POINT OF CONNECTION (@ BLDG)
- POINT OF CONNECTION (TO EXISTING)
- PIPE END CAP
- PROPOSED CLEANOUT
- STORM DRAIN AND SANITARY SEWER MANHOLE
- WETLAND MODS
- MONITORING WELLS

SITE DATA

SITE AREA:	1,364,209 SF (31.318 AC)
BUILDING AREA:	403,033 SF (9.252 AC)
FLOOR AREA RATIO (FAR):	403,033 SF/1,364,209 SF = 0.30 FAR

NOTE

PER CONDITIONS OF APPROVAL FOR FUTURE EQUESTRIAN FACILITY ON THE SOUTH SIDE OF DEL AMO BLVD:

1. REPLACE LIFTED, AND CRACKED SIDEWALK ON MADRONA AVE. AND SOUTH SIDE OF DEL AMO BLVD. ALONG FUTURE EQUESTRIAN FACILITY FRONTAGE PER CITY OF TORRANCE STD. NO. T102.
2. REPLACE EXISTING WHEELCHAIR RAMP AT SOUTHEAST CORNER OF MADRONA AVE. AND DEL AMO BLVD.
3. MAINTAIN 4' SIDEWALK ALONG DEL AMO SOUTHERN PROPERTY LINE AND REPLACE REMAINING 4' WITH APPROVED DROUGHT TOLERANT LANDSCAPING.
4. MAINTAIN AND REPAIR EXISTING PERIMETER CHAIN LINK FENCE AND PRIVACY SCREEN ON THE SOUTH SIDE OF DEL AMO BLVD.

NOTE

ALL EXISTING TREES WITHIN THE LIMITS OF IMPROVEMENTS WILL BE DEMOLISHED. ALL EXISTING TREES WITHIN THE PUBLIC RIGHT-OF-WAY, NOT AFFECTED BY PROPOSED DRIVEWAY APPROACH AND DECELERATION/ACCELERATION LANES, WILL BE PROTECTED IN PLACE.

ESTIMATED EARTHWORK QUANTITIES

CUT:	49,200 CY
FILL:	340,700 CY
NET:	291,500 CY (FILL)

NOTE: THE EARTHWORK QUANTITIES ABOVE ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR IS NOT AUTHORIZED TO USE THE ESTIMATES HEREIN FOR BIDDING AND CONSTRUCTION PURPOSES WITHOUT THE EXPLICIT WRITTEN PERMISSION OF THE ENGINEER OF RECORD. NO REPRESENTATIONS OF SUCH QUANTITIES OR A BALANCED SITE CONDITION ARE MADE BY THE ENGINEER OF RECORD.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE QUANTITIES ARE APPROXIMATE, IN PLACE VOLUMES CALCULATED FROM THE EXISTING GROUND TO THE PROPOSED FINISHED GRADE. EXISTING GROUND IS DEFINED BY THE CONTOURS AND SPOT GRADES ON THE BASE SURVEY. PROPOSED FINISHED GRADE IS DEFINED AS THE FINAL GRADE AS INDICATED ON THE GRADING PLAN(S) AS FINISHED GROUND, FINISHED SURFACE, AND FINISHED FLOOR ELEVATIONS.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE GRADING QUANTITIES HAVE NOT BEEN FACTORED TO ACCOUNT FOR CHANGES IN VOLUME DUE TO BULKING, CLEARING AND GRUBBING, SHRINKAGE, SUBSIDENCE, OVER-EXCAVATION AND RE-COMPACTION, AND CONSTRUCTION METHODS. NOR DO THEY ACCOUNT FOR THE THICKNESS OF PAVEMENT SECTIONS, STORMWATER QUALITY MEDIA SECTIONS, UTILITY PIPES, TRENCHING AND BEDDING MATERIALS, BUILDING OR WALL FOOTINGS, BUILDING SLAB THICKNESSES AND UNDERLYING BASE OR SAND LAYERS, REUSE OF PULVERIZED MATERIALS THAT WILL UNDERLIE NEW PAVEMENTS, ETC.

ANY OVEREXCAVATION AND RECOMPACTION DEPTHS AND VOLUMES, SHRINKAGE FACTORS, PAVEMENT SECTIONS, BUILDING PAD SECTIONS, AND BULKING FACTORS ARE BASED ON A SEPARATE GEOTECHNICAL REPORT. ANY BUILDING SLAB THICKNESSES ARE BASED ON THE SEPARATE BUILDING STRUCTURAL ENGINEERING PLANS. ANY UTILITY, STORMWATER MITIGATION, AND FOOTING SPOILS ARE BASED ON ESTIMATES PROVIDED BY THE OWNER OR CONTRACTOR.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 E THIRD ST, LONG BEACH, CA 92802
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

LICENSED PROFESSIONAL

NOT FOR CONSTRUCTION

DATE:

KHA PROJECT 194187001
DATE 9/23/2024
SCALE AS SHOWN
DESIGNED BY ML
DRAWN BY CL
CHECKED BY JM

PRELIMINARY DRAINAGE PLAN

TORRANCE REFINERY

PREPARED FOR
TORRANCE BLACK BEAUTY, LLC

CITY OF TORRANCE CA

C3

Plotted By:Gutierrez, Kevin Sheet Set:Kha Layout:C1 PRELIMINARY GRADING PLAN September 23, 2024 01:55:33pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\PlanSheets\PRELIM GRADING\DRAINAGE PLAN.dwg
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
811 Know what's below. Call 811 before you dig.

Kimley»Horn

IV. SITE SPECIFIC BMP SUMMARY

Based on the pollutants that are anticipated to be generated when the Torrance Industrial Project is built out applicable source control BMPs are correspondingly listed for each category. This report is responsible for determining, evaluating, and selecting the appropriate and applicable measures to treat the targeted pollutants to the Maximum Extent Practicable (MEP) standard.

The proposed project is an Industrial development. The anticipated pollutants for an Industrial Development site include oil and grease, trash and debris, sediment, nutrients, solvents and metals.

SOURCE CONTROL BMPS

Source control BMPs are required to be incorporated in all new development and redevelopment projects unless not applicable. The table below indicates all BMPs to be incorporated in the project. For those designated as not applicable (N/A), a brief explanation why is provided.

The specific source control BMPs for the Torrance Industrial Project include:

INCORPORATED SOURCE CONTROL BMP:	YES	N/A	DESCRIPTION
Peak Stormwater Runoff Discharge Rates	☒	☐	The project site's peak discharges will not cause or contribute to downstream erosion. Project runoff will discharge into the City's storm drain system.
Conserve Natural Areas	☒	☐	Natural areas will be conserved to the maximum extent possible.
Minimize Stormwater Pollutants of Concern	☒	☐	The proposed modular wetlands will provide treatment of pollutants of concern in stormwater.
Protect Slopes & Channels	☐	☒	No Major slopes need to be protected
Provide Storm Drain System Stenciling & Signage	☒	☐	The phrase "No Dumping – Only Rain In Drain" or equally effective phrase will be stenciled on catch basins and/or area drains to alert the public as to the destination of pollutants discharged into the stormwater.
Properly Design Outdoor Material Storage Areas	☐	☒	There are no outdoor material storage areas associated with the project.
Properly Design Trash Storage Areas	☐	☒	The trash storage area will be surfaced with an impervious surface and trash bins installed with waterproof lids.
Provide Proof of Ongoing BMP Maintenance	☒	☐	The owner will be responsible for the maintenance of the BMPs onsite, and ensure that they are in good working order.

INCORPORATED SOURCE CONTROL BMP:	YES	N/A	DESCRIPTION
Properly Design Loading/Unloading Dock Areas	☐	☒	There are no loading docks associated with this project.
Properly Design Repair/Maintenance Bays	☐	☒	There are no repair/maintenance bays proposed for the project site.
Properly Design Vehicle/ Equipment/ Accessory Wash Areas	☐	☒	There are no vehicle or equipment wash areas proposed for the project site.
Design Standards for Treatment Control BMPs	☒	☐	Post-construction structural BMP design will mitigate stormwater runoff for the SWQDv, prior to its discharge to a stormwater conveyance system.

The following source control BMP fact sheets taken from the 2003 California BMP Handbook are provided in Appendix D of this report as a reference to the design plans and/or specifications for the Commerce Retail Center Project:

- SD-10 Site Design & Landscape Planning
- SD-12 Efficient Irrigation
- SD-13 Storm Drainage Signage
- SD-21 Alternative Building Materials
- SD-32 Trash Storage Areas
- SC-10 Non-Stormwater Discharges
- SC-34 Waste Handling & Disposal
- SC-41 Building & Grounds Maintenance
- SC-44 Drainage System Maintenance
- SC-60 Housekeeping Practices
- SC-73 Landscape Maintenance
- SC-74 Parking/Storage Area Maintenance

V. STORMWATER QUALITY DESIGN VOLUME

Drainage Area	Total Area (ac)	Impervious (%)	Required SWQDv (ft^3)	Proposed SWQDv (ft^3)
Torrance Industrial	31.32	0.877	76,835	76,900

As a preliminary SUSMP, the site will be analyzed as a whole rather than split into various DMAs since the current proposed drainage patterns may change. The Preliminary SUSMP drainage area is displayed in Figure 3 The overall site layout will not change. The LID Manual requires using the greater of the 0.75 in, 24-hour rain event or the 85th percentile, 24-hour rain event per the Los Angeles County 85th percentile precipitation isohyetal map. The larger of the two stormwater quality events occurs during the 85th percentile, 24-hour storm event. The depth of rainfall was determined to be 0.85 inches according to the LA County Hydrology GIS map (Appendix E). The intensity, I=0.4655 in/hr, for the 85th percentile storm was calculated using Hydrocalc (Appendix E). The total flow volume that must be treated for the entire site was calculated using the rational method provided in the LA County LID Manual Section 6. Based on the area of 31.32 acres and an assumed runoff coefficient of 0.9 (unitless), the total required SWQDv was determined to be V=76,835 cf (see Appendix E for calculations) and the provided SWQDv was determined to be V=76,900 cf. Wetland Mods are proposed as the method for stormwater quality treatment before discharge to off-site drainage facilities. A preliminary size of 11'x30'x5' was selected to work in series with a total of three units on site. However, due to the depth of the onsite storm drain system, a low-flow pump is proposed to discharge flows upstream from the three wetland mod units. The low-flow pump will be installed after the proposed CDS unit that will divert low flows. The high-flow outlet was set at the SWQDv height within the tank to keep the 85th percentile volume on site. After the required SWQDv is met the remaining flow will bypass the wetland mods and discharge to the proposed parkway drain along Del Amo Blvd. Low flows will be pumped upstream of the Wetland mod units and then gravity flows back into the high-flow diversion manhole to be discharged onto Del Amo Blvd.

VI. STORMWATER QUALITY DESIGN MEASURES

BioClean Wetlands Mods will provide a water quality treatment method before discharging to the hardened storm drain and detention system.

LID SITE DESIGN BMPS

The following table describes the Low Impact Development site design BMPs used in this project and the methods used to incorporate them. Careful consideration of site design is a critical first step in stormwater pollution prevention from new developments and redevelopments.

INCORPORATED LID SITE DESIGN BMP:	YES	NO	DESCRIPTION
Conserve natural areas.	☒	☐	Natural areas will be conserved to the maximum extent practicable.

INCORPORATED LID SITE DESIGN BMP:	YES	NO	DESCRIPTION
Minimizing disturbances to natural drainage patterns.	☒	☐	Disturbances to natural drainage patterns will be minimized to the maximum extent practicable.
Minimizing and disconnecting impervious surfaces.	☒	☐	The project will increase the site's landscaped areas through site improvements. Site drains to bioretention facilities and infiltration trenches on-site.
Minimizing soil compaction.	☒	☐	Soil compaction will be minimized to the maximum extent practicable.
Directing runoff from impervious areas to pervious areas.	☐	☒	Runoff drains to storm drains.

LID TREATMENT CONTROL BMPS

The water quality design for the Project complies with the 2002 Los Angeles County SUSMP Manual and the subsequent 2014 Los Angeles County Low Impact Development (LID) Manual. The LID goals of increasing groundwater recharge, enhancing water quality, and preventing degradation to downstream natural drainage courses, as outlined in LID Manual, were used in considering treatment method alternatives.

The LID manual outlines LID BMPs and establishes a hierarchy of treatment methods as flows:

1. BMPs that promote infiltration
2. BMPs that storage and beneficially use stormwater runoff
3. BMPs that utilize the runoff for water conservation uses (Biofiltration)

The highest level on the hierarchy is required to be used unless it is technically infeasible to do so. Infiltration is considered infeasible due to infiltration and percolation testing performed for Psomas' Due Diligence Report (Appendix C). Biofiltration would be the next step considered since infiltration is not feasible, but is not viable due to the amount of space biofiltration would require. As a result, modular wetlands will be installed to treat water quality.

INCORPORATED LID TREATMENT CONTROL BMP:	YES	NO	DESCRIPTION
Bioretention facility	☐	☒	Wetlands Mods are chosen.
Cisterns/Rain Barrels	☐	☒	Wetlands Mods are chosen.
Dry Ponds	☐	☒	Wetlands Mods are chosen.
Dry Wells	☐	☒	Wetlands Mods are chosen.
Engineered Wetlands	☒	☐	Wetlands Mods will be installed to provide pollutant removal before stormwater enters the storm drain system.
Green Roofs	☐	☒	Wetlands Mods are chosen.

INCORPORATED LID TREATMENT CONTROL BMP:	YES	NO	DESCRIPTION
Infiltration Basin	☐	☒	Wetlands Mods are chosen.
Infiltration Trenches	☐	☒	Wetlands Mods are chosen.
Landscape Irrigation	☐	☒	Wetlands Mods are chosen.
Planter Boxes	☐	☒	Wetlands Mods are chosen.
Porous pavements	☐	☒	Wetlands Mods are chosen.
Sand Filters	☐	☒	Wetlands Mods are chosen.
Vegetated Buffers	☐	☒	Wetlands Mods are chosen.
Vegetated Swales	☐	☒	Wetlands Mods are chosen.
Wet Ponds	☐	☒	Wetlands Mods are chosen.

- A **WETLAND MOD** is a proprietary unit designed to remove pollutants such as heavy metals, hydrocarbons, bacteria, and Total Suspended Solids through biological, chemical and physical means. Stormwater is captured at an inlet, processed through a Cartridge designed to remove pollutants and is then treated through biofiltration before discharge to the municipal storm system. All Wetland Mods installed onsite will have vegetation placed per the manufacture's approved plant list or an approved equal. The system is designed to treat the design stormwater volume or flow and can bypass larger volumes.

LEGEND

- RIGHT-OF-WAY LINE
- CENTER LINE
- EASEMENT LINE
- SD — PROPOSED STORM DRAIN PIPE
- DRAINAGE AREA BOUNDARY
- FLOW LINE
- POINT OF CONNECTION (@ BLDG)
- POINT OF CONNECTION (TO EXISTING)
- PIPE END CAP
- (D) (S) STORM DRAIN AND SANITARY SEWER MANHOLE
- MODULAR WETLAND
- PROPOSED SLOPE

DRAINAGE MANAGEMENT AREA		
DRAINAGE AREA	31.32	ACRES
SWQDV	76835	CF
PROVIDED VOL.*	76900	CF

* TANK'S HIGH FLOW OUTLET IS SET AT THE TANK'S WQ HEIGHT TO ALLOW EXCESS VOLUME TO BE RELEASED @ 10 YEAR FLOWS

EX. ABOVE GROUND OIL LINE

EX. RAIL 20' EASEMENT

EX. PROPERTY LINE

EXISTING RAIL ROADS

TORRANCE REFINERY

MADRONA AVENUE

PROP. HYDRANT (TYP.)

PROP. SD MANHOLE.

PROP. HYDRANT (TYP.)

PROP. SD MANHOLE.

PROPOSED DRAINAGE AREA: 31.32 ACRES SWQDV: 13.32 CFS

PROP. SD MANHOLE.

PROP. HYDRANT (TYP.)

BUILDING FOOTPRINT FFE: 92.4

PROP. 24" STORM DRAIN.

PROP. HYDRANT (TYP.)

1080.0'

EX. RIGHT OF WAY

PROP. SD MANHOLE.

EX. HYDRANT (TYP.)

EX. WATER

EX. STORM DRAIN

3043 LF @ 0.57%

PROP. 2" IRRIG. SERV.

PROP. 3" WATER SERV.

EX. SEWER

PROP. 10" FIRE SERV.

EX. RIGHT OF WAY

EX. HYDRANT (TYP.)

DEL AMO BLVD.

EX. RIGHT OF WAY

94.20 FS

EX. HYDRANT (TYP.)

EX. WATER

PROP. 10" FIRE SERV.

PROP. 8" SEWER.

PROP. SEWER MANHOLE

PROP. 8" SEWER.

PROP. UNDERGROUND STORAGE SYSTEM 1900 LF 10" PIPE ≈149,225 CF BOTTOM OF SYS. INV 80.25

EX. RAIL 20' EASEMENT

HIGHFLOW OUTLET PIPE INV SET AT WQ VOL HEIGHT OF TANK. WQ VOL TO REMAIN AND BE PUMPED TO WETLAND MODS

PROP. WETLAND MODS (TYP.)

INV OUT: 80.25

SUMP PUMP DESIGNED FOR 85TH PERCENTILE FLOW ≈ 3 CFS

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

No.	REVISIONS	DATE	BY

Kimley»Horn

© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 THE CITY DRIVE, SUITE 200, ORANGE, CA 92868
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

NOT FOR CONSTRUCTION

KHA PROJECT	194187001
DATE	9/23/2024
SCALE	AS SHOWN
DESIGNED BY	----
DRAWN BY	----
CHECKED BY	----

PRELIMINARY SUSMP EXHIBIT

TORRANCE INDUSTRIAL

PREPARED FOR
PROLOGIS

CITY OF TORRANCE CA

Plotted By: Gutierrez, Kevin Sheet Set: Kha Layout: SUSMP EXH September 23, 2024 02:01:14pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\Exhibits\EXH-04 — SUSMP EXHIBIT.dwg

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

811 Know what's below. Call 811 before you dig.

SITE SPECIFIC DATA

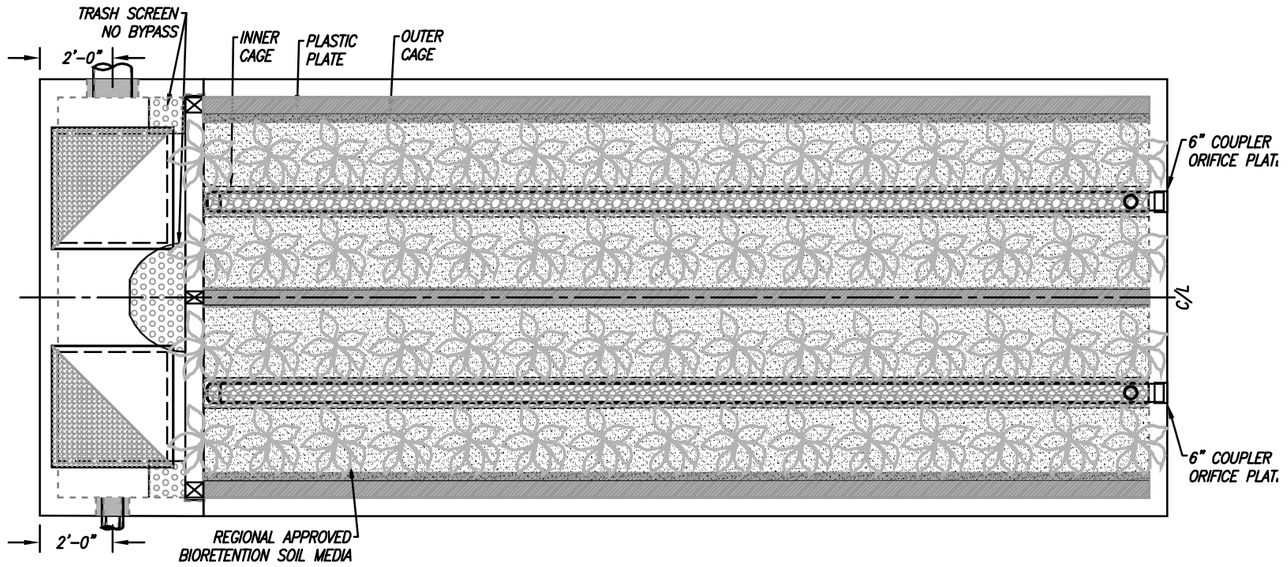
PROJECT ID	---
PROJECT NAME	---
PROJECT LOCATION	---
STRUCTURE ID	---

TREATMENT REQUIRED	
VOLUME BASED (CF)	FLOW BASED (CFS)
---	---

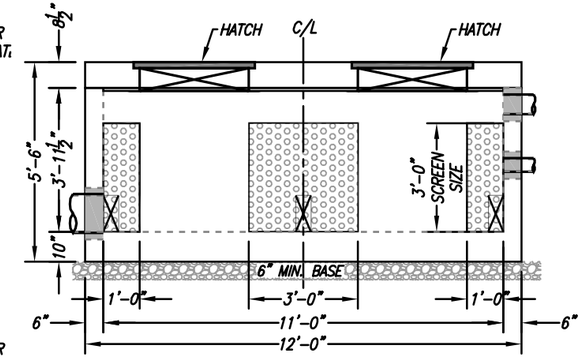
TREATMENT HGL AVAILABLE (FT)			---
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE	-3.00	PVC	2"
RETURN PIPE	-1.42	PVC	6"
EQUALIZER PIPE	-4.67	PVC	12"
OUTLET PIPE	-5.00	PVC-SDR35	6"
	PRETREATMENT	BIOFILTRATION	N/A
RIM ELEVATION	0.00	0.00	N/A
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	N/A
FRAME & COVER	(2) 36"X36"	N/A	N/A
LA COUNTY MEDIA MIX VOLUME (CY)			38.36
GRAVEL LAYER WITHIN MEDIA CHAMBER (CY)			8.02
ORIFICE DIAMETER (IN)			ø1.00"

NOTES: PRELIMINARY, NOT FOR CONSTRUCTION.

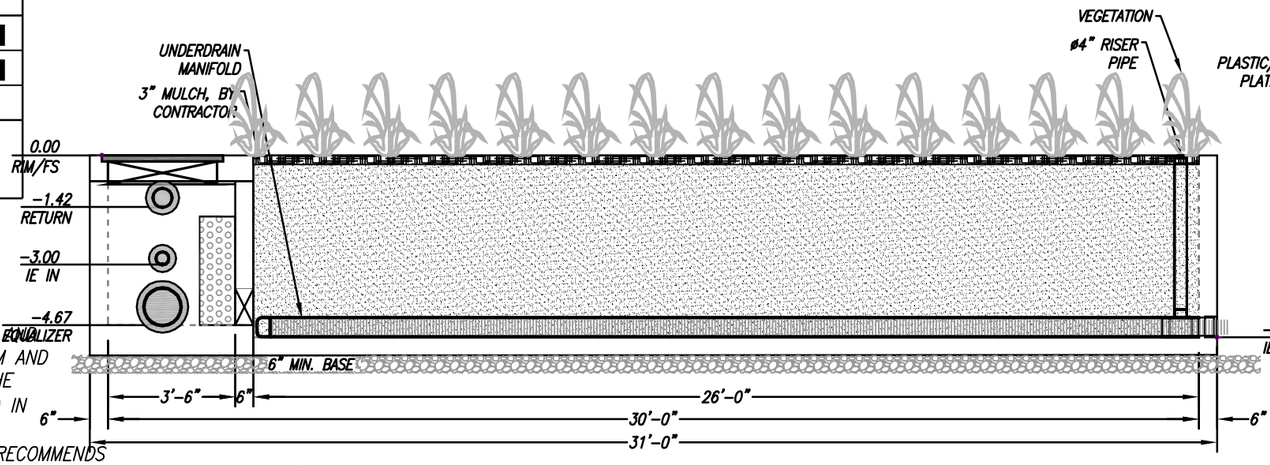
NOT FOR CONSTRUCTION
FOR REFERENCE ONLY



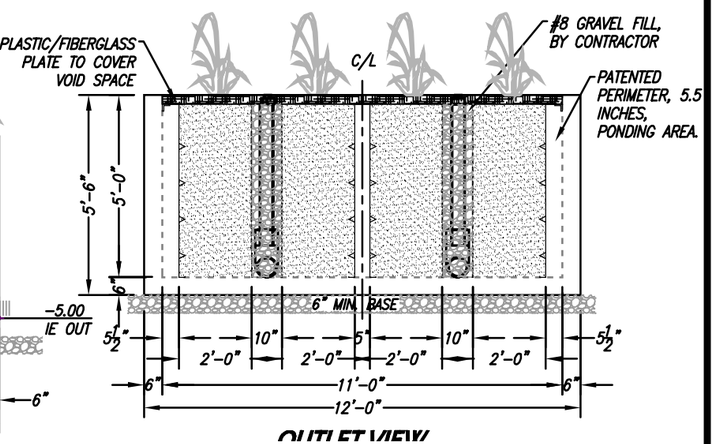
PLAN VIEW



INLET VIEW



ELEVATION VIEW



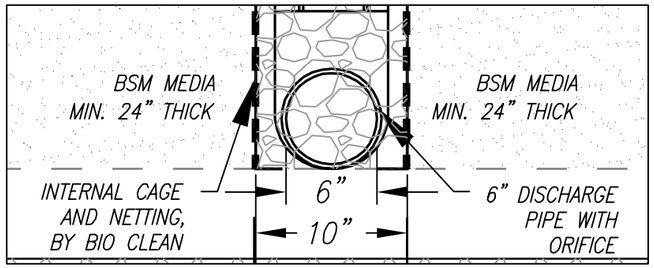
OUTLET VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURER'S STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.



INTERNAL CAGE DETAILS

REQUIRED HORIZ. MEDIA THICKNESS (INCHES)	24
TREATMENT VOLUME (CF)	34000
TARGETED DRAINDOWN DURATION (HR)	96
WETLANDMEDIA INFILTRATION RATE (IN/HR) OR	12
WETLANDMEDIA LOADING RATE (GPM/SF) OR	0.12
DISCHARGE RATE (CFS)	0.098
REQUIRED TOTAL MEDIA SURFACE AREA (SF)	367.94
PROVIDED TOTAL MEDIA SURFACE AREA (SF)	186.34
NUMBER OF ROW(S)	2

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

PROPRIETARY AND CONFIDENTIAL:

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODULAR WETLANDS SYSTEMS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODULAR WETLANDS SYSTEMS IS PROHIBITED.

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com

WetlandMOD-11'-30'-5'-0"-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

6/27/23GURINDER.SINGH

IX. HYDROMODIFICATION DISCUSSION

The Torrance Industrial Project can be considered exempt from hydromodification since stormwater is discharged to concrete lined channels and the receiving waters are not susceptible to hydromodification impacts.

X. INSPECTION/MAINTENANCE RESPONSIBILITY

It has been determined that the Owner (Prologis) shall assume all BMP inspection and maintenance responsibilities for the Torrance Industrial Project. Prologis will be responsible for maintenance of all storm drain inlets, collectors, or any other related flood control or stormwater control device. Furthermore, all interior streets and/or roadways, landscape, recreation areas, facilities and/or open space within the project limits will be maintained by the Owner. A Master Covenant and Agreement regarding on-site stormwater treatment devices maintenance shall be completed prior to completion and release of the Project by the City of Torrance (see Appendix F).

LONG-TERM FUNDING FOR BMP MAINTENANCE

Long-term funding for BMP maintenance shall be funded by Prologis

RESPONSIBLE PARTY CONTACT INFORMATION

Name: Nicole Torstvet, Prologis
3546 Concours St. , Suite 100
Ontario, CA 91764
Phone Number : (909) 673-8727

Kimley»Horn

XI. OPERATION & MAINTENANCE PLAN

Proper O&M is an important element of a stormwater mitigation plan to ensure BMPs remove pollution effectively. Routine maintenance or service also contributes to the efficiency and continuous operation of a system. The post development BMP maintenance responsibility and frequency matrix provided in this section detail the specific party to perform the inspection and maintenance of each BMP for the Commerce Retail Center Project and details the maintenance and inspection activities to be performed, and the frequency with which each shall be performed. Further Operations and Maintenance details can be found in Appendix E.

Structural BMP Maintenance Responsibility / Frequency Matrix

BMP		RESPONSIBILITY	MAINTENANCE FREQUENCY
SD-13	Storm Drainage Signage	Prologis	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible. Frequency: ANNUALLY
SD-32	Trash Storage Areas	Prologis	Sweep trash area at least once per week and before October 1st each year. Maintain area clean of trash and debris at all times. Frequency: WEEKLY
SC-43	Parking/Storage Area Maintenance	Prologis	Parking lots must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1st). Frequency: QUARTERLY
SD-12	Efficient Irrigation	Prologis	Verify that landscape design continues to function properly by correcting and adjusting to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in according with water demands given time of year, and day or night time temperatures. Frequency: WEEKLY
Bioclean	Wetland Mods	Prologis	Please see Appendix E for maintenance procedures. Frequency: PRIOR TO AND FOLLOWING THE RAINY SEASON. Minimum twice a year.

XI. APPENDICES

Appendix A: As-Builts

Appendix B: Torrance Industrial Preliminary Hydrology and Hydraulics Report

Appendix C: Psomas Due Diligence Report

Appendix D: BMP Fact Sheets

Appendix E: Stormwater Quality Calculations

Appendix F: Operations and Maintenance Plans

APPENDIX A

As-Builts

92712

LIST OF STANDARD DRAWINGS

L.A.C.F.C.D.

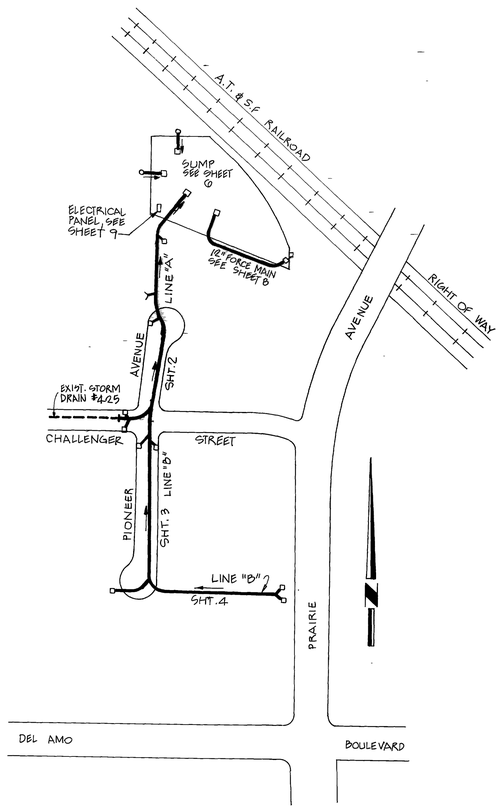
NO.	DESCRIPTION
2 - D150	M H. FRAME AND COVER FOR C.B
2 - D157	C. B. REINFORCEMENT FOR ROUND M.H
2 - D175	REMOVABLE PROTECTION BAR FOR C.B.
2 - D224	CONNECTION TO C.B. FOR PIPES 12" ϕ THROUGH 72" Ø
2 - D232	DETAIL OF C.B. OPENING
2 - D264	ADJUSTABLE PROTECTION BAR STIRRUP
2 - D107	CONCRETE RINGS REDUCER & PIPE FOR M.H. SHAFT
2 - D472	STANDARD 24" M.H. FRAME & COVER
2 - D172	CATCH BASIN REINFORCEMENT (IN WALLS)
2 - D96	STANDARD DROP STEP
2 - D171	STANDARD A615 REINFORCING BARS
2 - D173 1,2,3	PIPE SUPPORT ACROSS TRENCHES
2 - D251	SEWER ENCASEMENT
2 - D188	TRANSITION STRUCTURE Nº 3
2 - D393	CONCRETE COLLAR
2 - D415	LOCAL DEPRESSION NO. 4
2 - D466	SHORING FOR EXCAVATION
2 - D177	PIPE BEDDING FOR TRENCHES
2 - D160	C.B. NO. 1
2 - D162	C.B. NO. 2
2 - D163	C.B. NO. 3
2 - D113	M.H. NO. 4
2 - D184	M.H. NO. 2
2 - D112	J.S. NO. 2
2 - D179	TYPICAL FENCE & GATE DETAILS FOR DEBRIS BASIN RIGHT OF WAY(MOD)
2 - D265	INLET NO. 1

L.A. COUNTY ENGINEER

D-72	CONCRETE PIPE ANCHORS

HYDRAULIC ELEMENTS

LINE	STATION FROM	STATION TO	Q 50 ⚠	PIPE SIZE	Sf OR So FT./FT	V F.P.S.	PIPE FLOW CONDITIONS
A	1+38	2+70	~~128~~ 116	66"	.00148	5.4	FULL
A	2+70	2+84.25	~~128~~ 116	66"	.00148	5.4	FULL
A	2+84.25	3+04.25	~~124~~ 116	66"	.00138	5.3	FULL
A	3+04.25	4+07.39	112.8	66"	.00113	4.8	FULL
A	4+13.99	4+60.19	106.9	60"	.00169	5.4	FULL
A	4+60.19	7+18.89	98.1	60"	.00142	5.0	FULL
A	7+27.79	7+81.90	74.8	51"	.00196	5.3	FULL
A	7+90.79	8+10.61	68.4	51"	.00164	4.8	FULL
A1	—	—	4.0	18"	.00145	2.6	FULL
⚠ A2	—	—	~~12.8~~	~~24"~~	~~.00281~~	~~4.9~~	~~FULL~~
A 6	—	—	6.0	48"	.00009	0.6	PART
A3	—	—	9.0	21"	.00323	5.9	PART
A3	—	—	5.8	18"	.00305	8.5	PART
A4	—	—	3.6	18"	.00117	3.2	PART
A4	—	—	2.3	18"	.00048	2.5	PART
B	1+14	1+79.50	23.3	30"	.00322	4.7	FULL
B	1+79 30	2+04	19.5	27"	.00396	4.9	FULL
B	2+04	3+97.67	13.7	27"	.00196	3.4	FULL
B	4+02 34	5+93.70	13.7	27"	.00196	4.7	PART
B	5+99 80	6+93.69	7.2	24"	.00101	5.5	PART
B	6+60 36	9+78 36	7.2	24"	.00101	6.1	PART
B-1	—	—	3.8	18"	.00131	3.3	PART
B-2	—	—	5.8	18"	.00305	4.2	PART
B-3	—	—	6.5	18"	.00383	12.8	PART
B-3	—	—	6.5	18"	.00383	11.1	PART
B-4	—	—	1.6	12"	.00202	5.6	PART
B-4	—	—	5.6	18"	.00284	7.6	PART



INDEX MAP

SCALE: 1" = 200'

LEGEND

----------	EXISTING
————	PROPOSED
(100.00)	EXISTING ELEVATION
100.00	PROPOSED ELEVATION
C.B	CATCH BASIN
L.F.	LINEAL FEET
B.C.	BEGINNING OF CURVE
E.C.	END OF CURVE
P.R.C.	POINT OF REVERSED CURVE
T.C	TOP OF CURB ELEVATION
F.L.	FLOW LINE ELEVATION
INV.	INVERT ELEVATION
——9——	UNDERGROUND UTILITIES
CML & C	CEMENT MORTAR LINED & COVERED
⚠	A.C PAVEMENT

PLAN AND PROFILE OF STORM DRAIN

PIONEER AVENUE

FROM SUMP INLET TO EASEMENT

EASEMENT

FROM PIONEER AVENUE TO 360' EASTERLY

RETENTION BASIN

GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION AND SUPPLEMENTS THERETO, AS WRITTEN AND PROMULGATED BY THE SOUTHERN CALIFORNIA CHAPTERS OF A.P.W.A. & A.G.C.A. JOINT COOPERATIVE COMMITTEE AND TO THE SATISFACTION OF THE CITY ENGINEER.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND PROTECT ALL STRUCTURES, INCLUDING SUBSTRUCTURES SHOWN HEREON. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF REPAIRING OR REPLACING ANY OF THE SAID STRUCTURES DAMAGED BY HIM DURING PROSECUTION OF THE WORK. ALL LOCATIONS SHOWN HEREON FOR UTILITY LINES HAVE BEEN TAKEN FROM AVAILABLE RECORDS AND THEIR COMPLETENESS AND CORRECTNESS IS IN NO WAY GUARANTEED.
3. THE CONTRACTOR SHALL NOTIFY ALL PUBLIC UTILITY COMPANIES AND OWNERS OF PRIVATE UTILITIES WITHIN THE AREA OF CONSTRUCTION AT LEAST 2 WORKING DAYS IN ADVANCE OF PERFORMING ANY WORK WITHIN SAID AREA.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY ENGINEER BEFORE COMMENCING WORK.
5. MANHOLE AND CATCH BASIN COVERS SHALL BE MODIFIED IN THAT "TORRANCE DRAIN" SHALL APPEAR IN LIEU OF " L.A.C.F.C. D".
6. TRENCH BACKFILL WILL BE COMPACTED TO A RELATIVE DENSITY OF 95% IN THE UPPER 3 FT. AND 90% OR EQUAL TO THE RELATIVE DENSITY OF THE UNDISTURBED SOIL ADJACENT TO THE TRENCH, WHICHEVER IS LESS, BELOW A DEPTH OF THE UPPER 3 FT.
7. IN CASE OF CONFLICT BETWEEN A CONNECTOR PIPE AND AN EXISTING UNDERGROUND LINE THE CONNECTOR PIPE MAY BE REALIGNED OVER OR UNDER THE CONFLICTING LINE. CONNECTOR PIPE GRADES SHALL DRAIN POSITIVELY TOWARD THE MAIN LINE AND WHERE GRADE BREAKS EXCEED 5% A CONCRETE COLLAR PER L.A.C.F.C.D. STANDARD DRAWING 2-D393 SHALL BE CONSTRUCTED. "D"-LOAD STRENGTHS OF THE REALIGNMENT PIPE SHALL CONFORM TO L.A.C.F.C.D. STANDARD DRAWINGS 2-D213.1 AND/OR 2-D431
8. CAUTION: REVIEW APPROVED CONSTRUCTION PLAN. IF CONSTRUCTION REQUIRES WORKERS AND/OR EQUIPMENT TO BE WITHIN 6 FT. AND CRANES OR HOISTING DEVICES TO BE WITHIN 10 FT. OF OVERHEAD ELECTRIC LINES, CALL SO. CAL. EDISON CO. (213) 674-9441, 639-5471 EXT. 810 OR 892 IMMEDIATELY.
9. TRENCH RESURFACING IN EXISTING PAVED ROADWAYS SHALL BE 4" A.C. ON 8" BASE UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER, OR SHOWN HEREON.
10. ALL REINFORCED CONCRETE PIPE PIPE SHALL BE BEDDED IN ACCORDANCE WITH LOS ANGELES COUNTY FLOOD CONTROL DISTRICT CASE III BEDDING PER STANDARD PLAN 2-D177 UNLESS OTHERWISE NOTED.

REFERENCES

SD. 425
ST 755
SS 314
WP 145

PRIVATE ENGINEER'S NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE DRAWINGS.

BENCH MARK

TORRANCE # 3-4, COUNTY ENGINEER WELL MONUMENT IN SIDEWALK @ S.W. CORNER OF DEL AMO BLVD. AND HAWTHORNE BLVD. - 1960 ADJ. ELEVATION = 100.42

AS BUILT PERMIT N 88-433 INSP. ENIS 5-8-90

"AS BUILT" Permit No. 88-433 Insp. Enis 5-8-90

9/3/87

REVISION	DATE	DESCRIPTION	BY	CHECKED
⚠	7-21-87	ADDED A.C. PAVEMENT SYMBOL TO LEGEND, REV. HYDRAULIC CHART	JMR	RPP

CITY OF TORRANCE
ENGINEERING DEPARTMENT
RICHARD W. BURTT CITY ENGINEER

PLANS PREPARED BY:
CONSOLIDATED CONSULTANTS, INC.
1515 PALISADES DRIVE, SUITE "L"
PACIFIC PALISADES, CALIFORNIA 90272
(213) 459-8230
GEORGE J. SCHINER R.C.E. 12161 EXP. 3/31/89 — 9/17/86 DATE

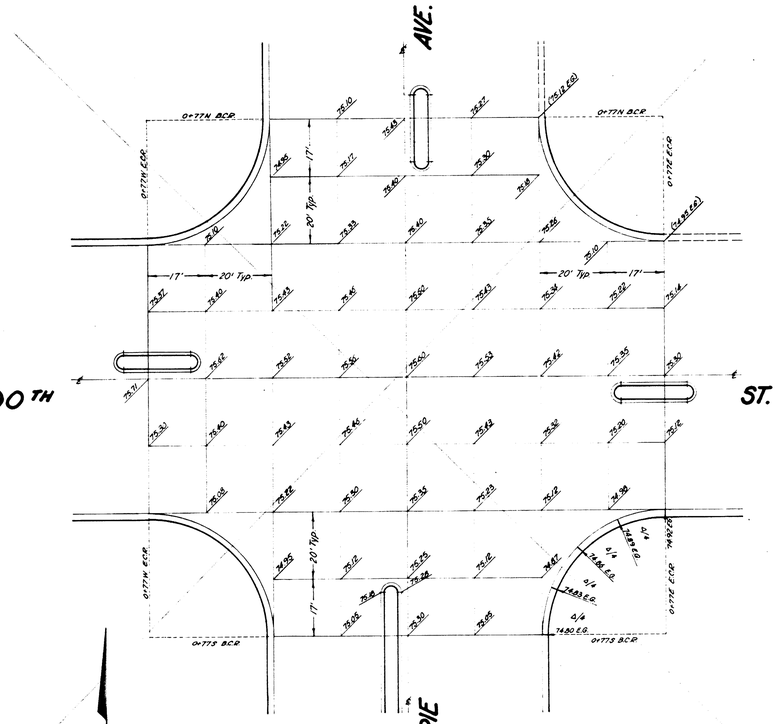
DRAWN: PRIVATE ENGINEER
DESIGNED PRIVATE ENGINEER
RECOMMENDED: M.P.R. 9/4/86
9/26/86 DATE

APPROVED: Richard W Burtt
CITY ENGINEER R.C.E. NO. 32862 EXP. 6/30/90
SCALE AS SHOWN
SHEET 1 OF 9
PLAN NO. SD-435

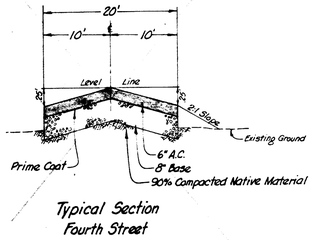
EASI FILE CORP. IRVINE, CA. HANGER EFH2A

SD-435
PIONEER AVE.
Sump W/O Prairie Ave. S/O R.R.
35 | 1-9

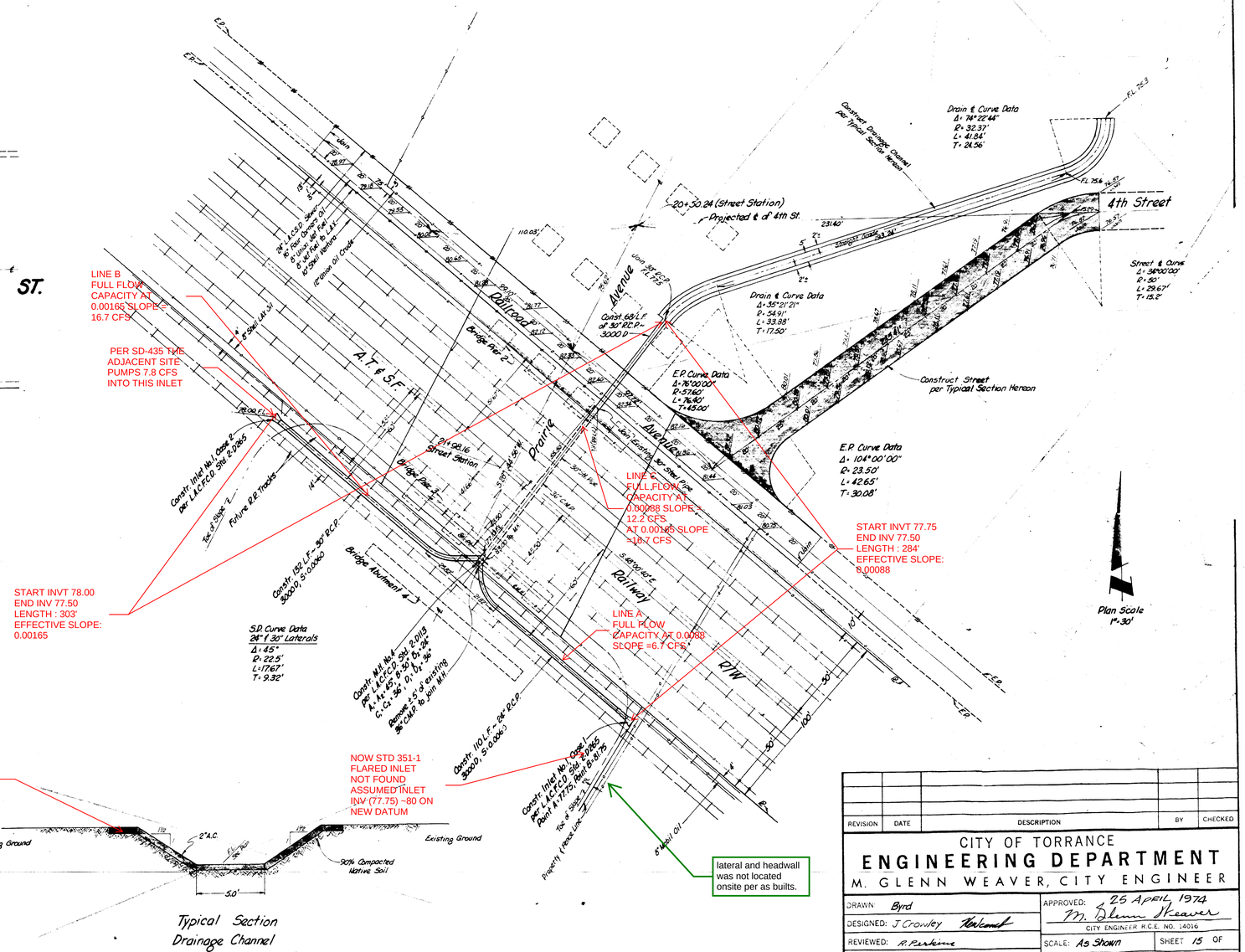
BSN FILE COORD. IRVINE, CA	HANGER ETHER	
19	5-6	
ST-549		
PRAIRIE-MADRONA-190th ST. TORRANCE BLVD.		



Prairie Ave. — 190th St.
Paving Plan



Typical Section
Fourth Street



APPROX 1.3' DEEP PER PLAN
SHOWING 2' SIDE SLOPES
6" of freeboard assumed
CAPACITY AT S=0.0043
Q=23.8 CFS

Typical Section
Drainage Channel

REVISION	DATE	DESCRIPTION	BY	CHECKED

CITY OF TORRANCE
ENGINEERING DEPARTMENT
M. GLENN WEAVER, CITY ENGINEER

DRAWN: Byrd	APPROVED: 25 APRIL 1974 M. Glenn Weaver CITY ENGINEER R.C.E. NO. 14016
DESIGNED: J Crowley	SCALE: As Shown SHEET 15 OF
REVIEWED: R. Perkins	
RECOMMENDED: DATE ASSISTANT CITY ENGINEER	PLAN NO. ST-549

Phase II 5 of 6

ST-549

APPENDIX B

Torrance Industrial Preliminary Hydrology and Hydraulics Report

PRELIMINARY HYDROLOGY STUDY

for

Torrance Industrial
Torrance, CA

September 2024

Prepared for:
Prologis
3546 Concours St, Suite 100
Ontario, CA 91764

Prepared by:
Kimley-Horn and Associates, Inc.
245 E Third Street
Long Beach, CA 90802
© Kimley-Horn and Associates, Inc. 2024

Kimley»Horn

TABLE OF CONTENTS

Narrative Sections

1. Background
2. Existing (Predevelopment) Conditions
    a. Existing Drainage
    b. Soils/Geotechnical
3. Proposed (Post-development) Conditions
    a. Drainage Features
    b. Detention System
    c. Water Quality Features

Appendix Sections

A. As-Builts
B. Bentley Flowmaster Results-Existing Conditions
C. HydroCalc Results
D. PondPack Results
E. Psomas Due Diligence Report
F. Preliminary Layout

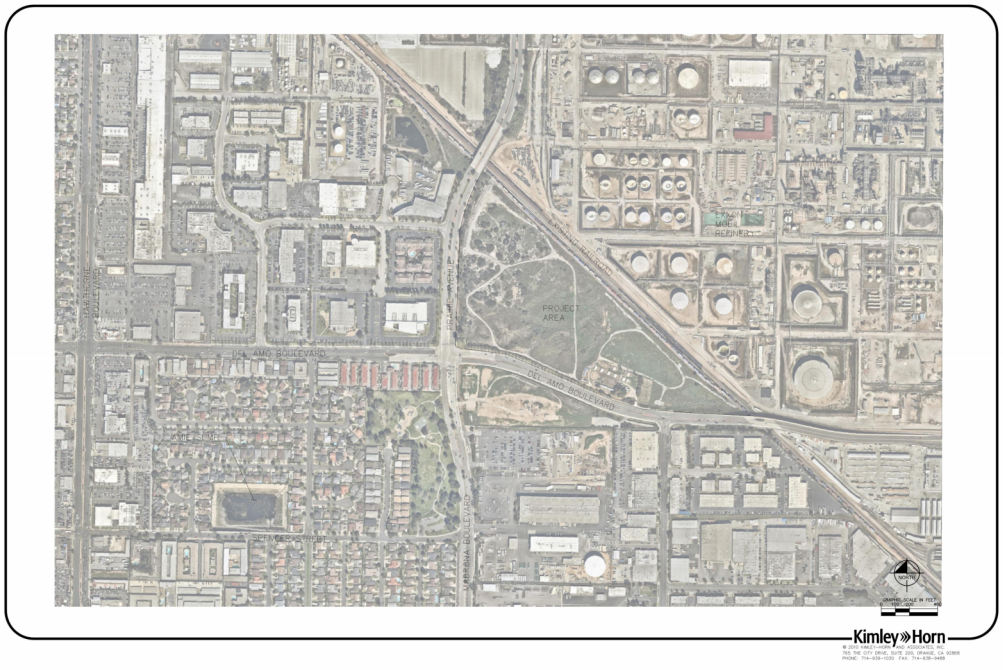


FIGURE 1: VICINITY MAP

1. Background

The Torrance Industrial site is located in the City of Torrance in Los Angeles County. The project site is southwest of the ExxonMobil Refinery and bounded by Madrona Avenue to the West, Del Amo Boulevard to the south, and railroad tracks from Northwest to Southeast. Madrona Avenue changes names to Prairie Avenue north of the project site shown in Figure 1.

The project site is approximately 31.32 acres. The Torrance Industrial Project will include the development of an industrial building, a parking spaces, proposed utilities-including water, storm, and sewer, and various site improvements including curb returns, curb and gutter.

2. Existing (Predevelopment) Conditions

The existing site is approximately 31.32 acres and mostly undeveloped. The project area has moderate slopes and generally slopes from west to east. The project site, shown in Figure 1 is triangular in shape such that flow discharges to the railroad that bounds the property site. The project site is located in an area that drains to one of the 17 sumps in the City of Torrance. The Pioneer sump is located west of the site, the Mobil Sump is located in the Exxon Mobil Refinery to the northwest, and the Amie Sump is located southwest of the site.

Existing stormwater facilities near the site are owned and maintained by Los Angeles County's Department of Public Works and City of Torrance. The City of Torrance owns and maintains the storm drains in Madrona Avenue and Del Amo Boulevard. Stormwater from Madrona/Prairie Avenue and Del Amo Boulevard are routed to the Amie Sump. Additionally, a storm drain

system was previously constructed by the City of Torrance for the Grade Separation at Madrona Avenue. Drains and headwalls were extended to the east (24" Drain) and west (30" drain) sides of the south bridge abutment from a 36" drain that was tunneled under the railroad tracks. However, during further onsite investigation, no lateral or head wall was found on the east side of the bridge similar to the west side.

The City of Torrance (City) has a master plan of drainage that divides the City into subareas and depicts the planned routing of stormwater. A crucial design element for this project is to ensure that drainage is directed to the planned locations within the City since sub-regional sump retention basins are used for drainage.

The City provided an exhibit with drainage subareas and stormwater routing nodes. The site appears to be located within Subarea 040205. The routing node for Subarea 040205 is located at the Prairie Avenue/Madrona Avenue Grade Separation at the railroad tracks. Based upon the limited information provided, the assumption was made that it is intended for the site to drain to the northwest corner of the site. The northwest corner's headwall on the east side of the Prairie Avenue/Madrona Avenue roadway embankment was not located. The site as is currently discharges onto the northerly railroad site and eventually makes its way towards the Mobile Sump

Soils/Geotechnical Investigation

The underlying soil type is expected to be Type 10 per the County of Los Angeles Hydrology Map (2004). A Geotechnical Feasibility Study was performed by Southern California Geotechnical for Psomas' July 2018 Due Diligence Report (Appendix E) for the project site. Borings encountered artificial fill of loose to medium dense silty fine to coarse sands, clayey sands and medium stiff to stiff fine sandy clays, and silty clays to clayey silts, extending to depths of 12' to 22.' Native alluvium was encountered beneath the fill soils or at the ground surface at all the boring and trench locations and extending to at least the maximum depth explored of 30± feet below existing site grades. Further, the Psomas Due Diligence Report noted that the Soil investigation concluded that infiltration was not a feasible option at the project site.

During boring and trenching, free water was not encountered. The lack of free water and the moisture level of the samples led the investigators to estimate that the groundwater at the site is more than 30 feet below the ground surface. Further, historically the groundwater levels typically read between 48 feet and 77 feet below ground surface from 2005-2017 (http://geotracker.waterboards.ca.gov).

3. Proposed (Post-development) Conditions

Drainage Design:

The Torrance Industrial Project will include the development of an industrial building, parking spaces, proposed utilities-including water, storm, and sewer, and various site improvements including curb returns, curb and gutter (Appendix F). The proposed drainage will ultimately be routed to the southeast corner of the project site. The project site's drainage shall be collected in a series of inlets, then routed through 18" to 48" storm drain pipes to an underground detention system. The preliminary design for the detention system includes a total of 1900 linear feet of 120" diameter pipe. Once routed to the detention system the stormwater would then be routed to a diversion manhole that will send the 85th percentile flow to a sump pump that discharges into three wetland mods working in series. The remaining high flows would be diverted through an outlet pipe that will surcharge into a separate diversion manhole with a high-flow pump. The high-flow pump will be designed to have a maximum outflow rate of 6 cfs to not exceed the downstream proposed parkway drain velocity capacity onto Del Amo Boulevard. A high flow pump will limit the discharge causing water to back into the detention tank causing it to reach its peak height within the system, but not allow on-site ponding. According to the City Master Drainage plan the Amie Sump has an approximate tributary area of 370 acres. A watershed of this size would have an estimated 50 year peak flow rate of >1000 cfs. The proposed discharge of 6 cfs is considered negligible as compared to the watershed peak flow rate. Since the City provided Master Drainage plan exhibit implies that the project site is to drain to the City storm drain infrastructure via a proposed parkway drain that will be located along Del Amo Blvd., it is reasonable to assume the project can discharge to the City system with a flow rate of 6 cfs as long as the parkway drain does not introduce and velocities exceeding 4 ft/s.

Detention Design:

The detention system is based upon the 50-year storm event per the LA County Hydrology Manual. As a preliminary design, the site was assessed as a whole and not further delineated to ensure that this report is applicable for precise changes in the future.

HydroCalc was used to determine the hydrograph of the 50-year storm event for the 31.32-acre site, assuming it was 87.7% impervious. The peak flow is expected at 40 cfs. The flow length was set at 3043 feet. The results are shown in Appendix C.

The resultant hydrograph was input as the design storm event in Pondpack to design the detention system (see Appendix D for results). The Catchment area (CO-1) was modeled as 31.32 acres. The catchment area was then routed to an underground Pond (PO-1). A pump designed such that the maximum discharge rate would be 6 cfs to not inundate the downstream system. The basin stage storage curve was calculated from the sum of the pipe stage storage and the basin stage storage. The detention system with the pump would require 1900 LF of 120" diameter pipe

Water Quality Features

Water Quality design for the project will comply with the 2014 Los Angeles County Low Impact Development (LID) Manual and will be discussed in more depth in the Preliminary SUSMP. Since infiltration is not feasible at this site and space is limited, wetland mods shall be implemented to treat stormwater.

APPENDIX A

As-Builts

90712

LIST OF STANDARD DRAWINGS

L.A.C.F.C.D.

NO.	DESCRIPTION
2 - D156	M H. FRAME AND COVER FOR C B
2- D157	C. B. REINFORCEMENT FOR ROUND M.H
2- D175	REMOVABLE PROTECTION BAR FOR C.B.
2- D224	CONNECTION TO C.B. FOR PIPES 12" ø THROUGH 72" ø
2- D232	DETAIL OF C.B. OPENING
2- D264	ADJUSTABLE PROTECTION BAR STIRRUP
2- D107	CONCRETE RINGS REDUCER & PIPE FOR M.H. SHAFT
2- D472	STANDARD 24" M.H. FRAME & COVER
2- D172	CATCH BASIN REINFORCEMENT (IN WALLS)
2- D96	STANDARD DROP STEP
2- D171	STANDARD A615 REINFORCING BARS
2- D173 1,2,3	PIPE SUPPORT ACROSS TRENCHES
2- D251	SEWER ENCASEMENT
2- D188	TRANSITION STRUCTURE Nº 3
2- D393	CONCRETE COLLAR
2- D415	LOCAL DEPRESSION NO. 4
2- D466	SHORING FOR EXCAVATION
2- D177	PIPE BEDDING FOR TRENCHES
2- D160	C.B. NO. 1
2- D162	C.B. NO. 2
2- D163	C.B. NO. 3
2- D113	M.H. NO. 4
2- D184	M.H. NO. 2
2- D112	J.S. NO. 2
2- D179	TYPICAL FENCE & GATE DETAILS FOR DEBRIS BASIN RIGHT OF WAY(MOD)
2- D265	INLET NO. 1

L.A. COUNTY ENGINEER

D-72	CONCRETE PIPE ANCHORS

HYDRAULIC ELEMENT

LINE	STATION FROM	STATION TO	Q 50 ⚠1	PIPE SIZE	Sf OR S. FT./FT
A	1+38	2+70	~~128.5~~ 116.8	66"	.00148
A	2+70	2+84.25	~~128.5~~ 116.8	66"	.00148
A	2+84.25	3+04.25	~~124.5~~ 116.8	66"	.00138
A	3+04.25	4+07.39	112.8	66"	.00113
A	4+13.99	4+60.19	106.9	60"	.00169
A	4+60.19	7+18.89	98.1	60"	.00142
A	7+27.79	7+81.90	74.8	51"	.00196
A	7+90.79	8+10.61	68.4	51"	.00164
A1	—	—	4.0	18"	.00145
⚠ ~~A2~~	~~—~~	~~—~~	~~12.0~~	~~24"~~	~~.00281~~
A 6	—	—	6.0	48"	.00009
A3	—	—	9.0	21"	.00323
A3	—	—	5.8	18"	.00305
A4	—	—	3.6	18"	.00117
A4	—	—	2.3	18"	.00048
B	1+14	1+75.50	23.3	30"	.00322
B	1+79 30	2+04	19.5	27"	.00396
B	2+04	3+97.67	13.7	27"	.00196
B	4+02.34	5+95.70	13.7	27"	.00196
B	5+99 80	6+55.69	7.2	24"	.00101
B	6+60 36	9+78 36	7.2	24"	.00101
B-1	—	—	3.8	18"	.00131
B-2	—	—	5.8	18"	.00305
B-3	—	—	6.5	18"	.00383
B-3	—	—	6.5	18"	.00383
B-4	—	—	1.6	12"	.00202
B-4	—	—	5.6	18"	.00284

DESIGNER EFH24

1-9

S/O R.R.

21-249

AVE.

0+77N B.C.R.

0+77W E.C.R.

0+77N B.C.R.

0+77E E.C.R.

(75.12 E.G.)

(74.95 E.G.)

75.10 75.27 75.43 75.55 75.17 75.30 75.40 75.10 75.10 75.22 75.33 75.40 75.35 75.26 75.10

17' 20' Typ. 17' 20' Typ. 17'

75.37 75.40 75.43 75.46 75.50 75.43 75.34 75.22 75.14

75.71 75.62 75.52 75.56 75.60 75.53 75.42 75.35 75.30

190TH ST.

5-6

PHASE II

BLVD.

GER ETHER

Street Width

Pipe Capacity

						Elevation (Upstream)	Elevation (Downstream)	(Length)	(Slope)					LA County's Calculation Peak Flow (Q10)	(Q25)	(Q50)	HGL (Upstream)	HGL (Downstream)		Street Capacity (Q25)	(Q50)		Q_Total (Street + Pipe) (Q10)	(Q25)	(Q50)	Deficiency (Q10)	(Q25)	(Q50)								
NODE_ID	USNODE	DSNODE	AREA(S.F.)	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOPO	TOPOSLOPE	DIAHTEX	PIPENO_WID	SIDESLOPE	MANNING	Q10LAF	Q25LAF	Q50LAF	BALHGL_US	BALHGL_DS	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEFQ	MAXDEFYR	PARALLELQ	PARALLELDI	REPLQ	REPLDIA	ADVOCDIA	RECDIA	RECWIDTH
010101-010102	10101	10102	2039075	01	01	44	43.5	367	0.0014	4	1	0	0	66	75	91	36.88	35.9	36	26.4	53.4	69.3	69.3	95.7	122.7				0								
010102-010103	10102	10103	883593.4	01	01	43.5	43	611	0.0008	4.5	1	0	0	109	124	147	35.9	34.26	32	19.9	39.1	94.9	94.9	114.8	134	14	9	13	14	10-Yr	14	2.25	109	4.75	0	4.75	0
010103-010104	10103	10104	1747995	01	01	43	42	666	0.0015	4.5	1	0	0	168	189	226	34.26	32.47	32	26.9	53	94.9	94.9	121.8	147.8	73	67	78	78	50-Yr	78	4.25	173	5.75	0	5.75	0
010104-010105	10104	10105	940494.2	01	01	42	41.5	217	0.0023	5	1	0	0	202	230	273	32.47	31.89	32	33.4	65.6	125.7	125.7	159	191.3	76	71	82	82	50-Yr	82	4.50	207	6.25	0	6.25	0
010105-010106	10105	10106	482162.2	01	01	41.5	37.5	612	0.0065	5.5	1	0	0	208	235	280	31.89	30.25	32	56.1	110.5	162	162	218.2	272.5	46	17	8	46	10-Yr	46	3.50	208	6.25	0	6.25	0
010106-010107	10106	10107	606664	01	01	37.5	33	466	0.0097	5.5	1	0	0	228	255	308	30.25	29	0	0	0	162	162	162	162	66	93	146	146	50-Yr	146	5.50	308	7.00	0	7.00	0
			6699983.8		**01 Total**																																
010201-010202	10201	10202	361478.3	01	02	31.66	31.83	48	-0.0036	1.5	1	0	0	30	34	36	29.43	29	0	0	0	9.3	9.3	9.3	9.3	21	25	27	27	50-Yr	27	2.25	36	2.50	0	2.50	0
			361478.3		**02 Total**																																
010301-010302	10301	10302	2165441	01	03	31	30	290	0.0035	0	0	0	0	71	80	94	27.43	26.19	64	19.2	47.4	0	0	19.2	47.4	71	61	47	71	10-Yr	71	3.75	71	3.75	0	3.75	0
010302-010303	10302	10303	323476.5	01	03	30	29	278	0.0036	2	1	0	0	91	102	121	26.19	25	0	0	0	13.8	13.8	13.8	13.8	77	88	107	107	50-Yr	107	4.50	121	4.75	0	4.75	0
			2488917.5		**03 Total**																																
010401-010402	10401	10402	437105.8	01	04	30.08	30.32	44	-0.0055	1.75	1	0	0	33	37	45	29.08	28.99	0	0	0	6.6	6.6	6.6	6.6	26	30	38	38	50-Yr	38	3.50	45	3.75	0	3.75	0
			437105.8		**04 Total**																																
010501-010502	10501	10502	304521	01	05	34.61	33.96	143	0.0045	1.25	1	0	0	26	30	32	31.89	30.6	0	0	0	5.7	5.7	5.7	5.7	20	24	26	26	50-Yr	26	2.25	32	2.50	0	2.50	0
			304521		**05 Total**																																
010601-010602	10601	10602	1577081	01	06	46	44	1112	0.0018	2.5	1	0	0	62	69	83	45	42.34	120	27.7	62.2	18.7	18.7	46.3	80.9	43	23	2	43	10-Yr	43	3.50	62	4.00	0	4.00	0
010602-010603	10602	10603	2072002	01	06	44	43.5	491	0.001	3.75	1	0	0	126	141	171	42.34	41.16	120	20.8	46.8	55	55	75.8	101.8	71	65	69	71	10-Yr	71	4.25	126	5.25	0	5.25	0
010603-010604	10603	10604	1374589	01	06	43.5	43	434	0.0012	5	1	0	0	173	195	234	41.16	40.12	100	22.2	49.8	118.5	118.5	140.6	168.3	55	54	66	66	50-Yr	66	4.25	184	6.00	0	6.00	0
010604-010605	10604	10605	1488309	01	06	43	42	822	0.0012	5	1	0	0	221	251	299	40.12	38.15	100	22.8	51.2	118.5	118.5	141.2	169.6	103	110	129	129	50-Yr	129	5.25	248	6.75	0	6.75	0
010621-010622	10621	10622	1784606	01	06	49	46	1278	0.0023	0	0	0	0	60	68	86	44.63	41.52	52	33.6	78.8	0	0	33.6	78.8	60	34	7	60	10-Yr	60	4.00	60	4.00	0	4.00	0
010622-010623	10622	10623		01	06	46	45	763	0.0013	0	0	0	0	109	125	164	41.52	39.67	52	25.1	58.9	0	0	25.1	58.9	109	100	105	109	10-Yr	109	5.00	109	5.00	0	5.00	0
010631-010623	10631	10623	1909423	01	06	46	45	454	0.0022	0	0	0	0	65	73	92	41.27	39.67	52	32.6	76.4	0	0	32.6	76.4	65	40	16	65	10-Yr	65	3.75	65	3.75	0	3.75	0
010623-010605	10623	10605		01	06	45	42	624	0.0048	0	0	0	0	168	191	249	39.67	38.15	52	48.1	112.9	0	0	48.1	112.9	168	143	136	168	10-Yr	168	5.75	168	5.75	0	5.75	0
010641-010642	10641	10642	1444039	01	06	43	42.5	1265	0.0004	2	1	0	0	58	66	80	41	38.32	64	6.5	16.1	9.6	9.6	16.1	25.7	48	50	54	54	50-Yr	54	4.00	64	4.25	0	4.25	0
010642-010605	10642	10605	813168.9	01	06	42.5	42	81	0.0062	2	1	0	0	74	85	100	38.32	38.15	64	25.6	63.4	9.6	9.6	35.3	73.1	64	50	27	64	10-Yr	64	4.25	74	4.50	0	4.50	0
010605-010606	10605	10606	1953984	01	06	42	41.66	614	0.0006	8	1	0	0	505	575	707	38.15	36.68	52	16.3	38.3	414.9	414.9	431.2	453.2	90	144	254	254	50-Yr	254	6.75	669	10.00	0	10.00	0
010606-010607	10606	10607	412782.4	01	06	41.66	40.83	615	0.0013	8	1	0	0	508	579	711	36.68	35.2	52	25.5	59.8	414.9	414.9	440.4	474.7	93	139	236	236	50-Yr	236	6.50	651	9.50	0	10.00	0
010651-010652	10651	10652	129719.3	01	06	40.44	40.52	259	-0.0003	1.25	1	0	0	11	13	14	37.37	36.15	0	0	0	4.1	4.1	4.1	4.1	7	9	10	10	50-Yr	10	1.75	14	2.00	0	2.00	0
010652-010607	10652	10607	260547.3	01	06	40.52	40.83	202	-0.0015	1.5	1	0	0	31	35	38	36.15	35.2	0	0	0	6.7	6.7	6.7	6.7	24	28	31	31	50-Yr	31	2.75	38	3.00	0	3.00	0
010607-010608	10607	10608	216319.5	01	06	40.83	40.54	140	0.0021	8	1	0	0	513	585	717	35.2	34.87	52	31.6	74.1	414.9	414.9	446.5	489	98	139	228	228	50-Yr	228	6.50	643	9.50	0	10.00	0
010608-010609	10608	10609	351078.8	01	06	40.54	35.94	1306	0.0035	8	1	0	0	516	589	721	34.87	31.74	52	41.2	96.6	414.9	414.9	456.1	511.5	101	133	210	210	50-Yr	210	6.25	624	9.50	0	10.00	0
010609-010610	10609	10610	283221.5	01	06	35.94	36.16	58	-0.0038	8	1	0	0	516	590	722	31.74	31.6	0	0	0	414.9	414.9	414.9	414.9	101	175	307	307	50-Yr	307	7.25	722	10.00	0	10.00	0
			16070870.7		**06 Total**																																
010701-010702	10701	10702	1023090	01	07	38.69	36.65	267	0.0076	4.5	1	0	0	52	57	69	35.67	34.76	32	60.7	119.4	106.5	106.5	167.2	225.9				0								
010702-010703	10702	10703	329999.9	01	07	36.65	36.04	381	0.0016	4.5	1	0	0	75	81	98	34.76	33.47	32	27.8	54.7	106.5	106.5	134.3	161.2				0								
010703-010704	10703	10704	1114730	01	07	36.04	36.74	343	-0.002	4.5	1	0	0	124	136	163	33.47	32.3	0	0	0	106.5	106.5	106.5	106.5	18	30	57	57	50-Yr	57	3.75	163	5.50	0	5.50	0
010704-010705	10704	10705	985102.3	01	07	36.74	38.25	88	-0.0171	4.5	1	0	0	165	183	218	32.3	32	0	0	0	106.5	106.5	106.5	106.5	59	77	112	112	50-Yr	112	4.75	218	6.00	0	6.00	0
			3452922.2		**07 Total**																																
010801-010802	10801	10802	1557466	01	08	44	41.42	329	0.0078	3.75	1	0	0	62	69	86	38.53	37.5	87	28.9	64.9	62.5	62.5	91.4	127.4				0								
010802-010803	10802	10803	585235.8	01	08	41.42	40.23	490	0.0024	3.25	1	0	0	102	115	136	37.5	35.97	87	16.1	36.2	42.7	42.7	58.8	78.8	59	56	57	59	10-Yr	59	3.75	102	4.75	0	4.75	0
010803-010804	10803	10804	103270.4	01	08	40.23	40.08	121	0.0012	3.25	1	0	0	105	117	139	35.97	35.6	87	11.5	25.9	42.7	42.7	54.2	68.6	62	63	70	70	50-Yr	70	4.00	113	4.75	0	4.75	0
010804-010805	10804	10805	260840.1	01	08	40.08	40.13	192	-0.0003	3.25	1	0	0	117	129	155	35.6	35	0	0	0	42.7	42.7	42.7	42.7	74	86	112	112	50-Yr	112	4.75	155	5.50	0	5.50	0
			2506812.3		**08 Total**																																
010901-010902	10901	10902	1116373	01	09	42.75	42.15	262	0.0023	2	1	0	0	55	60	72	39.87	39.19	0	0	0	10.7	10.7	10.7	10.7	44	49	61	61	50-Yr	61	4.00	72	4.25	0	4.25	0
010902-010903	10902	10903	279079	01	09	42.15	41.89	267	0.001	2	1	0	0	72	78	95	39.19	38.5	0	0	0	10.7	10.7	10.7	10.7	61	67	84	84	50-Yr	84	4.50	95	4.75	0	4.75	0
010903-010904	10903	10904	248537.3	01	09	41.89	41.61	143	0.002	2.5	1	0	0	85	92	113	38.5	38.13	0	0	0	19.4	19.4	19.4	19.4	66	73	94	94	50-Yr	94	4.75	113	5.00	0	5.00	0
010904-010905	10904	10905	49369.13	01	09	41.61	41.41	49	0.0041	2.75	1	0	0	86	94	114	38.13	38	0	0	0	25	25	25	25	61	69	89	89	50-Yr	89	4.50	114	5.00	0	5.00	0
			1693358.43		**09 Total**																																
			34015970.03		**01 Total**																																
020101-020102	20101	20102	664045.3	02	01	40.71	40.76	264	-0.0002	4.5	1	0	0	32	37	44	36.48	34.5	0	0	0	158.1	158.1	158.1	158.1				0								
			664045.3		**01 Total**																																
020201-020202	20201	20202	88083.36	02	02	41.3	40.82	915	0.0005	3.75	1	0	0	7	8	9	39.63	36.74	32	23.2	40.7	63.5	63.5	86.7	104.2				0								
020202-020203	20202	20203	340607	02	02	40.82	40.67	375	0.0004	4.75	1	0	0	28	35	38	36.74	35.56	32	20.2	35.5	119.3	119.3	139.6	154.9				0								
020203-020204	20203	20204	537619.8	02	02	40.67	40.31	176	0.002	5	1	0	0	53	63	71	35.56	35	0	0	0	136.8	136.8	136.8	136.8				0								
			966310.16		**02 Total**																																
020401-020402	20401	20402	1295889	02	04	38.98	39.86	185	-0.0048	2	1	0	0	50	56	70	37.66	36.8	0	0	0	14.4	14.4	14.4	14.4	36	42	56	56	50-Yr	56	3.50	70	3.75	0	3.75	0
			1295889		**04 Total**																																
020501-020502	20501	20502	133455.4	02	05	49.83	47.07	639	0.0043	4.75	1	0	0	10	12	13	48.83	45.94	32	66.5	116.8	141.5	141.5	208	258.3				0								
020502-020503	20502	20503	803917.6	02	05	47.07	43.74	779	0.0043	5.25	1	0	0	51	57	67	45.94	42.41	32	66.2	116.2	184.8	184.8	250.9	300.9				0								
020511-020512	20511	20512	124439.4	02	05	65.17	58.23	799	0.0087	3.5	1	0	0	7	8	9	63.34	57.23	0	0	0	81.4	81.4	81.4	81.4				0								
020512-020513	20512	20513	546857.8	02	05	58.23	62.03	292	-0.013	2	1	0	0	42	52	56	57.23	55.76	0	0	0	14.9	14.9	14.9	14.9	27	37	41	41	50-Yr	41	3.00	56	3.50	0	3.50	0
020513-020514	20513	20514	376730	02	05	62.03	52.62	932	0.0101	3	1	0	0	65	75	87	55.76	51.07	32	101.6	178.5	43.8	43.8	145.4	222.3	21	0	0	21	10-Yr	21	2.50	65	3.50	0	3.50	0
020514-020515	20514	20515	188795.5	02	05	52.62	50.69	399	0.0048	2.75	1	0	0	69	80	91	51.07	49.06	32	70.4	123.6	34.7	34.7	105.1	158.3	34	0	0	34	10-Yr	34	2.75	69	3.75	0	3.75	0
020521-020522	20521	20522	549661.9	02	05	55.24	52.81	386	0.0063	2	1	0	0	36	44	48	53.48	50.88	32	80.3	141	17.2	17.2	97.5	158.2	19	0	0	19	10-Yr	19	2.25	36	2.75	0	2.75	0
020522-020515	20522	20515	280444.8	02	05	52.81	50.69	272	0.0078	2	1	0	0	57	64	76	50.88	49.06	32	89.4	157	17.2	17.2	106.6	174.2	40	0	0	40	10-Yr	40	2.75	57	3.25	0	3.25	0
020515-020516	20515	20516	320377.5	02	05	50.69	45.91	911	0.0052	3.5	1	0	0	135	155	179	49.06	44.48	32	73.3	128.7	66.1	66.1	139.4	194.8	69	16	0	69	10-Yr	69	3.75	135	4.75	0	4.75	0
020516-020517	20516	20517	887724.9	02	05	45.91	44.07	280	0.0066	4.25	1	0	0	169	196	224	44.48	43.07	32	82	144	110.9	110.9	192.9	254.9	58	3	0	58	10-Yr	58	3.50	169	5.00	0	5.00	0
020517-020503	20517	20503	423956	02	05	44.07	43.74	263	0.0013	4.25	1	0	0	176	205	231	43.07	42.41	32	35.8	62.9	78.4	78.4	114.2	141.3	98	91	90	98	10-Yr	98	4.75	176	6.00	0	6.00	0
020503-020504	20503	20504	132577.9	02	05	43.74	45.19	1066	-0.0014	6	1	0	0	227	262	296	42.41	39.75	0	0	0	196.6	196.6	196.6	196.6	30	65	99	99	50-Yr	99	4.75	296	7.00	0	7.00	0
020504-020505	20504	20505	375663.8	02	05	45.19	40.52	903	0.0052	6.25	1	0	0	222	258	294	39.75	37.5	0	0	0	219.2	219.2	219.2	219.2	3	39	75	75	50-Yr	75	4.25	294	7.00	0	7.00	0
			5144602.5		**05 Total**																																
020601-020602	20601	20602	1916356	02	06	48.11	46	1490	0.0014	3.75	1	0	0	59	68	85	47.11	42.19	82	19.3	41.2	64.5	64.5	83.8	105.7				0								
020602-020603	20602	20603	1064540	02	06	46	45	495	0.002	3.5	1	0	0	82	114	133	42.19	40.56	82	23	49.1	53.7	53.7	76.7	102.8	28	37	30	37	25-Yr	37	3.25	91	4.50	0	4.50	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
020504-020505	20504	20505	375663.8	02	05	45.19	40.52	903	0.0052	6.25	1	0	0	222	258	294	39.75	37.5	0	0	0	219.2	219.2	219.2	219.2	3	39	75	75	50-Yr	75	4.25	294	7.00	0	7.00	0
			5144602.5		05 Total																																
020601-020602	20601	20602	1916356	02	06	48.11	46	1490	0.0014	3.75	1	0	0	59	68	85	47.11	42.19	82	19.3	41.2	64.5	64.5	83.8	105.7				0								
020602-020603	20602	20603	1064540	02	06	46	45	495	0.002	3.5	1	0	0	82	114	133	42.19	40.56	82	23	49.1	53.7	53.7	76.7	102.8	28	37	30	37	25-Yr	37	3.25	91	4.50	0	4.50	0
020603-020604	20603	20604	230582.4	02	06	45	43	676	0.003	4	1	0	0	86	116	136	40.56	38.33	82	27.9	59.5	76.6	76.6	104.5	136.1	9	12	0	12	25-Yr	12	2.00	88	4.25	0	4.50	0
020604-020605	20604	20605	185083.5	02	06	43	41.45	100	0.0155	4	1	0	0	91	118	138	38.33	38	0	0	0	76.6	76.6	76.6	76.6	14	41	61	61	50-Yr	61	3.75	138	5.00	0	5.00	0
			3396561.9		06 Total																																
020701-020702	20701	20702	2597876	02	07	88	87	623	0.0016	2.5	1	0	0	84	93	106	75.57	72.64	42	44.7	82.5	26.1	26.1	70.8	108.7	58	22	0	58	10-Yr	58	3.50	84	4.00	0	4.00	0
020702-020703	20702	20703	522534.8	02	07	87	85	551	0.0036	4	1	0	0	106	120	136	72.64	70.05	42	67.3	124.1	91.4	91.4	158.7	215.6	15	0	0	15	10-Yr	15	2.25	106	4.25	0	4.25	0
020703-020704	20703	20704	158372.2	02	07	85	43	6823	0.0062	4	1	0	0	108	122	138	70.05	38	0	0	0	91.4	91.4	91.4	91.4	17	31	47	47	50-Yr	47	3.25	138	4.75	0	4.75	0
			3278783		07 Total																																
020801-020802	20801	20802	1396150	02	08	67.97	65.08	401	0.0072	3.75	1	0	0	52	60	74	63.16	60.83	32	85.9	150.8	85.5	85.5	171.4	236.3				0								
020802-020803	20802	20803	683135.4	02	08	65.08	64.18	208	0.0043	4	1	0	0	89	104	123	60.83	59.62	32	66.5	116.8	101.6	101.6	168.1	218.4				0								
020803-020804	20803	20804	809091.4	02	08	64.18	92	799	-0.0348	4.25	1	0	0	130	150	178	59.62	54.98	0	0	0	119.4	119.4	119.4	119.4	11	31	59	59	50-Yr	59	3.50	178	5.00	0	5.00	0
020804-020805	20804	20805	658370.8	02	08	92	50.5	1313	0.0316	4	1	0	0	156	178	210	54.98	47.35	82	91.1	194.5	101.6	101.6	192.7	296.1	54	0	0	54	10-Yr	54	3.25	156	4.75	0	5.00	0
020805-020806	20805	20806	436661.9	02	08	50.5	50	60	0.0084	4	1	0	0	161	185	216	47.35	47	0	0	0	101.6	101.6	101.6	101.6	59	83	114	114	50-Yr	114	4.25	216	5.50	0	5.50	0
			3983409.5		08 Total																																
020331-020301	20331	20301	446966.8	02	03	78.46	80.08	682	-0.0024	2	1	0	0	22	24	29	77.46	76.1	0	0	0	9.4	9.4	9.4	9.4	13	15	20	20	50-Yr	20	2.75	29	3.25	0	3.25	0
020301-020302	20301	20302	2191628	02	03	80.08	77.76	580	0.004	3.75	1	0	0	84	94	109	76.18	71.98	60	34.9	72.7	95.3	95.3	130.2	167.9				0								
020302-020303	20302	20303	871909	02	03	77.76	73.87	1133	0.0034	4	1	0	0	112	125	147	71.98	63.76	60	32.4	67.3	113.2	113.2	145.6	180.5				0								
020341-020342	20341	20342	1757670	02	03	76	75.51	783	0.0006	3.5	1	0	0	47	54	64	75	71.79	82	12.8	27.4	59.8	59.8	72.6	87.2				0								
020342-020343	20342	20343	2963301	02	03	75.51	75.92	1053	-0.0004	5.25	1	0	0	103	119	143	71.79	67.47	0	0	0	176.4	176.4	176.4	176.4				0								
020343-020344	20343	20344	395567.5	02	03	75.92	75.25	683	0.001	5.25	1	0	0	104	121	145	67.47	64.67	82	16.1	34.3	176.4	176.4	192.4	210.6				0								
020344-020303	20344	20303	1396585	02	03	75.25	73.87	220	0.0063	5.25	1	0	0	129	151	179	64.67	63.76	82	40.6	86.7	176.4	176.4	217	263				0								
020351-020352	20351	20352	694942.3	02	03	72.17	72.72	460	-0.0012	4.5	1	0	0	31	34	41	71.17	69.84	0	0	0	98.3	98.3	98.3	98.3				0								
020352-020353	20352	20353	1309742	02	03	72.72	73.52	486	-0.0016	5	1	0	0	70	78	93	69.84	68.43	0	0	0	130.2	130.2	130.2	130.2				0								
020353-020354	20353	20354	1579141	02	03	73.52	74.44	1189	-0.0008	6	1	0	0	110	124	148	68.43	64.99	0	0	0	211.8	211.8	211.8	211.8				0								
020361-020362	20361	20362	848136.8	02	03	78.16	75.66	1089	0.0023	4.5	1	0	0	32	36	44	75.21	68.17	32	48.5	85.1	147.2	147.2	195.7	232.3				0								
020362-020354	20362	20354	642577.1	02	03	75.66	74.44	492	0.0025	4.5	1	0	0	48	56	65	68.17	64.99	29	47.9	83.1	147.2	147.2	195.2	230.3				0								
020354-020303	20354	20303	632339	02	03	74.44	73.87	425	0.0013	7	1	0	0	170	195	232	64.99	63.76	82	18.8	40.1	319.5	319.5	338.2	359.5				0								
020303-020304	20303	20304	757793.8	02	03	73.87	67.17	929	0.0072	7.25	9	0	0	427	493	582	63.76	61.08	60	46.9	97.6	514.3	514.3	561.2	611.8				0								
020346-020304	20346	20304	1673772	02	03	68.71	67.17	386	0.004	6	1	0	0	48	54	65	62.8	61.08	0	0	0	24.3	24.3	24.3	24.3	24	30	41	41	50-Yr	41	3.00	65	3.75	0	375	0
020304-020305	20304	20305		02	03	67.17	65.44	194	0.0089	7.5	9	0	0	470	543	642	61.08	60.52	60	52.2	108.6	580.3	580.3	632.5	688.9				0								
020305-020306	20305	20306	2307731	02	03	65.44	62.73	912	0.003	7.5	9	0	0	532	614	725	60.52	57.88	60	30.1	62.6	580.3	580.3	610.4	642.9	0	4	82	82	50-Yr	82	4.25	662	9.50	0	950	0
020306-020307	20306	20307	1036187	02	03	62.73	60.86	552	0.0034	7.5	9	0	0	553	641	758	57.88	56.28	60	32.2	66.9	580.3	580.3	612.4	647.1	0	29	111	111	50-Yr	111	4.75	691	9.50	0	950	0
020307-020308	20307	20308	2973288	02	03	60.86	58.46	1132	0.0021	10	9	0	0	627	728	861	56.28	53	60	25.4	52.9	853.1	853.1	878.6	906.1				0								
020371-020372	20371	20372	522073.9	02	03	57.64	56.84	333	0.0024	2	1	0	0	17	20	24	56.64	55.41	32	49.6	87.1	12.8	12.8	62.4	99.9	4	0	0	4	10-Yr	4	1.50	17	2.25	0	225	0
020372-020373	20372	20373	777325.9	02	03	56.84	56.95	428	-0.0003	2.5	1	0	0	40	46	54	55.41	53.84	0	0	0	23.2	23.2	23.2	23.2	17	23	31	31	50-Yr	31	3.00	54	3.50	0	3.50	0
020373-020308	20373	20308	103132.3	02	03	56.95	58.46	226	-0.0067	2.5	1	0	0	41	47	55	53.84	53	0	0	0	23.2	23.2	23.2	23.2	18	24	32	32	50-Yr	32	3.00	55	3.50	0	3.50	0
020308-020309	20308	20309	1114856	02	03	58.46	55.78	346	0.0078	10	9	0	0	689	800	946	53	52	60	48.7	101.2	853.1	853.1	901.8	954.3				0								
020381-020382	20381	20382	189155.3	02	03	62.04	62.19	301	-0.0005	1.5	1	0	0	9	11	13	58.68	57.42	0	0	0	6.3	6.3	6.3	6.3	3	5	7	7	50-Yr	7	1.75	13	2.00	0	200	0
020382-020309	20382	20309	931385.4	02	03	62.19	55.78	1292	0.005	1.75	1	0	0	37	42	49	57.42	52	60	38.9	81	9.5	9.5	48.5	90.5	27	0	0	27	10-Yr	27	2.75	37	3.00	0	300	0
020309-020310	20309	20310	721035.8	02	03	55.78	54.68	654	0.0017	10	9	0	0	726	843	996	52	50.11	34	42.6	75.6	853.1	853.1	895.8	928.7	0	0	67	67	50-Yr	67	4.00	920	10.50	0	10.50	0
020310-020311	20310	20311	1267680	02	03	54.68	53.14	453	0.0034	10	9	0	0	758	880	1038	50.11	48.8	32	59	103.6	853.1	853.1	912.1	956.8	0	0	81	81	50-Yr	81	4.25	934	10.50	0	10.50	0
020311-020312	20311	20312	950044.9	02	03	53.14	50.07	681	0.0045	12	9	0	0	780	906	1069	48.8	46.83	0	0	0	1081.5	1081.5	1081.5	1081.5				0								
020312-020313	20312	20313		02	03	50.07	49.5	304	0.0019	8.5	13	0	0	780	906	1068	46.83	45.95	32	43.8	77	1052.4	1052.4	1096.3	1129.4				0								
020313-020314	20313	20314		02	03	49.5	52.45	543	-0.0054	10	11	0	0	779	905	1067	45.95	44.38	0	0	0	1048.6	1048.6	1048.6	1048.6	0	0	18	18	50-Yr	18	2.50	1067	11.50	0	11.50	0
020314-020315	20314	20315	631308.9	02	03	52.45	53.56	280	-0.004	10	11	0	0	791	920	1085	44.38	43.57	0	0	0	1048.6	1048.6	1048.6	1048.6	0	0	36	36	50-Yr	36	3.25	1085	11.50	0	11.50	0
020391-020392	20391	20392	455254.3	02	03	65.76	64.27	939	0.0016	5	1	0	0	34	38	41	4.24	58.83	60	22	45.8	184.2	184.2	206.2	230				0								
020392-020393	20392	20393	1559511	02	03	64.27	61.36	780	0.0037	5	1	0	0	75	86	101	58.83	54.33	60	33.8	70.2	184.2	184.2	217.9	254.4				0								
020393-020394	20393	20394	991539.6	02	03	61.36	48.65	1160	0.011	5	1	0	0	105	123	149	54.33	47.65	60	57.9	120.3	184.2	184.2	242	304.5				0								
020394-020315	20394	20315	2247799	02	03	48.65	53.56	845	-0.0058	7	1	0	0	157	181	231	47.65	43.57	0	0	0	411	411	411	411				0								
020315-020316	20315	20316		02	03	53.56	43.62	855	0.0116	10	11	0	0	916	1066	1242	43.57	41.1	32	109.1	191.6	1048.6	1048.6	1157.7	1240.1	0	0	2	2	50-Yr	2	1.25	1050	11.00	0	11.50	0
020316-020317	20316	20317	648175.1	02	03	43.62	41.35	496	0.0046	10	11	0	0	921	1072	1249	41.1	39.66	32	68.5	120.2	1048.6	1048.6	1117.1	1168.8	0	0	80	80	50-Yr	80	4.25	1129	11.50	0	11.50	0
020317-020318	20317	20318	963892.1	02	03	41.35	38.66	773	0.0035	13	12	0	0	928	1081	1258	39.66	37.43	32	59.7	104.8	1777.1	1777.1	1836.8	1881.9				0								
020318-020319	20318	20319	238683.2	02	03	38.66	39.9	701	-0.0018	13	12	0	0	929	1083	1260	37.43	35.4	0	0	0	1777.1	1777.1	1777.1	1777.1				0								
			38792130		03 Total																																
			57521731.36	02 Total																																	
030101-030102	30101	30102	318482	03	01	35	33	49	0.0406	1.5	1	0	0	24	26	32	29.36	29	0	0	0	8.3	8.3	8.3	8.3	16	18	24	24	50-Yr	24	2.25	32	2.50	0	2.50	0
			318482		01 Total																																
030201-030202	30201	30202	467191.3	03	02	30.58	30.95	56	-0.0067	1	1	0	0	29	32	38	29.37	29	0	0	0	2.7	2.7	2.7	2.7	26	29	35	35	50-Yr	35	2.75	38	2.75	0	2.75	0
			467191.3		02 Total																																
030301-030302	30301	30302	412701	03	03	31.66	30.86	151	0.0053	2.25	1	0	0	28	31	37	30.66	29.86	0	0	0	20.9	20.9	20.9	20.9	7	10	16	16	50-Yr	16	2.25	37	3.00	0	3.00	0
			412701		03 Total																																
030401-030402	30401	30402	1179756	03	04	34.06	33.38	128	0.0053	2	1	0	0	40	47	59	31.49	30.6	0	0	0	17.6	17.6	17.6	17.6	22	29	41	41	50-Yr	41	3.00	59	3.25	0	3.25	0
			1179756		04 Total																																
030501-030502	30501	30502	1280375	03	05	37.88	37.28	431	0.0014	3.5	1	0	0	41	49	61	35.96	33.3	0	0	0	73.6	73.6	73.6	73.6				0								
030502-030503	30502	30503	449022.8	03	05	37.28	37.87	130	-0.0045	3.5	1	0	0	66	80	94	33.3	32.5	0	0	0	73.6	73.6	73.6	73.6	0	6	20	20	50-Yr	20	2.25	94	4.00	0	4.00	0
			1729397.8		05 Total																																
030601-030602	30601	30602	3635513	03	06	50.2	43.71	895	0.0073	3	1	0	0	101	114	137	43.83	39.13	32	59.1	116.4	45.1	45.1	104.2	161.5	56	10	0	56	10-Yr	56	3.50	101	4.25	0	4.25	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
030602-030603	30602	30603	1411778	03	06	43.71	45.11	434	-0.0032	4	1	0	0	141	163	196	39.13	36.85	0	0	0	97.1	97.1	97.1	97.1	44	66	99	99	50-Yr	99	4.25	196	5.25	0	5.25	0
030603-030604	30603	30604	548633.7	03	06	45.11	40.16	487	0.0102	4	1	0	0	162	190	225	36.85	34.3	32	70	137.8	97.1	97.1	167.1	234.9	65	23	0	65	10-Yr	65	3.50	162	5.00	0	5.25	0
030604-030605	30604	30605	576792.4	03	06	40.16	40.14	288	0.0001	4	1	0	0	187	220	258	34.3	32.78	32	5.8	11.4	97.1	97.1	102.9	108.5	90	117	150	150	50-Yr	150	4.75	247	5.75	0	5.75	0
030605-030606	30605	30606	208284.9	03	06	40.14	38.91	149	0.0082	4	1	0	0	186	217	256	32.78	32	0	0	0	97.1	97.1	97.1	97.1	89	120	159	159	50-Yr	159	5.00	256	6.00	0	6.00	0
			6381002		06 Total																																
030701-030702	30701	30702	245531.3	03	07	41.2	40.09	140	0.0079	1.25	1	0	0	18	21	22	33.99	33	0	0	0	5.1	5.1	5.1	5.1	13	16	17	17	50-Yr	17	2.00	22	2.25	0	2.25	0
			245531.3		07 Total																																
030801-030802	30801	30802	3005575	03	08	40	39.5	130	0.0038	1.25	1	0	0	85	95	112	27.98	27	0	0	0	5.2	5.2	5.2	5.2	80	90	107	107	50-Yr	107	4.00	112	4.00	0	4.00	0
			3005575		08 Total																																
030901-030902	30901	30902	393413.5	03	09	61.61	60.2	533	0.0026	3	1	0	0	13	16	20	57.94	55.3	80	16.8	37.7	43.8	43.8	60.6	81.5				0								
030902-030903	30902	30903	654506.8	03	09	60.2	57.57	989	0.0027	4.5	1	0	0	35	39	46	55.3	50.4	80	16.8	37.8	129.1	129.1	145.9	166.9				0								
030903-030904	30903	30904	1383506	03	09	57.57	55	535	0.0048	4.5	1	0	0	78	88	102	50.4	47.75	80	22.6	50.9	129.1	129.1	151.7	180				0								
			2431426.3		09 Total																																
031101-031102	31101	31102	199870.7	03	11	60	59	584	0.0017	2.25	1	0	0	11	13	16	58.26	55.83	32	28.7	56.6	18.6	18.6	47.4	75.2				0								
031102-031103	31102	31103	500652.1	03	11	59	58	464	0.0022	2.5	1	0	0	27	31	37	55.83	53.91	32	32.3	63.5	24.7	24.7	56.9	88.2	2	0	0	2	10-Yr	2	1.25	27	2.75	0	2.75	0
031103-031104	31103	31104	283602.7	03	11	58	55	1429	0.0021	4.5	1	0	0	35	41	48	53.91	47.96	62	15	37.2	118.3	118.3	133.3	155.6				0								
			984125.5		11 Total																																
031104-030904	31104	30904	880356.4	03	09	55	55	50	0	4.5	1	0	0	55	63	73	47.96	47.75	0	0	0	118.3	118.3	118.3	118.3				0								
030904-030905	30904	30905	134423	03	09	55	54	675	0.0015	6.5	1	0	0	132	149	174	47.75	44.41	74	12.6	29.3	344.2	344.2	356.8	373.6				0								
030905-030906	30905	30906	650956.9	03	09	54	53	671	0.0015	6.5	1	0	0	150	170	197	44.41	41.09	74	12.6	29.4	344.2	344.2	356.8	373.7				0								
030921-030922	30921	30922	236119	03	09	60.26	58.36	597	0.0032	2	1	0	0	10	11	14	56.41	52.82	36	40.4	81.8	16.3	16.3	56.7	98.1				0								
030922-030923	30922	30923	626672.3	03	09	58.36	57.58	393	0.002	3.5	1	0	0	28	32	38	52.82	50.45	36	31.9	64.6	72.4	72.4	104.3	136.9				0								
030923-030924	30923	30924	327129.1	03	09	57.58	56.8	495	0.0016	3.5	1	0	0	37	43	50	50.45	47.47	36	28.4	57.6	72.4	72.4	100.8	129.9				0								
030924-030925	30924	30925	422403.2	03	09	56.8	55.12	697	0.0024	3.75	1	0	0	48	56	66	47.47	43.28	36	35.2	71.2	87	87	122.1	158.2				0								
030961-030925	30961	30925	508627.8	03	09	56.48	55.12	321	0.0042	1.08	2	0	0	14	16	20	46.35	43.28	0	0	0	9.3	9.3	9.3	9.3	5	7	11	11	50-Yr	11	1.75	20	2.00	0	2.00	0
030925-030906	30925	30906		03	09	55.12	53	364	0.0058	3.75	1	0	0	59	69	82	43.28	41.09	36	54.6	110.6	87	87	141.6	197.6				0								
030906-030907	30906	30907	66076.72	03	09	53	52.5	398	0.0013	6.5	1	0	0	210	239	279	41.09	39.12	74	11.6	27	344.2	344.2	355.8	371.3				0								
030907-030908	30907	30908	626450.4	03	09	52.5	42	1546	0.0068	6.5	1	0	0	225	257	299	39.12	31.47	74	26.9	62.8	344.2	344.2	371.1	407				0								
030908-030909	30908	30909	195030.3	03	09	42	29.5	1152	0.0108	6.5	1	0	0	226	258	301	31.47	25.76	64	34	84.1	344.2	344.2	378.2	428.3				0								
030931-030932	30931	30932	2170731	03	09	53.65	45.6	1444	0.0056	3	1	0	0	63	71	89	44.35	35.87	0	0	0	47.6	47.6	47.6	47.6	15	23	41	41	50-Yr	41	3.00	89	4.00	0	4.00	0
030941-030942	30941	30942	1894578	03	09	47.37	46.53	272	0.0031	3.25	1	0	0	58	68	83	39	37.05	30	37.7	73.2	65.1	65.1	102.8	138.3				0								
030942-030932	30942	30932	595836.4	03	09	46.53	45.6	164	0.0057	3.25	1	0	0	91	107	128	37.05	35.87	0	0	0	65.1	65.1	65.1	65.1	26	42	63	63	50-Yr	63	3.25	128	4.25	0	4.25	0
030932-030933	30932	30933		03	09	45.6	30	1111	0.014	3.5	1	0	0	145	168	205	35.87	27.93	0	0	0	79.3	79.3	79.3	79.3	66	89	126	126	50-Yr	126	4.25	205	5.00	0	5.00	0
030951-030933	30951	30933	1222114	03	09	39.36	30	521	0.018	2	1	0	0	52	58	71	33.51	27.93	0	0	0	21.7	21.7	21.7	21.7	30	36	49	49	50-Yr	49	2.75	71	3.25	0	3.25	0
030933-030909	30933	30909		03	09	30	29.5	302	0.0017	4.5	1	0	0	193	222	268	27.93	25.76	0	0	0	154.9	154.9	154.9	154.9	38	67	113	113	50-Yr	113	4.00	268	5.75	0	5.75	0
030909-030910	30909	30910	798428.5	03	09	29.5	29	154	0.0032	6.5	1	0	0	385	443	520	25.76	25	0	0	0	344.2	344.2	344.2	344.2	41	99	176	176	50-Yr	176	5.25	520	7.75	0	7.75	0
			11355933.02		09 Total																																
031001-031002	31001	31002	1096793	03	10	60.33	57.99	512	0.0046	2.5	1	0	0	29	33	40	55.57	54.26	60	22.1	55.1	19	19	41.1	74.2	10	0	0	10	10-Yr	10	2.00	29	3.00	0	3.00	0
031002-031003	31002	31003	359136.1	03	10	57.99	56.4	665	0.0024	3	1	0	0	40	46	56	54.26	52.57	60	16	39.9	31	31	46.9	70.8	9	0	0	9	10-Yr	9	2.00	40	3.50	0	3.50	0
031003-031004	31003	31004	422797.8	03	10	56.4	55.63	254	0.003	3.5	1	0	0	51	59	71	52.57	51.93	60	18	45	46.7	46.7	64.7	91.7	4	0	0	4	10-Yr	4	1.50	51	3.75	0	3.75	0
031004-031005	31004	31005	412716.3	03	10	55.63	54.54	391	0.0028	4	1	0	0	62	72	86	51.93	50.93	60	17.2	43.1	66.7	66.7	83.9	109.8				0								
031005-031006	31005	31006	381788.9	03	10	54.54	50	760	0.006	4	1	0	0	72	84	101	50.93	49	60	25.2	63	66.7	66.7	91.9	129.7	5	0	0	5	10-Yr	5	1.75	72	4.25	0	4.25	0
			2673232.1		10 Total																																
			31184353.32	03 Total																																	
040201-040202	40201	40202	623602.6	04	02	90.84	96.87	332	-0.0181	4	1	0	0	32	38	43	89.84	88.52	0	0	0	84.4	84.4	84.4	84.4				0								
040202-040203	40202	40203	298839.9	04	02	96.87	89.23	815	0.0094	4.25	1	0	0	48	52	64	88.52	85.27	46	109.9	207.5	99.2	99.2	209.1	306.6				0								
040231-040232	40231	40232	156316.1	04	02	89.65	92.8	388	-0.0081	2	1	0	0	11	13	13	88.65	87.13	0	0	0	13.1	13.1	13.1	13.1				0								
040232-040203	40232	40203	211336.9	04	02	92.8	89.23	475	0.0075	2.25	1	0	0	24	28	31	87.13	85.27	0	0	0	18	18	18	18	6	10	13	13	50-Yr	13	2.00	31	3.00	0	3.00	0
040203-040204	40203	40204	1000032	04	02	89.23	87.39	415	0.0044	5	1	0	0	104	117	137	85.27	83.62	46	75.6	142.7	153	153	228.6	295.7				0								
040204-040205	40204	40205	2804501	04	02	87.39	85	675	0.0035	2.5	1	0	0	10	10	10	83.62	80.93	0	0	0	24.1	24.1	24.1	24.1				0								
040205-040206	40205	40206	1456333	04	02	85	84	331	0.003	2.5	1	0	0	61	68	79	80.93	79.61	0	0	0	24.1	24.1	24.1	24.1	37	44	55	55	50-Yr	55	3.50	79	4.00	0	4.00	0
040206-040207	40206	40207		04	02	84	75	2031	0.0044	0	0	0	0	61	68	78	79.61	71.52	0	0	0	0	0	0	0	61	68	78	78	50-Yr	78	4.00	78	4.00	0	4.00	0
040207-040208	40207	40208	3194759	04	02	75	65	1887	0.0053	0	0	0	0	205	228	264	71.52	64	0	0	0	0	0	0	0	205	228	264	264	50-Yr	264	6.25	264	6.25	0	6.25	0
040207-040208	40207	40208	1518866	04	02	75	65	1887	0.0053	0	0	0	0	205	228	264	71.52	64	0	0	0	0	0	0	0	205	228	264	264	50-Yr	264	6.25	264	6.25	0	6.25	0
040208-040209	40208	40209	3402895	04	02	65	60	1339	0.0037	0	0	0	0	308	341	395	64	59	0	0	0	0	0	0	0	308	341	395	395	50-Yr	395	7.25	395	7.25	0	7.25	0
040221-040222	40221	40222	2119743	04	02	78	70	1918	0.0042	0	0	0	0	68	76	87	75.97	68.81	0	0	0	0	0	0	0	68	76	87	87	50-Yr	87	4.25	87	4.25	0	4.25	0
040222-040223	40222	40223	3719878	04	02	70	65	1286	0.0039	0	0	0	0	182	204	235	68.81	64	0	0	0	0	0	0	0	182	204	235	235	50-Yr	235	6.00	235	6.00	0	6.00	0
040223-040209	40223	40209	1718087	04	02	65	60	1645	0.003	0	0	0	0	234	262	302	64	59	0	0	0	0	0	0	0	234	262	302	302	50-Yr	302	7.00	302	7.00	0	7.00	0
			22225189.5		02 Total																																
040101-040102	40101	40102	686786.9	04	01	72.03	69.61	512	0.0047	2.5	1	0	0	20	23	27	71.03	68.61	30	67.4	117.3	26.1	26.1	93.5	143.4				0								
040102-040103	40102	40103	490305.2	04	01	69.61	68.3	326	0.004	2.5	1	0	0	35	40	47	68.61	67.14	30	62.1	108.1	25.6	25.6	87.6	133.6	9	0	0	9	10-Yr	9	1.75	35	3.00	0	3.00	0
040103-040104	40103	40104	393111.3	04	01	68.3	65.85	617	0.004	3	1	0	0	47	55	65	67.14	64.35	30	61.8	107.5	41.6	41.6	103.3	149	5	0	0	5	10-Yr	5	1.50	47	3.25	0	3.25	0
040104-040105	40104	40105	679524.1	04	01	65.85	62.96	530	0.0055	3.75	1	0	0	65	76	90	64.35	61.96	30	72.4	126	75.3	75.3	147.7	201.3				0								
040105-040106	40105	40106	692861.9	04	01	62.96	61.32	836	0.002	5	1	0	0	83	96	113	61.96	59.09	32	44.8	78.7	141	141	185.8	219.7				0								
040106-040107	40106	40107	615836.1	04	01	61.32	57	898	0.0048	4.75	1	0	0	98	114	134	59.09	56	32	70.2	123.2	123	123	193.1	246.2				0								
040107-040108	40107	40108	1925208	04	01	57	55.95	1200	0.0009	5.25	1	0	0	147	170	200	56	53.6	32	29.9	52.6	123.2	123.2	153.1	175.7	24	17	24	24	50-Yr	24	3.00	147	5.75	0	5.75	0
040108-040109	40108	40109	475785	04	01	55.95	57	457	-0.0023	6.5	1	0	0	154	176	208	53.6	52.69	0	0	0	217.7	217.7	217.7	217.7				0								
040131-040132	40131	40132	1930684	04	01	61	58	507	0.0059	3.25	1	0	0	61	68	78	55.81	53.54	80	39.4	85.1	51.4	51.4	90.8	136.5	10	0	0	10	10-Yr	10	1.75	61	3.50	0	3.50	0
040132-040109	40132	40109	269583.1	04	01	58	57	192	0.0052	3.25	1	0	0	75	84	98	53.54	52.69	0	0	0	51.4	51.4	51.4	51.4	24	33	47	47	50-Yr	47	3.25	98	4.25	0	4.25	0
040109-040110	40109	40110	307198.5	04	01	57	60	455	-0.0066	7.5	7	0	0	214	247	287	52.69	51.78	0	0	0	345.5	345.5	345.5	345.5				0								

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
040110-040111	40110	40111	357373	04	01	60	60.5	1573	-0.0003	8	7	0	0	223	254	294	51.78	48.63	0	0	0	358	358	358	358				0							
040111-040112	40111	40112	2910148	04	01	60.5	60	221	0.0023	9	8	0	0	302	346	398	48.63	48.19	80	24.4	52.6	496.8	496.8	521.2	549.5				0							
040112-040113	40112	40113	2473730	04	01	60	59.5	750	0.0007	7.08	9	0	0	370	424	487	48.19	46.69	80	13.2	28.6	413.5	413.5	426.7	442.1	0	0	45	45	50-Yr	45	3.75	45	9.00	6	9.00	0
040113-040114	40113	40114	259013.1	04	01	59.5	59.2	1048	0.0003	7.08	9	0	0	371	426	489	46.69	44.59	52	19.3	37.8	413.5	413.5	432.8	451.3	0	0	38	38	50-Yr	38	3.50	45	9.00	0	9.00	0
040114-040115	40114	40115		04	01	59.2	59	522	0.0004	8.5	1	0	0	368	422	485	44.59	43.55	52	22.3	43.7	445.2	445.2	467.5	488.9				0							
040141-040142	40141	40142	349321.8	04	01	58.41	58.3	460	0.0002	2	1	0	0	27	30	33	53.22	49.67	32	15.7	27.5	18.4	18.4	34.1	45.9	9	0	0	9	10-Yr	9	1.75	27	2.50	0	2.50	0
040142-040115	40142	40115		04	01	58.3	59	792	-0.0009	2	1	0	0	21	24	27	49.67	43.55	0	0	0	18.4	18.4	18.4	18.4	3	6	9	9	50-Yr	9	1.75	27	2.50	0	2.50	0
040115-040116	40115	40116	1140292	04	01	59	58.6	550	0.0007	8.5	1	0	0	384	442	506	43.55	42.45	52	30.7	60.2	445.2	445.2	475.9	505.4	0	0	1	1	50-Yr	1	0.75	446	9.00	0	9.00	0
040116-040117	40116	40117	84118.82	04	01	58.6	58.3	1101	0.0003	8	7	0	0	385	443	506	42.45	40.25	52	18.8	36.9	340	340	358.8	376.9	45	84	129	129	50-Yr	129	5.50	469	9.00	0	9.00	0
040117-040118	40117	40118	11149700	04	01	58.3	57	1118	0.0012	25	9	0	0	640	741	829	40.25	38.01	0	0	0	2224.8	2224.8	2224.8	2224.8				0							
040118-040119	40118	40119		04	01	57	51.16	315	0.0185	35	9	0	0	638	738	827	38.01	37.38	0	0	0	3204	3204	3204	3204				0							
040151-040152	40151	40152	2497093	04	01	70	69	305	0.0033	3.75	1	0	0	78	87	99	69	66.71	65	30.5	66.1	97.3	97.3	127.7	163.3				0							
040152-040153	40152	40153	1700882	04	01	69	68	191	0.0052	3.75	1	0	0	134	150	174	66.71	65.28	65	38.5	83.6	97.3	97.3	135.8	180.8	37	14	0	37	10-Yr	37	2.75	134	4.25	0	4.25	0
040153-040154	40153	40154	689021.8	04	01	68	65	496	0.006	3.75	1	0	0	167	189	217	65.28	61.56	66	41	89.7	97.3	97.3	138.2	187	70	51	30	70	10-Yr	70	3.50	167	4.75	0	4.75	0
040154-040155	40154	40155		04	01	65	59	860	0.007	4	1	0	0	166	189	216	61.56	55.12	66	44	96.4	115.5	115.5	159.5	211.9	50	29	4	50	10-Yr	50	3.00	166	4.75	0	4.75	0
040155-040156	40155	40156	404155.2	04	01	59	56	460	0.0065	4	1	0	0	173	197	225	55.12	51.67	66	42.5	93.2	115.5	115.5	158.1	208.7	57	39	16	57	10-Yr	57	3.25	173	4.75	0	4.75	0
040156-040157	40156	40157		04	01	56	53	482	0.0062	4.25	1	0	0	171	196	223	51.67	48.06	66	41.6	91.1	135.8	135.8	177.4	226.9	35	19	0	35	10-Yr	35	2.75	171	4.75	0	4.75	0
040157-040158	40157	40158		04	01	53	50.34	607	0.0044	3.25	1	0	0	171	195	223	48.06	43.51	66	34.9	76.4	66.4	66.4	101.3	142.8	105	94	80	105	10-Yr	105	4.00	171	4.75	0	4.75	0
040158-040119	40158	40119	467480.4	04	01	50.34	51.16	818	-0.001	5	1	0	0	177	202	229	43.51	37.38	0	0	0	209.4	209.4	209.4	209.4	0	0	20	20	50-Yr	20	2.25	229	5.25	0	5.25	0
040119-040120	40119	40120		04	01	51.16	51.93	105	-0.0074	35	9	0	0	790	905	1023	37.38	37.17	0	0	0	3204	3204	3204	3204				0							
040161-040162	40161	40162	219135	04	01	69.48	68.11	847	0.0016	2	1	0	0	22	25	27	66.92	61.73	55	45.5	91.1	16.4	16.4	61.9	107.5	6	0	0	6	10-Yr	6	1.50	22	2.25	0	2.25	0
040162-040163	40162	40163	620491.3	04	01	68.11	67.75	522	0.0007	2.5	1	0	0	40	47	52	61.73	58.54	46	29.8	56.3	29.8	29.8	59.5	86	10	0	0	10	10-Yr	10	1.75	40	3.00	0	3.00	0
040163-040164	40163	40164	328036.9	04	01	67.75	67.81	484	-0.0001	2.75	1	0	0	41	56	68	58.54	55.58	0	0	0	38.4	38.4	38.4	38.4	3	18	30	30	50-Yr	30	2.50	68	3.50	0	3.50	0
040176-040177	40176	40177	123251.7	04	01	69	67.92	665	0.0016	2.5	1	0	0	11	13	13	63.98	57.82	46	45.7	86.3	36.7	36.7	82.5	123.1				0							
040177-040164	40177	40164	297627.1	04	01	67.92	67.81	242	0.0005	2.75	1	0	0	28	32	35	57.82	55.58	46	24.2	45.6	47.4	47.4	71.5	93				0							
040164-040165	40164	40165	292057.6	04	01	67.81	65	376	0.0075	3.5	1	0	0	72	95	111	55.58	53.28	0	0	0	73	73	73	73	0	22	38	38	50-Yr	38	2.75	111	4.25	0	4.25	0
040165-040166	40165	40166	158016.5	04	01	65	62.92	840	0.0025	3.5	1	0	0	79	102	120	53.28	48.13	0	0	0	73	73	73	73	6	29	47	47	50-Yr	47	3.00	120	4.25	0	4.25	0
040166-040167	40166	40167	713873.9	04	01	62.92	46.03	1031	0.0164	3.5	1	0	0	108	135	155	48.13	41.82	0	0	0	73	73	73	73	35	62	82	82	50-Yr	82	3.75	155	4.75	0	4.75	0
040167-040168	40167	40168	176192.5	04	01	46.03	53.03	351	-0.02	4.5	1	0	0	109	136	156	41.82	39.68	0	0	0	142.6	142.6	142.6	142.6	0	0	13	13	50-Yr	13	2.00	156	4.75	0	4.75	0
040168-040120	40168	40120	1558008	04	01	53.03	51.93	409	0.0027	5	1	0	0	160	193	223	39.68	37.17	0	0	0	188.9	188.9	188.9	188.9	0	4	34	34	50-Yr	34	2.75	223	5.50	0	5.50	0
040120-040121	40120	40121		04	01	51.93	46.54	752	0.0072	35	9	0	0	920	1062	1209	37.17	35.67	0	0	0	3204	3204	3204	3204				0							
040171-040172	40171	40172	5544397	04	01	45.43	46.94	233	-0.0065	4.5	1	0	0	180	199	229	39.31	37.62	0	0	0	154.9	154.9	154.9	154.9	25	44	74	74	50-Yr	74	3.50	229	5.25	0	5.25	0
040181-040182	40181	40182	189553	04	01	52.02	51.18	434	0.0019	2.5	1	0	0	15	17	19	47.77	45.41	62	24	50.7	28	28	52	78.7				0							
040182-040172	40182	40172	389352.1	04	01	51.18	46.94	1431	0.003	3.5	1	0	0	34	41	45	45.41	37.62	62	29.7	62.7	68.7	68.7	98.3	131.4				0							
040172-040121	40172	40121	631317.2	04	01	46.94	46.54	271	0.0015	3	12	0	0	227	255	292	37.62	35.67	0	0	0	341.7	341.7	341.7	341.7				0							
040121-040122	40121	40122		04	01	46.54	48.67	843	-0.0025	35	9	0	0	1128	1293	1475	35.67	33.98	0	0	0	3204	3204	3204	3204				0							
040191-040192	40191	40192	760760.2	04	01	47.21	48.54	406	-0.0033	2.5	1	0	0	37	41	49	39.49	35.85	0	0	0	36.1	36.1	36.1	36.1	1	5	13	13	50-Yr	13	1.75	49	3.00	0	3.00	0
040192-040122	40192	40122	261926.2	04	01	48.54	48.67	209	-0.0006	4	1	0	0	47	50	63	35.85	33.98	0	0	0	126.5	126.5	126.5	126.5				0							
040122-040123	40122	40123	1453433	04	01	48.67	48.06	1106	0.0006	35	9	0	0	1206	1383	1575	33.98	31.77	0	0	0	3204	3204	3204	3204				0							
040123-040124	40123	40124	2752924	04	01	48.06	47.65	598	0.0007	35	9	0	0	1282	1468	1672	31.77	30.58	0	0	0	3204	3204	3204	3204				0							
040124-040125	40124	40125	840910.9	04	01	47.65	34.77	923	0.0139	35	9	0	0	1290	1479	1683	30.58	28.73	0	0	0	3204	3204	3204	3204				0							
040196-040125	40196	40125	324446.7	04	01	45	34.77	1063	0.0096	2	1	0	0	24	30	32	37.91	28.73	60	54.2	112.7	19.5	19.5	73.7	132.2	5	0	0	5	10-Yr	5	1.25	24	2.25	0	2.25	0
040125-040126	40125	40126	1515313	04	01	34.77	36.67	113	-0.0169	11.5	7	0	0	1338	1533	1743	28.73	28.5	0	0	0	598.8	598.8	598.8	598.8	739	934	1144	1144	50-Yr	1144	12.50	1743	14.50	0	14.50	0
040126-040127	40126	40127	195965.5	04	01	36.67	50	405	-0.0329	11.5	7	0	0	1339	1536	1745	28.5	27.69	0	0	0	598.8	598.8	598.8	598.8	740	937	1146	1146	50-Yr	1146	12.50	1745	14.50	0	14.50	0
			52296202.52		01 Total																																
040301-040302	40301	40302		04	03	94	92	469	0.0043	0	0	0	0	22	25	27	90.61	86.41	36	69.3	124	0	0	69.3	124	22	0	0	22	10-Yr	22	2.25	22	2.25	0	2.25	0
040302-040303	40302	40303	120223.5	04	03	92	91.72	323	0.0009	2	1	0	0	24	26	31	86.41	83.52	64	15.8	34	19.8	19.8	35.6	53.8	4	0	0	4	10-Yr	4	1.25	24	2.25	0	2.25	0
040303-040304	40303	40304	360751.2	04	03	91.72	86.92	509	0.0094	2.25	1	0	0	38	44	50	83.52	78.96	64	52.1	112	27.1	27.1	79.2	139.2	11	0	0	11	10-Yr	11	1.75	38	2.75	0	2.75	0
040304-040305	40304	40305	437712.5	04	03	86.92	86.26	83	0.008	2.5	1	0	0	59	67	77	78.96	78.22	0	0	0	35.9	35.9	35.9	35.9	23	31	41	41	50-Yr	41	2.75	77	3.50	0	3.50	0
040311-040312	40311	40312	1624597	04	03	100.35	98.95	267	0.0053	2	1	0	0	36	42	51	82.68	81.25	0	0	0	15.4	15.4	15.4	15.4	21	27	36	36	50-Yr	36	2.75	51	3.25	0	3.25	0
040312-040313	40312	40313		04	03	98.95	92.58	292	0.0218	2	1	0	0	36	42	51	81.25	79.67	0	0	0	15.4	15.4	15.4	15.4	21	27	36	36	50-Yr	36	2.75	51	3.25	0	3.25	0
040313-040305	40313	40305		04	03	92.58	86.26	269	0.0235	2.5	1	0	0	36	42	51	79.67	78.22	0	0	0	28	28	28	28	8	14	23	23	50-Yr	23	2.50	51	3.25	0	3.25	0
040305-040306	40305	40306		04	03	86.26	77.8	171	0.0494	3.5	1	0	0	93	106	126	78.22	76.69	0	0	0	88.1	88.1	88.1	88.1	5	18	38	38	50-Yr	38	2.75	126	4.25	0	4.25	0
040306-040307	40306	40307	168529.1	04	03	77.8	75.53	242	0.0094	3.75	1	0	0	98	113	133	76.69	74.53	0	0	0	105.9	105.9	105.9	105.9	0	7	27	27	50-Yr	27	2.25	133	4.25	0	4.25	0
040307-040308	40307	40308	390515.5	04	03	75.53	78.75	362	-0.0089	3.75	1	0	0	117	134	158	74.53	73.81	0	0	0	50.2	50.2	50.2	50.2	67	84	108	108	50-Yr	108	5.00	158	6.00	0	6.00	0
040308-040309	40308	40309	270237.5	04	03	78.75	74.47	614	0.007	3.75	1	0	0	123	143	168	73.81	72.58	0	0	0	50.2	50.2	50.2	50.2	73	93	118	118	50-Yr	118	5.25	168	6.00	0	6.00	0
040321-040322	40321	40322	317482.1	04	03	102.11	92.3	1241	0.0079	2.5	1	0	0	25	28	30	97.26	83.74	72	45.6	101.7	39.8	39.8	85.3	141.4				0							
040322-040323	40322	40323	1122603	04	03	92.3	79.07	546	0.0242	2.5	1	0	0	61	67	79	83.74	77.78	0	0	0	39.8	39.8	39.8	39.8	21	27	39	39	50-Yr	39	2.50	79	3.25	0	3.25	0
040323-040309	40323	40309	1256520	04	03	79.07	74.47	477	0.0096	3	1	0	0	105	116	139	77.78	72.58	0	0	0	64.7	64.7	64.7	64.7	40	51	74	74	50-Yr	74	3.25	139	4.00	0	4.00	0
040309-040315	40309	40315	764548.9	04	03	74.47	74.61	40	-0.0035	12.5	8	0	0	252	287	343	72.58	72.5	0	0	0	802.8	802.8	802.8	802.8				0							
040331-040332	40331	40332	815430.3	04	03	99.39	79.87	749	0.026	2	1	0	0	39	43	52	89.54	76.65	0	0	0	27.6	27.6	27.6	27.6	11	15	24	24	50-Yr	24	2.00	52	2.75	0	2.75	0
040332-040333	40332	40333	483305.7	04	03	79.87	73.5	241	0.0264	2.5	1	0	0	68	78	89	76.65	72.5	0	0	0	50	50	50	50	18	28	39	39	50-Yr	39	2.50	89	3.25	0	3.25	0
040341-040342	40341	40342	422581.1	04	03	106.76	98.94	368	0.0213	2	1	0	0	33	37	40	95.88	93.45	0	0	0	17.1	17.1	17.1	17.1	16	20	23	23	50-Yr	23	2.25	40	3.00	0	3.00	0
040342-040343	40342	40343	1460018	04	03	98.94	95.59	279	0.012	2.5	1	0	0	84	94	110	93.45	91.61	0	0	0	30.9	30.9	30.9	30.9	53	63	79	79	50-Yr	79	3.75	110	4.25	0	4.25	0
040343-040344	40343	40344		04	03	95.59	98.41	157	-0.018	3.25	1	0	0	84	93	109	91.61	90.58	0	0	0	62.3	62.3	62.3	62.3	22	31	47	47	50-Yr	47	3.00	109	4.25	0	4.25	0
040344-040345	40344	40345		04	03	98.41	94.86	489	0.0073	4	1	0	0	83	92	108	90.58	87.35	0	0	0	108.4	108.4	108.4	108.4				0							
040345-040346	40345	40346	762707.9	04	03	94.86	97.49	1100	-0.0024	4	1	0	0	119	132	154	87.35	80.09	0	0	0	108.4	108.4	108.4	108.4	11	24	46	46	50-Yr	46	3.00	154	4.75	0	4.75	0
040346-040347	40346	40347	213994.8	04	03	97.49	83.93	692	0.0196	4	1	0	0	116	129	150	80.09	75.52	30	137.1	238.7	108.4	108.4	245.5	347.1	8	0	0	8	10-Yr	8	1.50	116	4.25	0	4.75	0
040351-040352	40351	40352	1850109	04	03	87.77	84.38	606	0.0056	3	1	0	0	58	65	78	86.77	83.38	32	75.7	132.9	46.4	46.4	122	179.3	12	0	0	12	10-Yr	12	2.00	58	3.50	0	3.50	0
040352-040353	40352	40353	669644.9	04	03	84.38	82.29	1026	0.002	4	1	0	0	85	97	114	83.38	78.6	0	0	0	91.4	91.4	91.4	91.4	0	6	23	23	50-Yr	23	2.50	114	4.50	0	4.50	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVDCDI	RECDIA	RECWIDT
040356-040357	40356	40357	225227.9	04	03	85.06	84.02	147	0.0071	1.5	1	0	0	18	20	22	84.06	82.2	0	0	0	11	11	11	11	7	9	11	11	50-Yr	11	1.75	22	2.00	0	2.00	0
040357-040353	40357	40353	73482.37	04	03	84.02	82.29	285	0.0061	2	1	0	0	20	23	26	82.2	78.6	0	0	0	23.6	23.6	23.6	23.6	0	0	2	2	50-Yr	2	1.00	26	2.25	0	2.25	0
040353-040347	40353	40347	832671.7	04	03	82.29	83.93	663	-0.0025	4	1	0	0	120	137	162	78.6	75.52	0	0	0	91.4	91.4	91.4	91.4	29	46	71	71	50-Yr	71	3.75	162	5.00	0	5.00	0
040347-040348	40347	40348	1365957	04	03	83.93	76.15	648	0.012	4.75	1	0	0	280	316	368	75.52	72.5	30	107.4	186.9	144.6	144.6	252	331.5	135	64	37	135	10-Yr	135	4.75	280	6.25	0	6.25	0
			16008850.97		03 Total																																
040401-040402	40401	40402	1300522	04	04	76.07	80.33	967	-0.0044	3.5	1	0	0	32	36	42	75.04	73	0	0	0	42.8	42.8	42.8	42.8				0								
040411-040412	40411	40412	89840.03	04	04	94.39	95.68	637	-0.002	2	1	0	0	7	8	8	93.39	90.37	0	0	0	14.4	14.4	14.4	14.4				0								
040412-040413	40412	40413	577827.1	04	04	95.68	93.09	359	0.0072	2	1	0	0	21	23	28	90.37	88.66	32	85.9	150.9	14.4	14.4	100.3	165.3	7	0	0	7	10-Yr	7	1.50	21	2.50	0	2.50	0
040413-040414	40413	40414	333096.9	04	04	93.09	86.97	830	0.0074	2	1	0	0	33	39	48	88.66	84.73	32	86.9	152.6	14.4	14.4	101.3	167	19	0	0	19	10-Yr	19	2.25	33	2.75	0	2.75	0
040414-040415	40414	40415	510829.1	04	04	86.97	83.36	578	0.0062	2	1	0	0	49	56	68	84.73	81.98	32	79.9	140.4	14.4	14.4	94.3	154.8	35	0	0	35	10-Yr	35	3.00	49	3.25	0	3.25	0
040415-040416	40415	40416	518219.2	04	04	83.36	81.53	306	0.006	2.5	1	0	0	63	73	87	81.98	80.53	32	78.2	137.3	26.1	26.1	104.3	163.4	37	0	0	37	10-Yr	37	3.00	63	3.50	0	3.50	0
040416-040417	40416	40417	893855.9	04	04	81.53	80.56	268	0.0036	2.5	1	0	0	86	99	119	80.53	79.56	32	60.8	106.8	22.9	22.9	83.7	129.7	63	15	0	63	10-Yr	63	3.75	86	4.25	0	4.25	0
040417-040418	40417	40418	739042.9	04	04	80.56	80.55	173	0.0001	6	1	0	0	106	122	147	79.56	78.95	55	8.6	17.2	232.7	232.7	241.3	249.9				0								
040418-040419	40418	40419		04	04	80.55	84.18	708	-0.0051	6	1	0	0	111	127	152	78.95	76.44	0	0	0	232.7	232.7	232.7	232.7				0								
040419-040420	40419	40420	1960737	04	04	84.18	82.12	958	0.0021	6	1	0	0	156	179	212	76.44	73.05	55	52.5	105	232.7	232.7	285.1	337.7				0								
040441-040420	40441	40420	674977.8	04	04	83.19	82.12	533	0.002	1.5	1	0	0	43	49	55	77.79	73.05	55	50.7	101.4	9.2	9.2	59.9	110.6	34	0	0	34	10-Yr	34	2.50	43	2.75	0	2.75	0
040420-040421	40420	40421	2236616	04	04	82.12	78.8	493	0.0067	8	5	0	0	224	254	304	73.05	71.31	56	92.6	186.7	269.1	269.1	361.6	455.7				0								
040421-040422	40421	40422	1743572	04	04	78.8	78.77	1044	0	8	5	0	0	268	304	362	71.31	67.62	34	5.6	9.9	269.1	269.1	274.6	278.9	0	29	83	83	50-Yr	83	4.25	352	7.25	0	7.25	0
040422-040423	40422	40423	1073164	04	04	78.77	78.65	620	0.0002	5.5	1	0	0	294	337	394	67.62	65.42	56	15.7	31.6	184.5	184.5	200.2	216.1	110	137	178	178	50-Yr	178	5.50	362	7.25	0	7.25	0
040423-040424	40423	40424	661794.6	04	04	78.65	76.63	540	0.0037	5.5	1	0	0	297	340	397	65.42	63.51	56	69	139.1	184.5	184.5	253.4	323.5	113	87	73	113	10-Yr	113	4.75	297	6.75	0	7.25	0
040424-040425	40424	40425	758129.3	04	04	76.63	75.84	195	0.0041	5.5	1	0	0	305	350	407	63.51	62.83	56	71.9	144.9	184.5	184.5	256.3	329.4	121	94	78	121	10-Yr	121	4.75	305	6.75	0	7.25	0
040425-040426	40425	40426	1753472	04	04	75.84	78.34	1172	-0.0021	6	1	0	0	355	407	470	62.83	58.68	0	0	0	232.7	232.7	232.7	232.7	122	174	237	237	50-Yr	237	6.25	470	8.00	0	8.00	0
040451-040426	40451	40426	1319018	04	04	89.07	78.34	499	0.0215	2	1	0	0	44	50	62	65.73	58.68	40	161.6	295.1	24.9	24.9	186.6	320	19	0	0	19	10-Yr	19	2.00	44	2.50	0	2.50	0
040426-040427	40426	40427	708376.4	04	04	78.34	72.58	1104	0.0052	6	1	0	0	384	440	506	58.68	54.78	36	76.9	137.6	232.7	232.7	309.5	370.2	151	130	136	151	10-Yr	151	5.25	384	7.25	0	8.00	0
040427-040428	40427	40428	862577.9	04	04	72.58	74.93	519	-0.0045	6	1	0	0	394	451	517	54.78	52.94	0	0	0	232.7	232.7	232.7	232.7	161	218	284	284	50-Yr	284	6.50	517	8.50	0	8.50	0
040461-040462	40461	40462	338320.9	04	04	70.65	75.82	783	-0.0066	2.5	1	0	0	27	30	36	62.35	54.03	0	0	0	39.2	39.2	39.2	39.2				0								
040462-040428	40462	40428	660124.1	04	04	75.82	74.93	102	0.0087	2.5	1	0	0	50	57	65	54.03	52.94	0	0	0	39.2	39.2	39.2	39.2	11	18	26	26	50-Yr	26	2.25	65	3.25	0	3.25	0
040428-040429	40428	40429	609354.4	04	04	74.93	72.18	601	0.0046	6	1	0	0	437	497	577	52.94	50.82	36	72	128.8	232.7	232.7	304.6	361.4	204	192	216	216	50-Yr	216	6.00	448	7.75	0	8.50	0
040429-040430	40429	40430	691169.8	04	04	72.18	67.41	1001	0.0048	6	1	0	0	456	517	596	50.82	47.28	42	77.1	142.3	232.7	232.7	309.8	374.9	223	207	221	223	10-Yr	223	6.00	456	7.75	0	8.50	0
040471-040430	40471	40430	1595893	04	04	72.08	67.41	374	0.0125	2.5	1	0	0	54	62	75	52.7	47.28	46	126.8	239.3	45.9	45.9	172.7	285.2	8	0	0	8	10-Yr	8	1.50	54	2.75	0	2.75	0
040430-040431	40430	40431	334472.6	04	04	67.41	64.79	479	0.0055	6	1	0	0	508	577	668	47.28	45.58	52	84.2	165.2	232.7	232.7	316.9	397.8	275	260	270	275	10-Yr	275	6.50	508	8.50	0	8.50	0
040431-040432	40431	40432	1074892	04	04	64.79	66.27	1064	-0.0014	6	1	0	0	545	622	715	45.58	41.82	0	0	0	232.7	232.7	232.7	232.7	312	389	482	482	50-Yr	482	8.00	715	9.50	0	9.50	0
040481-040482	40481	40482	1615725	04	04	87.88	89.67	374	-0.0048	2.5	1	0	0	49	56	69	74.73	71.74	0	0	0	34.1	34.1	34.1	34.1	15	22	35	35	50-Yr	35	2.75	69	3.50	0	3.50	0
040482-040483	40482	40483	235695.1	04	04	89.67	89.67	818	0	2.75	1	0	0	59	66	81	71.74	65.21	0	0	0	43.9	43.9	43.9	43.9	15	22	37	37	50-Yr	37	2.75	81	3.50	0	3.50	0
040483-040484	40483	40484	937172.3	04	04	89.67	89.98	681	-0.0005	3	1	0	0	86	100	127	65.21	59.76	0	0	0	55.4	55.4	55.4	55.4	31	45	72	72	50-Yr	72	3.50	127	4.25	0	4.25	0
040484-040485	40484	40485	530215.3	04	04	89.98	92.35	634	-0.0037	2.75	1	0	0	96	111	145	59.76	54.69	0	0	0	43.9	43.9	43.9	43.9	52	67	101	101	50-Yr	101	4.00	145	4.50	0	4.50	0
040485-040486	40485	40486	329712.3	04	04	92.35	77.02	706	0.0217	2.5	1	0	0	100	116	147	54.69	49.04	72	75.5	168.4	34.1	34.1	109.5	202.5	66	6	0	66	10-Yr	66	3.25	100	3.75	0	4.50	0
040486-040487	40486	40487	263355.4	04	04	77.02	72.85	411	0.0102	2.75	1	0	0	111	127	157	49.04	45.75	72	51.6	115.2	43.9	43.9	95.5	159.1	67	31	0	67	10-Yr	67	3.25	111	4.00	0	4.50	0
040487-040432	40487	40432	292951.8	04	04	72.85	66.27	492	0.0134	3	1	0	0	125	141	173	45.75	41.82	72	59.2	132.2	55.4	55.4	114.6	187.6	70	26	0	70	10-Yr	70	3.50	125	4.25	0	4.50	0
040432-040433	40432	40433	544239.6	04	04	66.27	59.47	596	0.0114	6.25	1	0	0	650	741	869	41.82	39.71	56	120.5	242.9	259.4	259.4	379.9	502.3	391	361	367	391	10-Yr	391	7.50	650	9.00	0	9.50	0
			28768961.73		04 Total																																
040501-040502	40501	40502	297152.6	04	05	102.5	97.56	716	0.0069	2	1	0	0	16	18	22	96.06	92.49	72	42.5	94.9	14.9	14.9	57.4	109.8	1	0	0	1	10-Yr	1	1.00	16	2.25	0	2.25	0
040502-040503	40502	40503	497579.2	04	05	97.56	90.37	718	0.01	2	1	0	0	31	36	43	92.49	88.91	72	51.3	114.4	14.9	14.9	66.1	129.2	16	0	0	16	10-Yr	16	2.25	31	2.75	0	2.75	0
040503-040504	40503	40504	593326.8	04	05	90.37	87.6	466	0.0059	2	1	0	0	49	57	67	88.91	86.58	72	39.5	88.1	14.9	14.9	54.3	103	34	3	0	34	10-Yr	34	2.75	49	3.25	0	3.25	0
040504-040505	40504	40505	391739.4	04	05	87.6	84.61	652	0.0046	2	1	0	0	57	65	79	86.58	83.33	87	34.7	70.1	14.9	14.9	49.5	84.9	42	15	0	42	10-Yr	42	3.00	57	3.50	0	3.50	0
040505-040506	40505	40506	1457568	04	05	84.61	80.98	671	0.0054	3	1	0	0	95	108	128	83.33	79.98	87	37.7	76.1	43.8	43.8	81.5	119.9	51	27	8	51	10-Yr	51	3.25	95	4.25	0	4.25	0
040521-040506	40521	40506	2109536	04	05	87.74	80.98	1324	0.0051	3	1	0	0	58	65	75	83.44	79.98	42	79.8	147.2	31.6	31.6	111.4	178.8	26	0	0	26	10-Yr	26	3.00	58	4.00	0	4.00	0
040506-040507	40506	40507	1436907	04	05	80.98	82.97	525	-0.0038	3.75	1	0	0	183	208	245	79.98	77.44	0	0	0	77.8	77.8	77.8	77.8	105	130	167	167	50-Yr	167	5.00	245	6.00	0	6.00	0
040507-040508	40507	40508	572884.7	04	05	82.97	79.03	838	0.0047	4	1	0	0	199	226	265	77.44	73.38	36	73	130.5	92.4	92.4	165.4	222.9	107	61	42	107	10-Yr	107	4.25	199	5.50	0	6.00	0
040508-040509	40508	40509	894346.8	04	05	79.03	74.99	985	0.0041	4.25	1	0	0	224	253	297	73.38	68.61	0	0	0	108.6	108.6	108.6	108.6	115	144	188	188	50-Yr	188	5.25	297	6.25	0	6.25	0
040509-040510	40509	40510	3335748	04	05	74.99	73.77	648	0.0019	4.5	1	0	0	260	298	354	68.61	65.48	28	41	70.7	126.5	126.5	167.5	197.2	133	131	157	157	50-Yr	157	5.00	283	6.25	0	6.25	0
040541-040542	40541	40542	716418.3	04	05	83.23	80.75	358	0.0069	1.25	1	0	0	14	17	23	70.04	68.51	0	0	0	3.9	3.9	3.9	3.9	10	13	19	19	50-Yr	19	2.50	23	2.50	0	2.50	0
040542-040543	40542	40543	287028.9	04	05	80.75	75.36	400	0.0135	2.5	1	0	0	23	28	37	68.51	66.8	0	0	0	25	25	25	25	0	3	12	12	50-Yr	12	2.00	37	3.00	0	3.00	0
040543-040510	40543	40510	175785.8	04	05	75.36	73.77	309	0.0051	2.5	1	0	0	32	36	49	66.8	65.48	0	0	0	25	25	25	25	7	11	24	24	50-Yr	24	2.50	49	3.25	0	3.25	0
040510-040511	40510	40511	735773.9	04	05	73.77	70.07	469	0.0079	4.25	1	0	0	284	327	389	65.48	63.21	30	87.1	151.5	108.6	108.6	195.7	260.2	175	131	129	175	10-Yr	175	5.25	284	6.25	0	6.25	0
040511-040512	40511	40512	1250191	04	05	70.07	66.86	595	0.0054	4.5	1	0	0	304	348	418	63.21	60.33	40	81	147.9	126.5	126.5	207.5	274.4	177	140	144	177	10-Yr	177	5.25	304	6.50	0	6.50	0
040512-040513	40512	40513	776785	04	05	66.86	65.44	623	0.0023	4.5	1	0	0	308	354	424	60.33	57.31	30	46.8	81.5	126.5	126.5	173.3	208	181	181	216	216	50-Yr	216	5.75	343	6.75	0	6.75	0
040513-040514	40513	40514	602661.4	04	05	65.44	64.37	343	0.0031	4.5	1	0	0	314	360	430	57.31	55.65	30	54.7	95.3	126.5	126.5	181.2	221.8	187	179	208	208	50-Yr	208	5.50	335	6.50	0	6.75	0
040514-040515	40514	40515	1000868	04	05	64.37	66.39	622	-0.0032	5.75	1	0	0	345	403	474	55.65	52.64	0	0	0	243.2	243.2	243.2	243.2	102	160	231	231	50-Yr	231	5.75	474	7.50	0	7.50	0
040515-040516	40515	40516	388499.3	04	05	66.39	68.03	697	-0.0024	5.75	1	0	0	347	403	478	52.64	49.27	0	0	0	243.2	243.2	243.2	243.2	104	160	235	235	50-Yr	235	5.75	478	7.50	0	7.50	0
040531-040532	40531	40532	570515.9	04	05	88.01	87.59	1302	0.0003	2.5	1	0	0	19	22	28	85.44	77.85	30	17.6	30.6	29	29	46.6	59.6				0								
040532-040533	40532	40533	1153464	04	05	87.59	84.19	924	0.0037	2.75	1	0	0	38	44	51	77.85	72.46	27	56.1	96.4	37.4	37.4	93.5	133.8	1	0	0	1	10-Yr	1	0.75	38	3.00	0	3.00	0
040533-040534	40533	40534	420999.1	04	05	84.19	81.71	821	0.003	2.75	1	0	0	50	58	65	72.46	67.67	65	29.2	63.4	37.4	37.4	66.6	100.8	13	0	0	13	10-Yr	13	2.00	50	3.25	0	3.25	0
040534-040535	40534	40535	1670754	04	05	81.71	81.92	480	-0.0004	3.5	1	0	0	87	100	115	67.67	64.87	0	0	0	71.2	71.2	71.2	71.2	16	29	44	44	50-Yr	44	3.00	115	4.25	0	4.25	0
040535-040536	40535	40536	308220.9	04	05	81.92	81.85	637	0.0001	3.5	1	0	0	90	103	119	64.87	61.16	50	12	23.1	71.2	71.2	83.1	94.3	19	20	25	25	50-Yr	25	2.50	96	4.00	0	4.25	0
040536-040537	40536	40537	776756.4	04	05	81.85	79.57	991	0.0023	3.25	1	0	0	107	124	141	61.16	55.38	40	52.9	96.5	58.4	58.4	111.3	154.9	49	13	0	49	10-Yr	49	3.25	107	4.25	0	4.25	0
040537-040516	40537	40516	614023	04	05	79.57	68.03	1048	0.011	3.25	1	0	0	118	138	157	55.38	49.27	65	55.8	121.1	58.4	58.4	114.2	179.5	60	24	0	60	10-Yr	60	3.50	118	4.25	0	4.25	0
040516-040517	40516	40517	3065978	04	05	68.03	63.64	1576	0.0028	7	1	0	0	546	631	741	49.27	41.64	72	27	60.3	411	411	438	471.3	135	193	270	270	50-Yr	270	6.00	681	8.50	0	8.50	0
			26101511.4		05 Total																																
040517-040433	40517	40433	780579.4	04	04	63.64	59.47	399	0.0105	7	1	0	0	552	639	746	41.64	39.71	23	85.6	145	411	411	496.6	556	141	142	190	190	50-Yr	190	5.25	601	8.50	0	8.50	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
040433-040434	40433	40434	176429.7	04	04	59.47	56.71	562	0.0049	9.25	7	0	0	1197	1368	1607	39.71	37.72	56	79	159.3	600.9	600.9	679.9	760.1	596	688	847	847	50-Yr	847	10.00	1448	12.00	0	12.00	0
040434-040435	40434	40435	526096.3	04	04	56.71	38.14	865	0.0215	10.5	6	0	0	1202	1375	1612	37.72	34.66	56	165.2	333.1	568.2	568.2	733.4	901.3	634	642	711	711	50-Yr	711	9.50	1279	11.50	0	12.50	0
			1483105.4		04 Total																																
040435-040127	40435	40127	395009.9	04	01	38.14	50	187	-0.0633	10.5	6	0	0	1206	1379	1616	34.66	34	0	0	0	568.2	568.2	568.2	568.2	638	811	1048	1048	50-Yr	1048	11.00	1616	12.50	0	12.50	0
			395009.9		01 Total																																
040601-040602	40601	40602	1638640	04	06	61.79	59	701	0.004	0	0	0	0	69	79	96	55.88	52.24	30	61.8	107.6	0	0	61.8	107.6	69	17	0	69	10-Yr	69	3.75	69	3.75	0	3.75	0
040602-040603	40602	40603	633177.4	04	06	59	56.5	1264	0.002	4	1	0	0	96	106	130	52.24	45.68	33	45.6	80.5	96.2	96.2	141.8	176.7				0								
040603-040604	40603	40604	826877.7	04	06	56.5	53	1099	0.0032	4.5	1	0	0	123	136	164	45.68	39.97	33	57.9	102.2	131.7	131.7	189.6	233.8				0								
040611-040612	40611	40612	441125.8	04	06	59.62	57.59	442	0.0046	2	1	0	0	37	43	45	48.59	44.15	44	76.4	142.5	21	21	97.4	163.5	16	0	0	16	10-Yr	16	2.00	37	2.50	0	2.50	0
040612-040613	40612	40613	521307.8	04	06	57.59	55.58	222	0.0091	2.25	1	0	0	67	74	85	44.15	41.93	0	0	0	28.8	28.8	28.8	28.8	38	45	56	56	50-Yr	56	3.00	85	3.50	0	3.50	0
040613-040604	40613	40604		04	06	55.58	53	195	0.0132	2.5	1	0	0	66	73	84	41.93	39.97	0	0	0	38.1	38.1	38.1	38.1	28	35	46	46	50-Yr	46	2.75	84	3.50	0	3.50	0
040604-040605	40604	40605	521701.6	04	06	53	52.21	351	0.0022	4.5	1	0	0	187	209	247	39.97	38.15	33	48.7	85.8	131.7	131.7	180.3	217.5	55	29	30	55	10-Yr	55	3.50	187	5.25	0	5.25	0
			4582830.3		06 Total																																
040605-040127	40605	40127	468753.7	04	01	52.21	50	799	0.0028	4.5	1	0	0	209	233	276	38.15	34	33	54	95.2	131.7	131.7	185.7	226.9	77	47	49	77	10-Yr	77	3.75	209	5.50	0	5.50	0
			468753.7		01 Total																																
			152330415.4		04 Total																																
051701-051702	51701	51702	413466.3	05	17	80.66	80.83	702	-0.0002	3	1	0	0	17	19	23	78.58	77.17	0	0	0	27.7	27.7	27.7	27.7				0								
051702-051703	51702	51703	1149458	05	17	80.83	80.35	284	0.0017	4	1	0	0	45	51	60	77.17	76.6	55	27.7	67.2	59.7	59.7	87.3	126.8				0								
051707-051708	51707	51708	124111.8	05	17	87.94	83.23	603	0.0078	2	1	0	0	10	12	13	84.24	79.45	0	0	0	18.8	18.8	18.8	18.8				0								
051708-051703	51708	51703	352185.5	05	17	83.23	80.35	357	0.0081	2	1	0	0	26	29	34	79.45	76.6	0	0	0	18.8	18.8	18.8	18.8	7	10	15	15	50-Yr	15	2.00	34	2.50	0	2.50	0
051703-051704	51703	51704	262865.4	05	17	80.35	79.41	496	0.0019	4.5	1	0	0	76	86	101	76.6	75.61	55	29.3	71.2	81.7	81.7	111	152.9				0								
051711-051712	51711	51712	241180	05	17	78.99	79.62	426	-0.0015	2	1	0	0	16	19	21	77.78	76.92	0	0	0	9.4	9.4	9.4	9.4	7	10	12	12	50-Yr	12	2.25	21	2.75	0	2.75	0
051712-051713	51712	51713	365744.1	05	17	79.62	79.6	222	0.0001	2.5	1	0	0	33	39	44	76.92	76.48	0	0	0	17	17	17	17	16	22	27	27	50-Yr	27	3.00	44	3.75	0	3.75	0
051713-051704	51713	51704	323653.5	05	17	79.6	79.41	1014	0.0002	3.5	1	0	0	43	50	58	76.48	74.45	42	10	21.2	41.8	41.8	51.7	62.9	1	0	0	1	10-Yr	1	1.00	43	3.75	0	3.75	0
051704-051705	51704	51705	1241609	05	17	79.41	79.18	745	0.0003	4.5	1	0	0	121	137	163	75.61	74.12	55	11.8	28.7	81.7	81.7	93.5	110.4	39	44	53	53	50-Yr	53	4.00	134	5.50	0	5.50	0
051721-051722	51721	51722	1597423	05	17	81.98	78.39	167	0.0214	2.25	1	0	0	40	45	53	77.78	77.05	24	89.8	168	19.1	19.1	108.9	187.1	21	0	0	21	10-Yr	21	2.50	40	3.00	0	3.00	0
051722-051723	51722	51723	564982.6	05	17	78.39	77.31	168	0.0064	2.75	1	0	0	63	71	83	77.05	76.31	24	49.2	92	32.6	32.6	81.8	124.5	30	0	0	30	10-Yr	30	2.75	63	3.75	0	3.75	0
051723-051724	51723	51724	76825.81	05	17	77.31	80.63	1094	-0.003	0	0	0	0	68	76	90	76.31	74.12	0	0	0	0	0	0	0	68	76	90	90	50-Yr	90	4.75	90	4.75	0	4.75	0
051731-051732	51731	51732	369250.8	05	17	82.69	81.11	444	0.0036	3.25	1	0	0	18	21	24	81.17	80.11	0	0	0	37.6	37.6	37.6	37.6				0								
051732-051733	51732	51733	194832	05	17	81.11	83.31	468	-0.0047	3.75	1	0	0	28	32	37	80.11	79.17	0	0	0	50.2	50.2	50.2	50.2				0								
051733-051734	51733	51734	489761.1	05	17	83.31	85.91	599	-0.0043	4.25	1	0	0	49	55	64	79.17	77.98	0	0	0	70.1	70.1	70.1	70.1				0								
051734-051735	51734	51735	369564.3	05	17	85.91	86.64	532	-0.0014	5	1	0	0	61	69	80	77.98	76.91	0	0	0	108.2	108.2	108.2	108.2				0								
051735-051736	51735	51736	301692.6	05	17	86.64	85.68	357	0.0027	5.25	1	0	0	69	76	85	76.91	76.2	0	0	0	123.2	123.2	123.2	123.2				0								
051736-051737	51736	51737	236979.4	05	17	85.68	84.23	574	0.0025	5.75	1	0	0	71	79	93	76.2	75.05	0	0	0	157	157	157	157				0								
051737-051738	51737	51738	402860.8	05	17	84.23	79.17	929	0.0054	6	1	0	0	84	97	113	75.05	73.19	0	0	0	175.9	175.9	175.9	175.9				0								
			9078446.01		17 Total																																
051601-051602	51601	51602	638043.2	05	16	79.33	80.89	235	-0.0066	2	1	0	0	37	41	46	78.33	77.85	0	0	0	9.4	9.4	9.4	9.4	28	32	37	37	50-Yr	37	3.50	46	3.75	0	3.75	0
051602-051603	51602	51603	2306771	05	16	80.89	79.21	508	0.0033	4.5	1	0	0	110	123	139	77.85	76.82	0	0	0	81.7	81.7	81.7	81.7	28	41	57	57	50-Yr	57	4.00	139	5.50	0	5.50	0
051603-051604	51603	51604	1124110	05	16	79.21	79.53	283	-0.0011	4.5	1	0	0	156	174	199	76.82	76.25	0	0	0	81.7	81.7	81.7	81.7	74	92	117	117	50-Yr	117	5.25	199	6.50	0	6.50	0
			4068924.2		16 Total																																
051501-051502	51501	51502	285621.5	05	15	103.51	93.44	755	0.0133	2	1	0	0	26	29	31	93.59	86	42	83.9	178.5	21.1	21.1	105	199.6	5	0	0	5	10-Yr	5	1.25	26	2.25	0	2.25	0
051511-051502	51511	51502	560247.8	05	15	96.76	93.44	180	0.0185	2	1	0	0	37	41	45	87.11	86	0	0	0	16.5	16.5	16.5	16.5	20	24	28	28	50-Yr	28	2.50	45	3.00	0	3.00	0
051502-051503	51502	51503	525972.1	05	15	93.44	88.83	213	0.0217	2.5	1	0	0	92	104	117	86	84.68	0	0	0	30	30	30	30	62	74	87	87	50-Yr	87	3.75	117	4.25	0	4.25	0
051503-051504	51503	51504	537613.5	05	15	88.83	82.03	588	0.0116	2.5	1	0	0	125	141	160	84.68	81.03	0	0	0	30	30	30	30	95	111	130	130	50-Yr	130	4.50	160	4.75	0	4.75	0
051516-051504	51516	51504	391065.2	05	15	91.33	82.03	521	0.0178	2.5	1	0	0	30	34	40	88.47	81.03	0	0	0	45.6	45.6	45.6	45.6				0								
051504-051505	51504	51505	460027.3	05	15	82.03	78.31	1022	0.0036	4.5	1	0	0	178	201	230	81.03	77.22	72	19.7	46.7	111.1	111.1	130.8	157.8	67	70	72	72	50-Yr	72	4.00	183	5.50	0	5.50	0
051505-051506	51505	51506	262912.9	05	15	78.31	77.82	107	0.0046	5	1	0	0	174	195	224	77.22	76.82	30	45.9	89	147.1	147.1	193	236.1	27	2	0	27	10-Yr	27	2.75	174	5.50	0	5.50	0
051521-051522	51521	51522	160754.6	05	15	84.75	82.95	189	0.0095	1.5	1	0	0	15	17	18	78.24	77.82	0	0	0	4.6	4.6	4.6	4.6	10	12	13	13	50-Yr	13	2.25	18	2.75	0	2.75	0
051522-051523	51522	51523	114465.8	05	15	82.95	78.29	246	0.019	2	1	0	0	25	28	31	77.82	77.29	0	0	0	9.9	9.9	9.9	9.9	15	18	21	21	50-Yr	21	2.75	31	3.25	0	3.25	0
051523-051524	51523	51524	117989.1	05	15	78.29	77.58	503	0.0014	2.5	1	0	0	35	38	43	77.29	76.28	0	0	0	17	17	17	17	18	21	26	26	50-Yr	26	3.00	43	3.75	0	3.75	0
051526-051527	51526	51527	1690241	05	15	81.9	81.12	172	0.0045	3	1	0	0	60	67	81	78.4	78.01	72	22	52.2	29.7	29.7	51.7	81.9	30	15	0	30	10-Yr	30	3.25	60	4.00	0	4.00	0
051527-051524	51527	51524	627782.1	05	15	81.12	77.58	625	0.0057	3.5	1	0	0	96	107	127	78.01	76.58	72	24.6	58.2	44.8	44.8	69.4	103.1	51	38	24	51	10-Yr	51	3.75	96	4.75	0	4.75	0
051524-051506	51524	51506	116922.9	05	15	77.58	77.82	304	-0.0008	3.5	1	0	0	123	138	169	76.58	75.97	0	0	0	41.8	41.8	41.8	41.8	81	96	127	127	50-Yr	127	5.50	169	6.00	0	6.00	0
051506-051507	51506	51507	3721157	05	15	77.82	86.27	620	-0.0136	5	1	0	0	388	434	511	76.82	75.58	0	0	0	108.2	108.2	108.2	108.2	280	326	403	403	50-Yr	403	8.50	511	9.00	0	9.00	0
051531-051532	51531	51532	2325765	05	15	82.23	81.23	144	0.0069	2.25	1	0	0	65	75	94	81.23	80.23	0	0	0	23.9	23.9	23.9	23.9	41	51	70	70	50-Yr	70	3.50	94	4.00	0	4.00	0
051536-051532	51536	51532	3741150	05	15	82.1	81.23	113	0.0077	2.75	1	0	0	97	109	126	81.1	80.23	0	0	0	43.1	43.1	43.1	43.1	54	66	83	83	50-Yr	83	3.75	126	4.25	0	4.25	0
051532-051533	51532	51533		05	15	81.23	79.94	526	0.0025	3.75	1	0	0	161	183	219	80.23	78.94	72	16.2	38.3	56.2	56.2	72.3	94.5	105	111	125	125	50-Yr	125	5.25	181	6.00	0	6.00	0
051533-051534	51533	51534	652126	05	15	79.94	79.61	359	0.0009	3.75	1	0	0	190	215	259	78.94	78.22	134	19.8	44.5	50.2	50.2	70	94.7	140	145	164	164	50-Yr	164	6.00	215	6.50	0	6.50	0
051534-051507	51534	51507	391203.2	05	15	79.61	86.27	1069	-0.0062	4	1	0	0	193	223	265	78.22	76.08	0	0	0	59.7	59.7	59.7	59.7	133	163	205	205	50-Yr	205	6.50	265	7.00	0	7.00	0
051541-051542	51541	51542	1294935	05	15	77.43	78.42	116	-0.0085	2	1	0	0	54	60	74	76.43	76.2	0	0	0	9.4	9.4	9.4	9.4	45	51	65	65	50-Yr	65	4.25	74	4.50	0	4.50	0
051551-051552	51551	51552	735419.6	05	15	84.39	81.07	446	0.0074	2	1	0	0	42	52	57	78.89	77.96	0	0	0	9.6	9.6	9.6	9.6	32	42	47	47	50-Yr	47	3.75	57	4.00	0	4.00	0
051552-051553	51552	51553	100599.4	05	15	81.07	77.11	887	0.0045	2.5	1	0	0	48	57	64	77.96	76.11	0	0	0	17.5	17.5	17.5	17.5	31	40	47	47	50-Yr	47	3.75	64	4.25	0	4.25	0
051553-051554	51553	51554	277635.5	05	15	77.11	79.68	540	-0.0048	2.25	1	0	0	51	61	70	76.11	75.03	0	0	0	12.9	12.9	12.9	12.9	38	48	57	57	50-Yr	57	4.00	70	4.25	0	4.25	0
051554-051555	51554	51555	441388.1	05	15	79.68	77.37	261	0.0088	2.25	1	0	0	71	78	95	75.03	74.51	30	63.8	123.9	12.9	12.9	76.7	136.8	58	1	0	58	10-Yr	58	4.00	71	4.50	0	4.50	0
051555-051556	51555	51556	367518.5	05	15	77.37	78.72	375	-0.0036	2.25	1	0	0	94	105	125	74.51	73.76	0	0	0	12.9	12.9	12.9	12.9	81	92	112	112	50-Yr	112	5.25	125	5.50	0	5.50	0
051561-051562	51561	51562	770134	05	15	80.47	79.81	329	0.002	2	1	0	0	47	53	63	75.66	75	0	0	0	9.4	9.4	9.4	9.4	38	44	54	54	50-Yr	54	4.00	63	4.25	0	4.25	0
			20670647.1		15 Total																																
1401-051402	51401	51402	649355.9	05	14	99.51	98.14	153	0.009	2.5	1	0	0	35	39	47	93.65	92.79	0	0	0	28.5	28.5	28.5	28.5	7	11	19	19	50-Yr	19	2.25	47	3.25	0	3.25	0
1402-051403	51402	51403	791975.8	05	14	98.14	91.7	1207	0.0053	2.5	1	0	0	73	82	99	92.79	86.05	0	0	0	28.5	28.5	28.5	28.5	45	54	71	71	50-Yr	71	3.75	99	4.00	0	4.00	0
1403-051404	51403	51404	1484308	05	14	91.7	93.59	153	-0.0124	2.5	1	0	0	110	125	152	86.05	85.2	0	0	0	28.5	28.5	28.5	28.5	82	97	124	124	50-Yr	124	4.50	152	4.75	0	4.75	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
051411-051412	51411	51412	2068758	05	14	88.6	90.14	143	-0.0108	3.25	1	0	0	63	73	90	87.6	87.31	0	0	0	34.3	34.3	34.3	34.3	29	39	56	56	50-Yr	56	4.00	90	4.75	0	4.75	0
051412-051413	51412	51413	2129612	05	14	90.14	106.09	552	-0.0289	4.25	1	0	0	127	146	183	87.31	86.21	0	0	0	70.1	70.1	70.1	70.1	57	76	113	113	50-Yr	113	5.25	183	6.25	0	6.25	0
051417-051413	51417	51413	825824.9	05	14	92.77	106.09	517	-0.0258	1.75	1	0	0	40	49	60	90.51	86.21	0	0	0	13.4	13.4	13.4	13.4	27	36	47	47	50-Yr	47	3.00	60	3.25	0	3.25	0
051413-051414	51413	51414	201326.1	05	14	106.09	105.79	563	0.0005	4.5	1	0	0	168	198	247	86.21	85.08	52	16	37.6	81.7	81.7	97.7	119.2	86	100	128	128	50-Yr	128	5.50	209	6.50	0	6.50	0
051414-051415	51414	51415	195058	05	14	105.79	105.96	213	-0.0008	5	1	0	0	165	193	240	85.08	84.66	0	0	0	108.2	108.2	108.2	108.2	57	85	132	132	50-Yr	132	5.50	240	6.75	0	6.75	0
051421-051422	51421	51422	3595660	05	14	103.78	104.01	397	-0.0006	2.25	1	0	0	98	109	127	92.67	85.2	0	0	0	39.4	39.4	39.4	39.4	59	70	88	88	50-Yr	88	3.25	127	3.50	0	3.50	0
051431-051432	51431	51432	191727.9	05	14	107.37	101.25	223	0.0274	1.5	1	0	0	14	16	17	90.64	85.2	0	0	0	15.2	15.2	15.2	15.2	0	1	2	2	50-Yr	2	0.75	17	1.75	0	1.75	0
			12133606.6		14 Total																																
051301-051302	51301	51302	527754.6	05	13	90.92	87.66	174	0.0188	1.75	1	0	0	20	24	29	83.79	81.11	0	0	0	18.3	18.3	18.3	18.3	2	6	11	11	50-Yr	11	1.50	29	2.25	0	2.25	0
051302-051303	51302	51303	408185.7	05	13	87.66	75.39	435	0.0282	1.5	1	0	0	37	43	53	81.11	74.39	0	0	0	12.1	12.1	12.1	12.1	25	31	41	41	50-Yr	41	2.50	53	2.75	0	2.75	0
051303-051304	51303	51304	223070	05	13	75.39	68.63	718	0.0094	0	0	0	0	48	56	68	74.39	64.5	36	69.5	140.7	0	0	69.5	140.7	48	0	0	48	10-Yr	48	2.75	48	2.75	0	2.75	0
051311-051312	51311	51312	453484.5	05	13	92.21	89.52	238	0.0113	1.5	1	0	0	31	35	42	81.6	79.94	30	72.2	140.2	8.2	8.2	80.4	148.4	23	0	0	23	10-Yr	23	2.25	31	2.50	0	2.50	0
051312-051314	51312	51314	819923.8	05	13	89.52	96.81	462	-0.0158	3	1	0	0	64	75	90	79.94	76.72	0	0	0	51.8	51.8	51.8	51.8	12	23	38	38	50-Yr	38	2.75	90	3.75	0	3.75	0
051314-051315	51314	51315	608253.9	05	13	96.81	92.34	455	0.0098	3.25	1	0	0	85	100	119	76.72	73.54	0	0	0	64.2	64.2	64.2	64.2	21	36	55	55	50-Yr	55	3.25	119	4.25	0	4.25	0
051315-051316	51315	51316	437413.3	05	13	92.34	69.44	1218	0.0188	3.5	1	0	0	96	108	136	73.54	65.02	0	0	0	78.2	78.2	78.2	78.2	18	30	58	58	50-Yr	58	3.25	136	4.50	0	4.50	0
051316-051317	51316	51317	762041.7	05	13	69.44	68.94	75	0.0067	3.5	1	0	0	110	129	160	65.02	64.5	0	0	0	78.2	78.2	78.2	78.2	32	51	82	82	50-Yr	82	3.75	160	4.75	0	4.75	0
051321-051322	51321	51322	352999.4	05	13	94.13	89.07	420	0.0121	2.25	1	0	0	26	30	33	91.88	88.07	30	74.6	144.7	27.4	27.4	102	172.2				0							
051336-051322	51336	51322	250709.5	05	13	89.99	89.07	174	0.0053	2.5	1	0	0	17	20	21	88.99	88.07	0	0	0	27.7	27.7	27.7	27.7				0							
051322-051323	51322	51323	144465.4	05	13	89.07	95.34	328	-0.0191	2.75	1	0	0	47	53	61	88.07	86.19	0	0	0	37.1	37.1	37.1	37.1	10	16	24	24	50-Yr	24	2.50	61	3.50	0	3.50	0
051323-051324	51323	51324	147038.6	05	13	95.34	94.18	383	0.003	3.5	1	0	0	53	59	69	86.19	83.99	0	0	0	70.5	70.5	70.5	70.5				0							
051341-051324	51341	51324	215812.7	05	13	94.23	94.18	556	0.0001	1.5	1	0	0	18	21	22	87.43	83.99	0	0	0	7.7	7.7	7.7	7.7	10	13	14	14	50-Yr	14	2.00	22	2.25	0	2.25	0
051324-051325	51324	51325	529675.1	05	13	94.18	86.01	661	0.0124	3.75	1	0	0	81	93	108	83.99	80.2	0	0	0	84.8	84.8	84.8	84.8	0	8	23	23	50-Yr	23	2.50	108	4.25	0	4.25	0
051346-051347	51346	51347	307403.6	05	13	111.19	95.01	241	0.0673	2.25	1	0	0	25	29	31	89.39	86.87	36	185.7	376.1	29.5	29.5	215.2	405.6				0							
051347-051348	51347	51348	305079.2	05	13	95.01	92.82	233	0.0094	2.75	1	0	0	46	53	59	86.87	84.44	36	69.5	140.7	50.3	50.3	119.8	191				0							
051348-051325	51348	51325	208252.4	05	13	92.82	86.01	406	0.0168	2.75	1	0	0	60	67	77	84.44	80.2	36	92.7	187.9	50.3	50.3	143.1	238.2	10	0	0	10	10-Yr	10	1.50	60	3.00	0	3.00	0
051351-051352	51351	51352	309668.8	05	13	110.66	98.58	477	0.0253	1.5	1	0	0	24	28	30	102.74	96.41	0	0	0	11.3	11.3	11.3	11.3	13	17	19	19	50-Yr	19	2.00	30	2.25	0	2.25	0
051352-051353	51352	51353	421849.8	05	13	98.58	91.33	515	0.0141	2	1	0	0	51	58	64	96.41	89.57	45	85.8	187.4	24.2	24.2	110	211.6	27	0	0	27	10-Yr	27	2.25	51	2.75	0	2.75	0
051353-051354	51353	51354	307392.2	05	13	91.33	86.59	638	0.0074	2.75	1	0	0	71	78	90	89.57	81.1	0	0	0	56.6	56.6	56.6	56.6	14	21	33	33	50-Yr	33	2.50	90	3.50	0	3.50	0
051391-051392	51391	51392	154668.9	05	13	96.85	93.86	664	0.0045	2	1	0	0	11	13	13	95.85	92.72	0	0	0	14.4	14.4	14.4	14.4				0							
051392-051393	51392	51393	582237.2	05	13	93.86	90.8	698	0.0044	2.75	1	0	0	33	39	46	92.72	89.43	32	46	90.5	33.7	33.7	79.6	124.1				0							
051393-051394	51393	51394	934424.7	05	13	90.8	89.43	650	0.0021	4.25	1	0	0	73	85	99	89.43	86.36	0	0	0	107.5	107.5	107.5	107.5				0							
051394-051395	51394	51395	716263.5	05	13	89.43	88.54	596	0.0015	5	1	0	0	103	120	140	86.36	83.55	76	12.6	28.4	165.8	165.8	178.4	194.1				0							
051395-051354	51395	51354	472709.3	05	13	88.54	86.59	521	0.0037	3.41	1	0	0	117	133	152	83.55	81.1	0	0	0	59.8	59.8	59.8	59.8	57	73	98	98	50-Yr	98	4.25	158	5.00	0	5.00	0
051354-051325	51354	51325	178573	05	13	86.59	86.01	192	0.003	3.41	1	0	0	166	187	225	81.1	80.2	0	0	0	59.8	59.8	59.8	59.8	106	127	165	165	50-Yr	165	5.00	225	5.75	0	5.75	0
051325-051326	51325	51326	218809.9	05	13	86.01	86.65	321	-0.002	6.17	1	0	0	300	339	403	80.2	78.68	0	0	0	290.5	290.5	290.5	290.5	10	49	113	113	50-Yr	113	4.50	403	7.00	0	7.00	0
051326-051327	51326	51327	265875.6	05	13	86.65	91.2	406	-0.0112	6.17	1	0	0	300	341	401	78.68	76.77	0	0	0	290.5	290.5	290.5	290.5	10	51	111	111	50-Yr	111	4.50	401	7.00	0	7.00	0
051397-051398	51397	51398	1482510	05	13	91.02	89.15	683	0.0027	2	1	0	0	38	45	53	90.02	83.24	32	36.3	71.5	20.9	20.9	57.2	92.4	17	0	0	17	10-Yr	17	2.00	38	2.75	0	2.75	0
051398-051399	51398	51399	1439913	05	13	89.15	91.22	327	-0.0063	3	1	0	0	79	91	114	83.24	79.99	0	0	0	61.6	61.6	61.6	61.6	17	29	52	52	50-Yr	52	3.00	114	4.00	0	4.00	0
051399-051327	51399	51327	216186.9	05	13	91.22	91.2	325	0.0001	4	1	0	0	85	98	122	79.99	76.77	72	2.6	6.1	132.7	132.7	135.3	138.8				0							
051327-051328	51327	51328	690890.9	05	13	91.2	91.78	360	-0.0016	6.17	1	0	0	399	452	537	76.77	75.07	0	0	0	290.5	290.5	290.5	290.5	109	162	247	247	50-Yr	247	6.00	537	8.00	0	8.00	0
051328-051329	51328	51329		05	13	91.78	94.65	874	-0.0033	6.75	1	0	0	395	450	534	75.07	70.95	0	0	0	369.1	369.1	369.1	369.1	26	81	165	165	50-Yr	165	5.00	534	8.00	0	8.00	0
051329-051330	51329	51330	661469.1	05	13	94.65	68.89	1293	0.0199	7	1	0	0	391	451	532	70.95	64.86	36	101.1	204.7	406.7	406.7	507.7	611.4				0							
051330-051331	51330	51331	704424.5	05	13	68.89	69.19	76	-0.0039	7	1	0	0	395	456	538	64.86	64.5	0	0	0	406.7	406.7	406.7	406.7	0	49	131	131	50-Yr	131	4.75	538	8.00	0	8.00	0
051361-051362	51361	51362	1311362	05	13	115	109.89	877	0.0058	2	1	0	0	51	58	70	105.96	93.77	80	24.9	56	24.8	24.8	49.7	80.8	26	8	0	26	10-Yr	26	2.25	51	2.75	0	2.75	0
051362-051363	51362	51363	383182.9	05	13	109.89	99.13	575	0.0187	2.5	1	0	0	58	65	79	93.77	85.77	80	44.6	100.3	44.9	44.9	89.6	145.3	13	0	0	13	10-Yr	13	1.75	58	3.00	0	3.00	0
051363-051364	51363	51364	185867.1	05	13	99.13	77.97	633	0.0334	7.5	1	0	0	63	72	87	85.77	76.97	36	130.9	265.2	840.6	840.6	971.5	1105.8				0							
051371-051372	51371	51372	676598.3	05	13	88.4	83.01	194	0.0277	2	1	0	0	30	34	42	82.13	79.33	32	115.6	227.6	25.2	25.2	140.9	252.8	5	0	0	5	10-Yr	5	1.25	30	2.25	0	2.25	0
051372-051364	51372	51364	372029.7	05	13	83.01	77.97	164	0.0308	2.5	1	0	0	55	63	77	79.33	76.97	0	0	0	45.7	45.7	45.7	45.7	9	17	31	31	50-Yr	31	2.25	77	3.25	0	3.25	0
051364-051365	51364	51365	512707.4	05	13	77.97	70.49	1156	0.0065	7.5	1	0	0	140	160	191	76.97	67.14	36	57.6	116.7	657.4	657.4	715	774				0							
051365-051366	51365	51366	2158369	05	13	70.49	71.71	311	-0.0039	7.5	1	0	0	190	215	255	67.14	64.5	0	0	0	657.4	657.4	657.4	657.4				0							
051381-051382	51381	51382	3066958	05	13	79.37	75.35	157	0.0257	3.5	1	0	0	77	86	100	68.75	64.5	0	0	0	153.8	153.8	153.8	153.8				0							
			25126505.1		13 Total																																
051101-051102	51101	51102	6105250	05	11	89.35	89.82	44	-0.0107	1.5	1	0	0	166	190	233	88.35	88.23	0	0	0	5.2	5.2	5.2	5.2	161	185	228	228	50-Yr	228	6.25	233	6.50	0	6.50	0
051102-051103	51102	51103		05	11	89.82	92.65	728	-0.0039	10	20	0	0	166	190	233	88.23	86.15	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051121-051103	51121	51103	538655.2	05	11	91.34	92.65	176	-0.0075	1.75	1	0	0	38	45	48	87.78	86.15	0	0	0	14.1	14.1	14.1	14.1	24	31	34	34	50-Yr	34	2.50	48	3.00	0	3.00	0
051103-051104	51103	51104	91315.87	05	11	92.65	96.11	599	-0.0058	10	20	0	0	187	212	263	86.15	84.45	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051104-051105	51104	51105	124233.2	05	11	96.11	96.14	165	-0.0002	4.54	1	0	0	183	210	258	84.45	83.98	0	0	0	98.9	98.9	98.9	98.9	84	111	159	159	50-Yr	159	5.50	258	6.75	0	6.75	0
051131-051132	51131	51132	125604.8	05	11	97.38	97.35	313	0.0001	2.25	1	0	0	7	8	9	95.63	93.98	72	3.2	7.6	20.9	20.9	24.1	28.5				0							
051132-051133	51132	51133	542032.2	05	11	97.35	97.23	92	0.0013	2.75	1	0	0	37	44	48	93.98	93.49	98	11.8	26.5	35.8	35.8	47.6	62.3	1	0	0	1	10-Yr	1	1.00	37	3.00	0	3.00	0
051133-051134	51133	51134	48440.28	05	11	97.23	96.99	199	0.0012	3	1	0	0	38	44	50	93.49	92.44	98	11.3	25.5	45.1	45.1	56.4	70.5				0							
051134-051135	51134	51135	420519.9	05	11	96.99	96.07	769	0.0012	3	1	0	0	57	63	75	92.44	88.37	98	11.3	25.4	45.1	45.1	56.4	70.5	12	7	5	12	10-Yr	12	2.00	57	3.50	0	3.50	0
051135-051105	51135	51105	471339.8	05	11	96.07	96.14	830	-0.0001	3	1	0	0	62	68	84	88.37	83.98	0	0	0	45.1	45.1	45.1	45.1	17	23	39	39	50-Yr	39	3.00	84	4.00	0	4.00	0
051105-051106	51105	51106	516650.2	05	11	96.14	91.88	520	0.0082	10	20	0	0	247	281	344	83.98	82.5	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051141-051106	51141	51106	2325465	05	11	92.72	91.88	157	0.0054	2	1	0	0	85	101	125	83.21	82.5	0	0	0	14.1	14.1	14.1	14.1	71	87	111	111	50-Yr	111	4.50	125	4.75	0	4.75	0
051106-051107	51106	51107	102601.4	05	11	91.88	92.18	185	-0.0016	10	20	0	0	325	375	453	82.5	81.97	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051146-051107	51146	51107	1438490	05	11	90.88	92.18	148	-0.0088	2.5	1	0	0	80	90	110	83.28	81.97	0	0	0	35.9	35.9	35.9	35.9	44	54	74	74	50-Yr	74	3.50	110	4.00	0	4.00	0
051107-051108	51107	51108	40962.62	05	11	92.18	99.16	962	-0.0073	10	20	0	0	384	446	536	81.97	79.23	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051108-051109	51108	51109	203933	05	11	99.16	102.01	176	-0.0162	5.28	1	0	0	377	438	525	79.23	78.73	0	0	0	148	148	148	148	229	290	377	377	50-Yr	377	7.50	525	8.50	0	8.50	0
051109-051110	51109	51110	43366.96	05	11	102.01	106.76	182	-0.0262	10	20	0	0	376	437	524	78.73	78.22	0	0	0	3065.8	3065.8	3065.8	3065.8				0							
051151-051110	51151	51110	297902.3	05	11	108.02	106.76	170	0.0074	1.5	1	0	0	17	20	22	86.88	78.22	0	0	0	22	22	22	22	0	0	0	0	50-Yr	0	0.25	22	1.75	0	1.75	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
051110-051111	51110	51111		05	11	106.76	109.49	252	-0.0108	10	20	0	0	377	438	525	78.22	77.5	0	0	0	3065.8	3065.8	3065.8	3065.8				0								
051156-051157	51156	51157	212750.8	05	11	113.91	114.66	164	-0.0046	1.5	1	0	0	15	18	19	86.86	77.5	0	0	0	23.3	23.3	23.3	23.3				0								
051161-051162	51161	51162	1136937	05	11	100	97.43	127	0.0202	2	1	0	0	71	89	97	92.6	91.38	0	0	0	20.6	20.6	20.6	20.6	50	68	76	76	50-Yr	76	3.50	97	3.75	0	3.75	0
051162-051163	51162	51163	500792.5	05	11	97.43	91.79	416	0.0136	2.5	1	0	0	107	129	142	91.38	87.37	0	0	0	37.3	37.3	37.3	37.3	70	92	105	105	50-Yr	105	3.75	142	4.25	0	4.25	0
051163-051164	51163	51164	427462.9	05	11	91.79	89.18	283	0.0092	3	1	0	0	137	160	179	87.37	84.65	0	0	0	60.7	60.7	60.7	60.7	76	99	118	118	50-Yr	118	4.00	179	4.75	0	4.75	0
051164-051165	51164	51165	857407.1	05	11	89.18	90.21	212	-0.0049	4	1	0	0	195	225	257	84.65	82.61	0	0	0	130.7	130.7	130.7	130.7	64	94	126	126	50-Yr	126	4.00	257	5.25	0	5.25	0
051165-051166	51165	51166	317309.2	05	11	90.21	93.79	353	-0.0101	4.5	1	0	0	212	239	278	82.61	79.21	0	0	0	178.9	178.9	178.9	178.9	33	60	99	99	50-Yr	99	3.75	278	5.50	0	5.50	0
051166-051167	51166	51167	660964.3	05	11	93.79	96.51	177	-0.0153	4.5	1	0	0	235	266	307	79.21	77.5	0	0	0	178.9	178.9	178.9	178.9	56	87	128	128	50-Yr	128	4.00	307	5.75	0	5.75	0
051171-051172	51171	51172	118393.6	05	11	94.14	92.16	410	0.0048	2.25	1	0	0	6	7	8	93.14	81.07	32	48.3	95	49.4	49.4	97.7	144.4				0								
051172-051173	51172	51173	517959.9	05	11	92.16	93.07	121	-0.0075	3.5	1	0	0	38	45	49	81.07	77.5	0	0	0	160.5	160.5	160.5	160.5				0								
051181-051182	51181	51182	997226.9	05	11	93.51	91.03	396	0.0063	2.5	1	0	0	62	71	87	82.56	78.81	32	55	108.1	37.1	37.1	92.1	145.3	25	0	0	25	10-Yr	25	2.25	62	3.25	0	3.25	0
051182-051183	51182	51183	1028791	05	11	91.03	97.94	139	-0.0499	3.75	1	0	0	113	132	163	78.81	77.5	0	0	0	109.5	109.5	109.5	109.5	4	23	54	54	50-Yr	54	3.00	163	4.50	0	4.50	0
			20212757.93		11 Total																																
			91290886.94	05 Total																																	
060101-060102	60101	60102	2627404	06	01	65.93	64	703	0.0027	2.75	1	0	0	67	76	88	59.73	55	33	53.8	94.8	40.2	40.2	94	135	27	0	0	27	10-Yr	27	2.50	67	3.50	0	3.50	0
060111-060112	60111	60112	306564.1	06	01	60	59	394	0.0025	2	1	0	0	25	29	31	58.37	57.16	33	51.7	91.2	11.7	11.7	63.4	102.9	13	0	0	13	10-Yr	13	2.25	25	2.75	0	2.75	0
060112-060102	60112	60102	594594.1	06	01	59	64	698	-0.0072	2.75	1	0	0	56	67	73	57.16	55	0	0	0	27.3	27.3	27.3	27.3	29	40	46	46	50-Yr	46	3.50	73	4.00	0	4.00	0
060121-060122	60121	60122	937288.6	06	01	65.44	64	201	0.0072	4	1	0	0	43	48	58	62.56	61	0	0	0	18.9	18.9	18.9	18.9	24	29	39	39	50-Yr	39	2.75	58	3.25	0	3.25	0
			4465850.8	06 Total																																	
070101-070102	70101	70102	2672451	07	01	350	310.33	371	0.1069	1.5	1	0	0	66	76	89	314.6	309.33	0	0	0	11.6	11.6	11.6	11.6	54	64	77	77	50-Yr	77	3.25	89	3.25	0	3.25	0
070102-070103	70102	70103	6134025	07	01	310.33	146.76	1675	0.0977	1.5	1	0	0	237	270	338	309.33	145.76	23	187.4	348.4	30.5	30.5	217.8	378.8	207	52	0	207	10-Yr	207	3.25	237	3.25	0	3.25	0
070103-070104	70103	70104	1034452	07	01	146.76	73.73	1346	0.0543	2	1	0	0	291	321	412	145.76	72.73	0	0	0	49	49	49	49	242	272	363	363	50-Yr	363	4.25	412	4.50	0	4.50	0
070104-070105	70104	70105	1579743	07	01	73.73	71.94	579	0.0031	4.25	1	0	0	340	381	476	72.73	70.94	0	0	0	87.3	87.3	87.3	87.3	253	294	389	389	50-Yr	389	7.50	476	8.50	0	8.50	0
070121-070122	70121	70122	1016769	07	01	78.16	75.38	261	0.0107	3	1	0	0	44	50	57	77.16	74.38	0	0	0	64.1	64.1	64.1	64.1				0								
070122-070123	70122	70123		07	01	75.38	73.77	418	0.0039	3.25	1	0	0	44	49	57	74.38	72.77	0	0	0	47.9	47.9	47.9	47.9	0	1	9	9	50-Yr	9	1.75	57	3.50	0	3.50	0
070123-070105	70123	70105	280322	07	01	73.77	71.94	775	0.0024	3.75	1	0	0	53	60	70	72.77	70.94	0	0	0	55	55	55	55	0	5	15	15	50-Yr	15	2.50	70	4.25	0	4.25	0
070105-070106	70105	70106	391421.6	07	01	71.94	71.37	613	0.0009	4.75	1	0	0	388	436	542	70.94	69.12	0	0	0	115.5	115.5	115.5	115.5	272	320	426	426	50-Yr	426	8.00	542	8.50	0	8.50	0
070131-070132	70131	70132	656984.3	07	01	112.67	77.19	733	0.0484	3.25	1	0	0	37	41	46	111.67	76.19	72	71.8	170.2	168.7	168.7	240.5	338.9				0								
070132-070106	70132	70106	416281.9	07	01	77.19	71.37	709	0.0082	4.25	1	0	0	66	71	84	76.19	69.12	60	29.6	73.9	156.8	156.8	186.3	230.7				0								
070106-070107	70106	70107	507801.2	07	01	71.37	72.5	318	-0.0036	6	1	0	0	447	507	621	69.12	68.18	0	0	0	215.4	215.4	215.4	215.4	232	292	406	406	50-Yr	406	7.75	621	9.00	0	9.00	0
070736-070107	70736	70107	756551.9	07	01	72.42	72.5	154	-0.0005	2.5	1	0	0	26	28	32	70.14	68.18	0	0	0	42.9	42.9	42.9	42.9				0								
070107-070108	70107	70108	66602.89	07	01	72.5	68.63	733	0.0053	6.25	1	0	0	470	532	648	68.18	66	36	52	105.4	240.2	240.2	292.2	345.5	230	240	302	302	50-Yr	302	7.00	543	8.50	0	9.00	0
070111-070112	70111	70112	2544125	07	01	231.7	141.54	610	0.1479	2	1	0	0	67	76	89	162.87	136.12	0	0	0	44	44	44	44	23	32	45	45	50-Yr	45	2.25	89	2.75	0	2.75	0
070112-070113	70112	70113	921428.2	07	01	141.54	96.95	915	0.0487	3	1	0	0	106	125	147	136.12	95.95	32	153.3	301.6	129.8	129.8	283	431.4				0								
070113-070114	70113	70114	1473343	07	01	96.95	83.59	593	0.0225	3	1	0	0	161	190	221	95.95	82.59	32	104.2	205	92.9	92.9	197.1	297.9	68	0	0	68	10-Yr	68	2.75	161	3.75	0	3.75	0
070114-070115	70114	70115	247573.8	07	01	83.59	81.62	198	0.0099	3.5	1	0	0	169	197	232	82.59	79.75	32	69.2	136.2	111.7	111.7	180.9	247.9	57	16	0	57	10-Yr	57	2.75	169	4.25	0	4.25	0
070115-070108	70115	70108	989421.9	07	01	81.62	68.63	960	0.0135	4.5	1	0	0	212	248	289	79.75	66	36	83.3	168.7	218.4	218.4	301.6	387				0								
070117-070108	70117	70108	155068.5	07	01	72.1	68.63	630	0.0055	3	1	0	0	10	11	13	67.61	66	36	53.1	107.6	31.6	31.6	84.7	139.2				0								
			26310216.99		01 Total																																
070201-070202	70201	70202	2181568	07	02	172.49	150.11	728	0.0308	2	1	0	0	62	75	88	159.4	142.4	48	125.2	281.5	32.1	32.1	157.3	313.7	30	0	0	30	10-Yr	30	2.00	62	2.75	0	2.75	0
070202-070203	70202	70203	1211843	07	02	150.11	122.53	893	0.0309	3.25	1	0	0	111	133	154	142.4	121.53	32	122	240.1	117.3	117.3	239.3	357.4				0								
070203-070204	70203	70204	332645.2	07	02	122.53	103.56	854	0.0222	3.75	1	0	0	115	138	162	121.53	102.56	32	103.5	203.7	167.3	167.3	270.8	371				0								
070221-070204	70221	70204	1536723	07	02	104.84	103.56	298	0.0043	3.75	1	0	0	51	62	74	103.84	102.56	40	47.5	99.4	73.6	73.6	121.2	173				0								
070204-070205	70204	70205	254178.5	07	02	103.56	102.83	344	0.0021	5	1	0	0	168	202	235	102.56	97.2	39	33.4	69.2	302.1	302.1	335.4	371.3				0								
070205-070206	70205	70206	884235.2	07	02	102.83	94.17	421	0.0206	4.75	1	0	0	207	248	288	97.2	90.63	72	46.8	111	263.4	263.4	310.3	374.4				0								
070206-070207	70206	70207	367803.9	07	02	94.17	84.37	465	0.0211	4.5	1	0	0	213	254	294	90.63	83.37	84	47.4	106.5	228.1	228.1	275.4	334.5				0								
070207-070208	70207	70208	230050.2	07	02	84.37	72.13	788	0.0155	4.75	1	0	0	218	258	299	83.37	71.13	84	40.7	91.4	262.6	262.6	303.3	354				0								
070208-070209	70208	70209	381372.4	07	02	72.13	72.19	433	-0.0001	6	1	0	0	232	268	310	71.13	66	0	0	0	427.2	427.2	427.2	427.2				0								
070231-070232	70231	70232	844158.6	07	02	96.98	87.71	501	0.0185	2	1	0	0	47	55	62	92.03	86.71	0	0	0	21.6	21.6	21.6	21.6	25	33	40	40	50-Yr	40	2.75	62	3.00	0	3.00	0
070232-070233	70232	70233		07	02	87.71	77.54	1038	0.0098	0	0	0	0	47	55	62	86.71	76.54	0	0	0	0	0	0	0	47	55	62	62	50-Yr	62	3.25	62	3.25	0	3.25	0
070233-070234	70233	70234	5259417	07	02	77.54	74.53	368	0.0082	2.5	1	0	0	195	220	252	76.54	73.53	0	0	0	34.5	34.5	34.5	34.5	161	186	218	218	50-Yr	218	5.00	252	5.50	0	5.50	0
070241-070234	70241	70234	397508.7	07	02	78.44	74.53	802	0.0049	2.5	1	0	0	30	34	36	77.44	73.53	60	22.8	57	26.7	26.7	49.5	83.6	3	0	0	3	10-Yr	3	1.25	30	2.75	0	2.75	0
070234-070235	70234	70235	508577.7	07	02	74.53	71.51	587	0.0051	6.5	1	0	0	242	269	310	73.53	69.11	36	51.4	104	421.6	421.6	473	525.6				0								
070235-070209	70235	70209	195453	07	02	71.51	72.19	414	-0.0016	6.5	1	0	0	243	272	311	69.11	66	0	0	0	421.6	421.6	421.6	421.6				0								
070211-070212	70211	70212	481134.8	07	02	74.59	76	1023	-0.0014	2.5	1	0	0	18	20	24	70.41	66	0	0	0	25	25	25	25				0								
			15066669.2		02 Total																																
070301-070302	70301	70302	65821.33	07	03	84.69	82.52	767	0.0028	2	1	0	0	7	9	9	82.87	80.89	75	17.4	40.2	10.7	10.7	28.1	50.9				0								
070302-070303	70302	70303	135984.3	07	03	82.52	81.47	636	0.0017	3	1	0	0	43	45	47	80.89	79.26	55	27.4	66.5	31.6	31.6	58.9	98	11	0	0	11	10-Yr	11	2.25	43	3.50	0	3.50	0
070303-070304	70303	70304	2070708	07	03	81.47	88.88	931	-0.008	4	1	0	0	104	112	125	79.26	76.87	0	0	0	68	68	68	68	36	44	57	57	50-Yr	57	3.75	125	5.25	0	5.25	0
070304-070305	70304	70305	1154801	07	03	88.88	74.22	1419	0.0103	4	1	0	0	175	201	217	76.87	73.22	55	68.4	166.2	68	68	136.4	234.2	107	65	0	107	10-Yr	107	4.75	175	5.75	0	5.75	0
070305-070306	70305	70306	2997395	07	03	74.22	75.44	431	-0.0028	5.75	1	0	0	255	285	322	73.22	72.36	0	0	0	157	157	157	157	98	128	165	165	50-Yr	165	6.00	322	7.75	0	7.75	0
070306-070307	70306	70307	1543786	07	03	75.44	75.09	681	0.0005	5.75	1	0	0	305	342	393	72.36	71	0	0	0	157	157	157	157	148	185	236	236	50-Yr	236	6.75	393	8.50	0	8.50	0
070307-070308	70307	70308	908867.9	07	03	75.09	73.5	657	0.0024	6.5	1	0	0	334	375	429	71	69.68	35	35	70.4	217.7	217.7	252.7	288.1	116	122	141	141	50-Yr	141	5.75	359	8.00	0	8.50	0
070336-070337	70336	70337	312164.7	07	03	75.8	74.05	346	0.0051	2	1	0	0	30	34	36	72.17	70.73	0	0	0	13.6	13.6	13.6	13.6	16	20	22	22	50-Yr	22	2.50	36	3.00	0	3.00	0
070337-070308	70337	70308	335171.3	07	03	74.05	73.5	250	0.0022	2.5	1	0	0	55	62	69	70.73	69.68	35	33.4	67.1	24.7	24.7	58	91.8	30	4	0	30	10-Yr	30	2.75	55	3.50	0	3.50	0
070308-070309	70308	70309	184921.7	07	03	73.5	72.22	778	0.0016	6.75	1	0	0	345	388	442	69.68	68.13	35	28.9	58	240.8	240.8	269.6	298.8	104	118	143	143	50-Yr	143	5.75	384	8.50	0	8.50	0
070341-070342	70341	70342	1551650	07	03	75.81	75.92	114	-0.001	3.25	1	0	0	54	61	74	74.81	74.52	0	0	0	38.3	38.3	38.3	38.3	16	23	36	36	50-Yr	36	3.25	74	4.25	0	4.25	0
070342-070343	70342	70343	199672.5	07	03	75.92	74.96	443	0.0022	3.5	1	0	0	70	78	94	74.52	73.4	72	15.2	36	46.7	46.7	61.9	82.7	23	16	11	23	10-Yr	23	2.75	70	4.25	0	4.25	0
070343-070344	70343	70344	552843.3	07	03	74.96	74.26	455	0.0015	4.25	1	0	0	97	110	130	73.4	72.25	72	12.8	30.4	78.4	78.4	91.2	108.7	19	19	21	21	50-Yr	21	2.75	100	4.75	0	4.75	0
070344-070345	70344	70345	1388327	07	03	74.26	73.74	431	0.0012	4.75	1	0	0	146	166	196	72.25	71.16	72	11.3	26.9	105.5	105.5	116.8	132.3	41	49	64	64	50-Yr	64	4.00	169	5.75	0	5.75	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
070345-070346	70345	70346	482805.8	07	03	73.74	73.24	415	0.0012	5.25	1	0	0	161	178	213	71.16	70.11	72	11.3	26.9	137.7	137.7	149.1	164.6	23	29	48	48	50-Yr	48	3.75	186	6.00	0	6.00	0
070346-070347	70346	70347	472396.7	07	03	73.24	72.7	447	0.0012	5.25	1	0	0	174	191	227	70.11	68.98	72	11.3	26.9	137.7	137.7	149.1	164.6	36	42	62	62	50-Yr	62	4.00	200	6.25	0	6.25	0
070347-070309	70347	70309	479139.9	07	03	72.7	72.22	338	0.0014	5.25	1	0	0	183	204	241	68.98	68.13	72	12.3	29.1	137.7	137.7	150	166.9	45	54	74	74	50-Yr	74	4.25	212	6.25	0	6.25	0
070309-070310	70309	70310	789602.6	07	03	72.22	73.26	538	-0.0019	8.5	1	0	0	532	592	687	68.13	67.05	0	0	0	445.2	445.2	445.2	445.2	87	147	242	242	50-Yr	242	7.00	687	10.50	0	10.50	0
070310-070311	70310	70311	354532.1	07	03	73.26	73.99	413	-0.0018	8.5	1	0	0	535	597	692	67.05	66.22	0	0	0	445.2	445.2	445.2	445.2	90	152	247	247	50-Yr	247	7.00	692	10.50	0	10.50	0
070321-070322	70321	70322	1314374	07	03	84.8	74.96	947	0.0104	2.5	1	0	0	31	35	43	76.05	68.96	32	70.8	139.3	33	33	103.8	172.3				0							
070326-070322	70326	70322	1074164	07	03	73.55	74.96	475	-0.003	2.5	1	0	0	33	37	45	71.21	68.96	0	0	0	26.1	26.1	26.1	26.1	7	11	19	19	50-Yr	19	2.25	45	3.25	0	3.25	0
070322-070311	70322	70311	996713	07	03	74.96	73.99	579	0.0017	4.75	1	0	0	96	110	132	68.96	66.22	32	28.4	56	144.6	144.6	173	200.6				0							
070311-070312	70311	70312	875251.4	07	03	73.99	73.36	253	0.0025	7.5	8	0	0	656	735	860	66.22	65.71	0	0	0	442.3	442.3	442.3	442.3	214	293	418	418	50-Yr	418	8.50	860	11.00	0	11.00	0
070331-070332	70331	70332	2115505	07	03	71.27	71.83	265	-0.0021	2.75	1	0	0	66	73	84	68.6	67.78	0	0	0	27.3	27.3	27.3	27.3	39	46	57	57	50-Yr	57	3.75	84	4.25	0	4.25	0
070332-070312	70332	70312	118208.1	07	03	71.83	73.36	673	-0.0023	3	1	0	0	68	78	90	67.78	65.71	0	0	0	34.5	34.5	34.5	34.5	34	44	56	56	50-Yr	56	3.75	90	4.50	0	4.50	0
070312-070313	70312	70313	351859.6	07	03	73.36	75.35	935	-0.0021	7.5	9	0	0	726	816	950	65.71	63.84	0	0	0	516.3	516.3	516.3	516.3	210	300	434	434	50-Yr	434	8.50	950	11.50	0	11.50	0
070313-070314	70313	70314	973045.1	07	03	75.35	75.78	380	-0.0011	11	10	0	0	752	844	984	63.84	63.08	0	0	0	992.1	992.1	992.1	992.1				0							
			23799711.33		03 Total																																
070401-070402	70401	70402	289679.1	07	04	78.58	76.07	418	0.006	2	1	0	0	19	21	26	77.58	74.99	0	0	0	16.5	16.5	16.5	16.5	2	4	9	9	50-Yr	9	1.75	26	2.50	0	2.50	0
070402-070403	70402	70403	537646.6	07	04	76.07	74.83	359	0.0035	4	1	0	0	39	46	55	74.99	72.77	30	39.9	77.5	105	105	144.9	182.5				0							
070403-070404	70403	70404	885055.3	07	04	74.83	71.03	442	0.0086	4.5	1	0	0	69	80	96	72.77	70.03	0	0	0	143.8	143.8	143.8	143.8				0							
070404-070405	70404	70405	711968.3	07	04	71.03	73.18	489	-0.0044	4.5	1	0	0	95	109	131	70.03	69.05	0	0	0	81.7	81.7	81.7	81.7	13	27	49	49	50-Yr	49	3.75	131	5.50	0	5.50	0
070421-070422	70421	70422	439342.8	07	04	74.42	74.18	141	0.0017	2.75	1	0	0	35	41	44	72.71	72.07	30	28	54.4	32.9	32.9	61	87.3	2	0	0	2	10-Yr	2	1.00	35	3.00	0	3.00	0
070422-070423	70422	70423	449143.3	07	04	74.18	73.68	404	0.0012	3	1	0	0	69	78	87	72.07	70.24	30	23.9	46.4	41.6	41.6	65.4	87.9	27	13	0	27	10-Yr	27	2.75	69	3.75	0	3.75	0
070423-070405	70423	70405	478317.8	07	04	73.68	73.18	261	0.0019	4	1	0	0	93	101	118	70.24	69.05	30	29.7	57.7	89.5	89.5	119.2	147.2	4	0	0	4	10-Yr	4	1.25	93	4.25	0	4.25	0
070405-070406	70405	70406		07	04	73.18	72.83	292	0.0012	5.5	1	0	0	176	195	234	69.05	68.47	30	23.5	45.7	139.5	139.5	163	185.1	37	32	49	49	50-Yr	49	3.75	188	6.25	0	6.25	0
070431-070432	70431	70432	498738.8	07	04	75.15	70.22	790	0.0062	2	1	0	0	35	45	48	71.1	69.22	0	0	0	10.3	10.3	10.3	10.3	25	35	38	38	50-Yr	38	3.50	48	3.75	0	3.75	0
070436-070437	70436	70437	115493.8	07	04	72.06	71.48	170	0.0034	1.5	1	0	0	10	12	12	71.06	70.2	0	0	0	7	7	7	7	3	5	5	5	25-Yr	5	1.50	12	2.00	0	2.00	0
070437-070432	70437	70432	375998.1	07	04	71.48	70.22	192	0.0066	1.75	1	0	0	9	11	12	70.2	69.22	0	0	0	10.5	10.5	10.5	10.5	0	0	1	1	50-Yr	1	1.00	12	2.00	0	2.00	0
070432-070406	70432	70406		07	04	70.22	72.83	469	-0.0056	3	1	0	0	57	65	78	69.22	68.28	0	0	0	27.7	27.7	27.7	27.7	29	37	50	50	50-Yr	50	4.00	78	4.50	0	4.50	0
070406-070407	70406	70407	347867.3	07	04	72.83	71.29	790	0.0019	5.5	1	0	0	233	261	315	68.47	66.89	30	30	58.2	139.5	139.5	169.4	197.7	94	92	117	117	50-Yr	117	5.25	257	7.00	0	7.00	0
070407-070408	70407	70408	727423.8	07	04	71.29	70.14	311	0.0037	5.5	1	0	0	249	280	337	66.89	66.27	30	41.3	80.2	139.5	139.5	180.8	219.6	110	99	117	117	50-Yr	117	5.25	257	7.00	0	7.00	0
070441-070442	70441	70442	172079.3	07	04	70.25	73.31	188	-0.0163	1.5	1	0	0	13	15	16	69.1	68.64	0	0	0	4.8	4.8	4.8	4.8	8	10	11	11	50-Yr	11	2.25	16	2.50	0	2.50	0
070442-070443	70442	70443	201638.7	07	04	73.31	70.57	339	0.0081	2.25	1	0	0	23	25	30	68.64	67.81	60	29.4	73.4	14.1	14.1	43.5	87.5	9	0	0	9	10-Yr	9	2.00	23	2.75	0	2.75	0
070443-070408	70443	70408	247504.8	07	04	70.57	70.14	632	0.0007	2.25	1	0	0	33	37	44	67.81	66.27	72	8.5	20.2	14.1	14.1	22.6	34.3	19	14	10	19	10-Yr	19	2.75	33	3.25	0	3.25	0
070408-070409	70408	70409	638154.9	07	04	70.14	69.03	329	0.0034	6	1	0	0	294	331	400	66.27	65.61	36	41.6	84.3	175.9	175.9	217.5	260.1	118	114	140	140	50-Yr	140	5.75	316	7.50	0	7.50	0
070409-070410	70409	70410	319231.7	07	04	69.03	68.76	137	0.002	6	1	0	0	295	334	401	65.61	65.34	36	31.8	64.5	175.9	175.9	207.7	240.3	119	126	161	161	50-Yr	161	6.00	337	7.75	0	7.75	0
070451-070410	70451	70410	449405.6	07	04	67.02	68.76	238	-0.0073	1.5	1	0	0	14	16	19	65.58	65.1	0	0	0	4.4	4.4	4.4	4.4	10	12	15	15	50-Yr	15	2.50	19	2.75	0	2.75	0
070410-070411	70410	70411	59034.27	07	04	68.76	67.77	630	0.0016	6.25	1	0	0	308	348	417	65.34	64.08	36	28.4	57.5	196.1	196.1	224.5	253.6	112	124	163	163	50-Yr	163	6.00	360	8.00	0	8.00	0
070411-070412	70411	70412	264407.9	07	04	67.77	67.32	239	0.0019	6.25	1	0	0	305	344	417	64.08	63.6	36	31	62.9	196.1	196.1	227.1	259	109	117	158	158	50-Yr	158	6.00	354	8.00	0	8.00	0
			8208132.17		04 Total																																
070501-070502	70501	70502	2587615	07	05	106.71	79	841	0.033	2	1	0	0	118	133	163	105.71	78	0	0	0	38.2	38.2	38.2	38.2	80	95	125	125	50-Yr	125	3.25	163	3.50	0	3.50	0
070502-070503	70502	70503	2532910	07	05	79	75.85	566	0.0056	6	3	0	0	234	266	323	78	74.85	0	0	0	143	143	143	143	91	123	180	180	50-Yr	180	5.00	323	6.25	0	6.25	0
070503-070504	70503	70504	857174.9	07	05	75.85	75.46	703	0.0006	6	3	0	0	252	287	346	74.85	72.54	0	0	0	123.9	123.9	123.9	123.9	128	163	222	222	50-Yr	222	6.00	346	6.00	5.97	0.00	0
070511-070512	70511	70512	1178004	07	05	107.77	86.28	776	0.0277	2	1	0	0	93	108	116	106.77	85.28	53	114.4	271.3	35	35	149.3	306.3	58	0	0	58	10-Yr	58	2.50	93	3.00	0	3.00	0
070512-070513	70512	70513	446517.6	07	05	86.28	73.95	918	0.0134	6	5	0	0	116	127	149	85.28	72.95	53	79.7	189	453.3	453.3	533	642.3				0							
070516-070513	70516	70513	1930125	07	05	76.38	73.95	656	0.0037	1.5	1	0	0	65	73	87	75.38	72.95	53	41.8	99.3	5.9	5.9	47.8	105.2	59	25	0	59	10-Yr	59	3.75	65	3.75	0	3.75	0
070513-070504	70513	70504	367631	07	05	73.95	75.46	420	-0.0036	7.5	6	0	0	166	189	220	72.95	72.11	0	0	0	355.1	355.1	355.1	355.1				0							
070504-070505	70504	70505		07	05	75.46	71.4	841	0.0048	7.5	7	0	0	403	458	547	72.54	69.77	0	0	0	513.1	513.1	513.1	513.1	0	0	34	34	50-Yr	34	3.00	547	7.50	6.79	7.50	6.79
070505-070506	70505	70506	1273781	07	05	71.4	67.57	973	0.0039	6.5	1	0	0	422	480	574	69.77	66.57	0	0	0	279.7	279.7	279.7	279.7	142	200	294	294	50-Yr	294	6.75	574	9.00	0	9.00	0
070521-070522	70521	70522	478592	07	05	69.27	68.14	339	0.0033	1.5	1	0	0	16	17	22	68.27	67.07	30	39.2	76.1	5.8	5.8	45	81.9	10	0	0	10	10-Yr	10	2.00	16	2.25	0	2.25	0
070522-070506	70522	70506	778500.9	07	05	68.14	67.57	141	0.004	2.5	1	0	0	38	43	50	67.07	66.57	36	45.6	92.3	22.5	22.5	68.1	114.8	15	0	0	15	10-Yr	15	2.25	38	3.25	0	3.25	0
070506-070507	70506	70507	943187.4	07	05	67.57	67.09	366	0.0013	8	10	0	0	477	542	648	66.57	65.84	0	0	0	749.8	749.8	749.8	749.8				0							
070531-070532	70531	70532	860259.9	07	05	73.8	74.57	531	-0.0014	2.75	1	0	0	43	52	58	72.8	71.74	0	0	0	22	22	22	22	21	30	36	36	50-Yr	36	3.50	58	4.00	0	4.00	0
070532-070533	70532	70533	212230.5	07	05	74.57	71.48	695	0.0044	3.5	1	0	0	42	50	58	71.74	70.35	60	21.8	54.4	41.8	41.8	63.5	96.2	0	0	0	0	10-Yr	0	0.50	42	3.75	0	4.00	0
070537-070538	70537	70538	773598.9	07	05	73.35	72.86	117	0.0042	2	1	0	0	36	44	49	72.08	71.78	30	44	85.5	10.7	10.7	54.7	96.2	25	0	0	25	10-Yr	25	3.00	36	3.25	0	3.25	0
070538-070533	70538	70533		07	05	72.86	71.48	503	0.0027	2.5	1	0	0	35	43	49	71.78	70.48	60	17.1	42.7	19.4	19.4	36.5	62.1	16	6	0	16	10-Yr	16	2.50	35	3.25	0	3.25	0
070551-070552	70551	70552	4102910	07	05	79	74.61	841	0.0052	1.5	4	0	0	103	115	134	78	73.61	0	0	0	23.2	23.2	23.2	23.2	80	92	111	111	50-Yr	111	4.25	134	1.50	17.66	1.50	17.66
070552-070533	70552	70533	2616088	07	05	74.61	71.48	703	0.0045	2.5	1	0	0	164	190	222	73.61	70.48	32	46.3	91.2	25.6	25.6	71.9	116.7	138	118	105	138	10-Yr	138	4.75	164	5.25	0	5.25	0
070533-070534	70533	70534	327569.8	07	05	71.48	71.27	539	0.0004	5.5	1	0	0	238	277	322	70.48	69.4	60	6.4	16.1	139.5	139.5	145.9	155.6	99	131	166	166	50-Yr	166	6.00	306	7.50	0	7.50	0
070534-070535	70534	70535	367043.5	07	05	71.27	70.08	594	0.002	5.5	1	0	0	239	278	324	69.4	68.21	60	14.6	36.5	139.5	139.5	154.1	176	100	124	148	148	50-Yr	148	5.75	287	7.25	0	7.50	0
070535-070507	70535	70507	744138.6	07	05	70.08	67.09	1393	0.0021	5.5	1	0	0	246	286	332	68.21	65.43	60	15.1	37.8	139.5	139.5	154.6	177.2	107	131	155	155	50-Yr	155	5.75	294	7.50	0	7.50	0
070507-070508	70507	70508	1833728	07	05	67.09	67.56	446	-0.0011	13	10	0	0	755	867	1021	65.84	64.95	0	0	0	1355.7	1355.7	1355.7	1355.7				0							
070541-070542	70541	70542	765129.3	07	05	68.15	67.15	405	0.0025	2.25	1	0	0	40	49	55	66.55	65.47	0	0	0	14.9	14.9	14.9	14.9	25	34	40	40	50-Yr	40	3.50	55	3.75	0	3.75	0
070542-070508	70542	70508	659614.8	07	05	67.15	67.56	198	-0.0021	2.25	1	0	0	74	91	102	65.47	64.95	0	0	0	14.9	14.9	14.9	14.9	59	76	87	87	50-Yr	87	4.50	102	4.75	0	4.75	0
070508-070509	70508	70509		07	05	67.56	67.29	560	0.0005	13	10	0	0	768	881	1035	64.95	63.83	0	0	0	1355.7	1355.7	1355.7	1355.7				0							
			26636350.1		05 Total																																
			95555228.99	07 Total																																	
80101-080102	80101	80102	1791948	08	01	78.34	80.05	585	-0.0029	4.75	1	0	0	55	65	78	77.34	75.65	0	0	0	113.6	113.6	113.6	113.6				0							
80176-080102	80176	80102	558520.7	08	01	77.38	80.05	287	-0.0093	2.5	1	0	0	29	33	37	76.38	75.65	0	0	0	19	19	19	19	10	14	18	18	50-Yr	18	2.50	37	3.25	0	3.25	0
80102-080103	80102	80103	395718.5	08	01	80.05	77.19	1139	0.0025	4.75	1	0	0	91	104	131	75.65	72.37	60	16.4	40.9	113.6	113.6	129.9	154.5				0							
80186-080103	80186	80103	425229	08	01	74.1	77.19	153	-0.0202	2	1	0	0	30	34	37	73.1	72.37	0	0	0	14.6	14.6	14.6	14.6	15	19	22	22	50-Yr	22	2.50	37	3.00	0	3.00	0
80103-080104	80103	80104	724822.4	08	01	77.19	79.18	356	-0.0056	5	1	0	0	130	148	185	72.37	71.34	0	0	0	130.2	130.2	130.2	130.2	0	18	55	55	50-Yr	55	3.75	185	5.75	0	5.75	0
80104-080105	80104	80105	565471.2	08	01	79.18	79.98	1085	-0.0007	5	1	0	0	157	181	219	71.34	68.21	0	0	0	130.2	130.2	130.2	130.2	27	51	89	89	50-Yr	89	4.50	219	6.25	0	6.25	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
080105-080106	80105	80106	452347.3	08	01	79.98	67.83	821	0.0148	5.25	1	0	0	157	178	216	68.21	65.84	60	39.7	99.2	148.3	148.3	188	247.6	9	0	0	9	10-Yr	9	2.00	157	5.50	0	6.25	0
080121-080106	80121	80106	1191802	08	01	66.51	67.83	740	-0.0018	3	1	0	0	37	42	52	65.51	64.03	0	0	0	27.7	27.7	27.7	27.7	9	14	24	24	50-Yr	24	3.00	52	4.00	0	4.00	0
080106-080107	80106	80107	1164859	08	01	67.83	66.02	285	0.0064	8.25	1	0	0	226	260	311	65.84	65.02	60	26	65	495.1	495.1	521.1	560.1				0							
080107-080108	80107	80108	1309944	08	01	66.02	68.61	515	-0.005	8.25	1	0	0	262	303	360	65.02	63.99	0	0	0	411.2	411.2	411.2	411.2				0							
080108-080109	80108	80109	1200944	08	01	68.61	68.01	497	0.0012	8.25	1	0	0	292	338	399	63.99	63	60	11.3	28.4	411.2	411.2	422.5	439.5				0							
080131-080132	80131	80132	2571720	08	01	77.92	71.93	789	0.0076	3.75	1	0	0	75	85	98	73.43	70.93	0	0	0	63.5	63.5	63.5	63.5	11	21	34	34	50-Yr	34	3.00	98	4.50	0	4.50	0
080132-080133	80132	80133	2751676	08	01	71.93	71.85	1128	0.0001	4.75	1	0	0	147	166	194	70.93	68.67	36	6	12.2	94.3	94.3	100.4	106.5	53	66	87	87	50-Yr	87	4.75	182	6.25	0	6.25	0
080141-080142	80141	80142	2028348	08	01	68.61	71.28	922	-0.0029	4.5	1	0	0	66	73	85	67.61	65.77	0	0	0	81.7	81.7	81.7	81.7	0	0	3	3	50-Yr	3	1.50	85	4.75	0	4.75	0
080142-080133	80142	80133	970205.9	08	01	71.28	71.85	207	-0.0028	4.5	1	0	0	103	117	135	65.77	65.35	0	0	0	81.7	81.7	81.7	81.7	21	35	53	53	50-Yr	53	4.00	135	5.50	0	5.50	0
080133-080134	80133	80134	2659207	08	01	71.85	72.25	777	-0.0005	5	1	0	0	282	320	369	68.67	67.12	0	0	0	108.2	108.2	108.2	108.2	174	212	261	261	50-Yr	261	7.00	369	8.00	0	8.00	0
080146-080134	80146	80134	220163.8	08	01	73.12	72.25	257	0.0034	1.5	1	0	0	20	24	25	68.89	67.12	0	0	0	8.1	8.1	8.1	8.1	12	16	17	17	50-Yr	17	2.00	25	2.50	0	2.50	0
080134-080135	80134	80135		08	01	72.25	72.27	353	-0.0001	5.75	1	0	0	283	320	369	67.12	66.41	0	0	0	157	157	157	157	126	163	212	212	50-Yr	212	6.50	369	8.00	0	8.00	0
080151-080152	80151	80152	816965.1	08	01	83.25	72.22	348	0.0317	2.75	1	0	0	35	40	49	79.76	71.22	0	0	0	77	77	77	77				0							
080152-080153	80152	80153	95245.37	08	01	72.22	69.04	363	0.0088	3	1	0	0	41	45	56	71.22	68.04	30	63.5	123.3	58.1	58.1	121.6	181.4				0							
080153-080154	80153	80154	759625.1	08	01	69.04	70.49	836	-0.0017	4.75	1	0	0	80	90	109	68.04	66.37	0	0	0	94.3	94.3	94.3	94.3	0	0	15	15	50-Yr	15	2.50	109	5.25	0	5.25	0
080154-080155	80154	80155	1366693	08	01	70.49	69.07	514	0.0028	5.25	1	0	0	119	135	163	66.37	65.34	32	36.5	71.8	123.2	123.2	159.7	195				0							
080161-080155	80161	80155	1058228	08	01	68.66	69.07	437	-0.0009	3.5	1	0	0	41	48	59	66.92	65.34	0	0	0	56.1	56.1	56.1	56.1	0	0	3	3	50-Yr	3	1.25	59	3.75	0	3.75	0
080155-080135	80155	80135	458141.8	08	01	69.07	72.27	535	-0.006	6	1	0	0	164	188	225	65.34	64.27	0	0	0	175.9	175.9	175.9	175.9	0	12	49	49	50-Yr	49	3.75	225	6.75	0	6.75	0
080135-080136	80135	80136	486522	08	01	72.27	69.84	663	0.0037	6.5	1	0	0	433	497	577	66.41	65.09	30	41.1	79.8	217.7	217.7	258.8	297.5	215	238	279	279	50-Yr	279	7.25	497	9.00	0	9.00	0
080166-080167	80166	80167	901284.4	08	01	69.9	69.52	262	0.0015	2.25	1	0	0	37	43	53	67.26	66.18	0	0	0	18.4	18.4	18.4	18.4	19	25	35	35	50-Yr	35	3.00	53	3.50	0	3.50	0
080167-080136	80167	80136	175118.8	08	01	69.52	69.84	265	-0.0012	2.5	1	0	0	48	54	68	66.18	65.09	0	0	0	24.4	24.4	24.4	24.4	24	30	44	44	50-Yr	44	3.25	68	3.75	0	3.75	0
080136-080109	80136	80109	253927.5	08	01	69.84	68.01	967	0.0019	6.5	1	0	0	460	525	610	65.09	63.15	30	29.5	57.3	217.7	217.7	247.3	275.1	242	278	335	335	50-Yr	335	7.75	553	9.50	0	9.50	0
080171-080109	80171	80109	1405946	08	01	69.51	68.01	1069	0.0014	2.75	1	0	0	41	47	59	68.51	63.15	60	12.2	30.6	34.7	34.7	47	65.3	6	0	0	6	10-Yr	6	1.50	41	3.00	0	3.00	0
080109-080110	80109	80110	570182.6	08	01	68.01	69.69	940	-0.0018	9	11	0	0	789	907	1065	63.15	61.28	0	0	0	802.6	802.6	802.6	802.6	0	104	262	262	50-Yr	262	7.00	1065	12.00	0	12.00	0
080196-080197	80196	80197	386127.3	08	01	75.93	73.67	278	0.0081	2	1	0	0	27	30	37	67.37	65.26	0	0	0	18.3	18.3	18.3	18.3	9	12	19	19	50-Yr	19	2.25	37	2.75	0	2.75	0
080197-080198	80197	80198	441774.5	08	01	73.67	72.22	248	0.0059	2.25	1	0	0	52	63	72	65.26	63.37	0	0	0	25.1	25.1	25.1	25.1	27	38	47	47	50-Yr	47	3.00	72	3.50	0	3.50	0
080198-080110	80198	80110	360396.8	08	01	72.22	69.69	274	0.0092	2.25	1	0	0	76	89	105	63.37	61.28	0	0	0	25.1	25.1	25.1	25.1	51	64	80	80	50-Yr	80	3.50	105	4.00	0	4.00	0
080110-080111	80110	80111	807387	08	01	69.69	69.56	749	0.0002	9	11	0	0	806	927	1085	61.28	59.78	30	9	17.4	802.6	802.6	811.5	819.9	3	116	265	265	50-Yr	265	7.00	1068	12.00	0	12.00	0
080111-080112	80111	80112	682648.9	08	01	69.56	80.61	1078	-0.0103	9	11	0	0	805	926	1084	59.78	57.62	0	0	0	802.6	802.6	802.6	802.6	2	123	281	281	50-Yr	281	7.25	1084	12.00	0	12.00	0
080112-080113	80112	80113	1058227	08	01	80.61	58	855	0.0265	9	11	0	0	808	931	1089	57.62	55.91	30	110.4	214.4	802.6	802.6	913	1017	5	18	72	72	50-Yr	72	4.50	875	11.00	0	12.50	0
080181-080182	80181	80182	1754400	08	01	72.24	66.72	1875	0.0029	4.75	1	0	0	50	59	71	71.24	64.35	32	37.7	74.1	128.3	128.3	166	202.4				0							
080191-080182	80191	80182	597660.8	08	01	65.91	66.72	242	-0.0033	3.5	1	0	0	34	38	46	64.91	64.35	0	0	0	44.8	44.8	44.8	44.8	0	0	1	1	50-Yr	1	1.00	46	3.75	0	3.75	0
080182-080183	80182	80183	1496667	08	01	66.72	64.7	870	0.0023	4.75	1	0	0	104	121	144	64.35	61.16	30	32.7	63.5	128.3	128.3	161	191.8				0							
080183-080184	80183	80184	415101.2	08	01	64.7	64.01	583	0.0012	5.25	1	0	0	108	125	151	61.16	59.02	30	23.4	45.4	167.6	167.6	190.9	212.9				0							
080184-080113	80184	80113	248143.5	08	01	64.01	58	846	0.0071	4.75	1	0	0	109	126	150	59.02	55.91	30	57.2	111.1	128.3	128.3	185.5	239.4				0							
080113-080114	80113	80114	654585.1	08	01	58	57	97	0.0103	9	11	0	0	909	1051	1227	55.91	55.72	33	71.1	140.8	802.6	802.6	873.6	943.4	106	177	284	284	50-Yr	284	7.25	1086	12.00	0	12.50	0
			38233925.57		01 Total																																
080201-080202	80201	80202	932323.1	08	02	66.7	67.11	538	-0.0008	3	1	0	0	41	47	55	65.7	63.57	0	0	0	39.2	39.2	39.2	39.2	2	8	16	16	50-Yr	16	2.25	55	3.50	0	3.50	0
080202-080203	80202	80203	1106472	08	02	67.11	62.89	512	0.0082	4	1	0	0	75	87	101	63.57	61.54	30	61.6	119.7	84.4	84.4	146	204				0							
080203-080204	80203	80204	637981.9	08	02	62.89	60	641	0.0045	4.5	1	0	0	93	107	128	61.54	59	33	47.1	93.2	115.5	115.5	162.5	208.7				0							
080204-080205	80204	80205	432039.7	08	02	60	58	924	0.0022	4.5	1	0	0	96	115	141	59	56.51	33	32.6	64.6	94.9	94.9	127.5	159.5	1	0	0	1	10-Yr	1	1.00	96	4.75	0	4.75	0
			3108816.7		02 Total																																
080205-080114	80205	80114	532022.6	08	01	58	57	190	0.0053	4.5	1	0	0	102	130	154	56.51	56	33	50.9	100.8	94.9	94.9	145.8	195.7	7	0	0	7	10-Yr	7	1.75	102	4.75	0	4.75	0
			41874764.87	08 Total																																	
090101-090102	90101	90102	110687.9	09	01	107.31	107.89	412	-0.0014	2	1	0	0	10	12	12	106.31	102.96	0	0	0	18.9	18.9	18.9	18.9				0							
090102-090103	90102	90103	199145.1	09	01	107.89	108.2	287	-0.0011	2.75	1	0	0	23	26	29	102.96	100.63	0	0	0	44.2	44.2	44.2	44.2				0							
090103-090104	90103	90104	1573689	09	01	108.2	97.36	935	0.0116	5.33	3	0	0	70	80	97	100.63	93.04	0	0	0	148.6	148.6	148.6	148.6				0							
090104-090105	90104	90105	1794204	09	01	97.36	87.76	774	0.0124	5.33	3	0	0	120	137	166	93.04	86.76	0	0	0	148.6	148.6	148.6	148.6	0	0	19	19	50-Yr	19	2.25	168	4.75	0	4.75	0
090105-090106	90105	90106	804730.3	09	01	87.76	83.23	726	0.0062	2.75	1	0	0	154	176	210	86.76	82.23	0	0	0	38.7	38.7	38.7	38.7	115	137	171	171	50-Yr	171	5.00	210	5.25	0	5.25	0
090106-090107	90106	90107	516646.6	09	01	83.23	82.29	283	0.0033	3.25	1	0	0	168	192	228	82.23	81.18	50	40.6	93.3	46.6	46.6	87.3	139.9	121	105	88	121	10-Yr	121	4.75	168	5.50	0	5.75	0
090107-090108	90107	90108	3491980	09	01	82.29	81.83	133	0.0035	3.5	1	0	0	280	316	369	81.18	80.69	50	41.5	95.2	56.8	56.8	98.3	152.1	223	218	217	223	10-Yr	223	6.00	280	6.50	0	6.50	0
090108-090109	90108	90109	136551	09	01	81.83	80.43	375	0.0037	3.75	1	0	0	280	316	366	80.69	79.3	50	43.1	98.9	68.3	68.3	111.4	167.2	212	205	201	212	10-Yr	212	5.75	280	6.50	0	6.50	0
090109-090110	90109	90110	453264.3	09	01	80.43	79.08	387	0.0035	3.75	1	0	0	286	325	376	79.3	77.87	50	41.7	95.6	68.3	68.3	110	163.9	218	215	212	218	10-Yr	218	6.00	286	6.50	0	6.50	0
090110-090111	90110	90111	795158.4	09	01	79.08	77.8	832	0.0015	4	1	0	0	320	365	421	77.87	74.79	50	27.7	63.5	81.1	81.1	108.8	144.6	239	256	276	276	50-Yr	276	6.50	358	7.00	0	7.00	0
090121-090122	90121	90122	1547423	09	01	78.49	78.03	309	0.0015	2	1	0	0	52	59	72	77.49	76.87	80	12.6	28.3	9.4	9.4	22	37.7	43	37	34	43	10-Yr	43	3.75	52	4.00	0	4.00	0
090122-090123	90122	90123	538874.5	09	01	78.03	77.21	769	0.0011	2.25	1	0	0	79	92	111	76.87	75.33	80	10.7	23.9	12.9	12.9	23.5	36.8	66	68	74	74	50-Yr	74	4.50	87	4.75	0	4.75	0
090123-090111	90123	90111	450673.2	09	01	77.21	77.8	389	-0.0015	2.75	1	0	0	88	100	124	75.33	74.55	0	0	0	22	22	22	22	66	78	102	102	50-Yr	102	5.00	124	5.50	0	5.50	0
090131-090111	90131	90111		09	01	80.43	77.8	1691	0.0016	4.5	1	0	0	58	70	71	79.43	74.79	36	14.1	28.5	94.9	94.9	109	123.4				0							
090111-090112	90111	90112	1341062	09	01	77.8	74.19	432	0.0084	8	7	0	0	510	571	660	74.79	73.19	56	59.7	149.6	548.2	548.2	607.8	697.8				0							
090112-090113	90112	90113	957935.6	09	01	74.19	73	414	0.0029	8	7	0	0	545	614	709	73.19	72	0	0	0	485.3	485.3	485.3	485.3	60	129	224	224	50-Yr	224	6.25	709	9.50	0	9.50	0
			15244047.5		01 Total																																
090201-090202	90201	90202	2171005	09	02	1020	900	2698	0.0445	0	0	0	0	84	94	116	997.86	892.79	36	150.7	304.9	0	0	150.7	304.9	84	0	0	84	10-Yr	84	2.75	84	2.75	0	2.75	0
090221-090222	90221	90222	1354365	09	02	1020	910	1590	0.0692	0	0	0	0	69	78	94	1019	909	36	187.9	380.4	0	0	187.9	380.4	69	0	0	69	10-Yr	69	2.25	69	2.25	0	2.25	0
090222-090202	90222	90202	1850201	09	02	910	900	983	0.0102	0	0	0	0	139	158	186	909	892.79	36	72.1	145.8	0	0	72.1	145.8	139	86	40	139	10-Yr	139	3.75	139	3.75	0	3.75	0
090202-090203	90202	90203	1643286	09	02	900	890	543	0.0184	0	0	0	0	276	315	384	892.79	883.84	36	96.9	196.2	0	0	96.9	196.2	276	218	188	276	10-Yr	276	5.00	276	5.00	0	5.00	0
090226-090203	90226	90203	1926275	09	02	1100	890	1792	0.1172	0	0	0	0	83	93	117	1034.8	883.84	36	244.5	494.9	0	0	244.5	494.9	83	0	0	83	10-Yr	83	2.25	83	2.25	0	2.25	0
090203-090204	90203	90204	2367330	09	02	890	860	1506	0.0199	0	0	0	0	435	492	606	883.84	859	36	100.8	204.1	0	0	100.8	204.1	435	391	402	435	10-Yr	435	5.75	435	5.75	0	5.75	0
090231-090232	90231	90232	2093125	09	02	1080	900	2029	0.0887	0	0	0	0	82	92	117	1079	899	36	212.8	430.7	0	0	212.8	430.7	82	0	0	82	10-Yr	82	2.25	82	2.25	0	2.25	0
090236-090232	90236	90232	1229459	09	02	1000	900	767	0.1303	0	0	0	0	67	76	91	977.04	899	36	257.9	522	0	0	257.9	522.67	0	0	0	67	10-Yr	67	2.25	67	2.25	0	2.25	0
090241-090232	90241	90232	1867242	09	02	920	900	649	0.0308	0	0	0	0	80	90	109	919	899	36	125.4	253.8	0	0	125.4	253.8	80	0	0	80	10-Yr	80	2.75	80	2.75	0	2.75	0

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
090617-090473	90617	90473	1669651	09	04	740	600	921	0.1519	0	0	0	0	138	157	184	725.67	599	36	278.5	563.6	0	0	278.5	563.6	138	0	0	138	10-Yr	138	2.50	138	2.50	0	2.50	0
090471-090472	90471	90472	1852067	09	04	950	740	2212	0.0949	0	0	0	0	90	101	115	949	705.64	36	220.1	445.5	90	0	0	90	0	0	0	90	10-Yr	90	2.25	90	2.25	0	2.25	0
090472-090473	90472	90473	1773882	09	04	740	600	969	0.1444	0	0	0	0	155	176	205	705.64	599	36	271.5	549.5	155	0	0	155	0	0	0	155	10-Yr	155	2.75	155	2.75	0	2.75	0
090473-090474	90473	90474	1003662	09	04	600	520	1479	0.0541	0	0	0	0	326	364	438	599	518.34	36	166.1	336.3	326	198	102	326	10-Yr	326	4.25	326	4.25	0	4.25	0			
090474-090475	90474	90475	971478.4	09	04	520	395	2344	0.0533	0	0	0	0	332	377	487	518.34	390.5	36	165	333.9	0	0	165	333.9	332	212	153	332	10-Yr	332	4.25	332	4.25	0	4.25	0
090475-090457	90475	90457	1356982	09	04	395	360	898	0.039	0	0	0	0	356	429	559	390.5	341.55	36	141.1	285.5	0	0	141.1	285.5	356	288	274	356	10-Yr	356	4.25	356	4.25	0	4.25	0
090457-090458	90457	90458	1583089	09	04	360	280	1900	0.0421	0	0	0	0	1093	1269	1627	341.55	261.06	36	146.6	296.7	0	0	146.6	296.7	1093	1122	1330	1330	50-Yr	1330	7.25	1330	7.25	0	7.25	0
090458-090460	90458	90460	3540440	09	04	280	279	44	0.0229	0	0	0	0	1193	1380	1771	261.06	259.21	36	108	218.6	0	0	108	218.6	1193	1272	1552	1552	50-Yr	1552	7.75	1552	7.75	0	7.75	0
090460-090461	90460	90461		09	04	279	250.09	477	0.0606	6	1	0	0	1193	1380	1770	259.21	239.01	0	0	0	809.8	809.8	809.8	809.8	383	570	960	960	50-Yr	960	6.50	1770	8.50	0	8.50	0
			13751251.4		04 Total																																
090601-090602	90601	90602	1278409	09	06	400	320	1260	0.0635	0	0	0	0	58	64	78	397.88	319	36	180	364.3	0	0	180	364.3	58	0	0	58	10-Yr	58	2.25	58	2.25	0	2.25	0
090602-090603	90602	90603	2743080	09	06	320	260	1140	0.0526	0	0	0	0	161	181	224	319	259	36	163.9	331.7	0	0	163.9	331.7	161	17	0	161	10-Yr	161	3.25	161	3.25	0	3.25	0
			4021489		06 Total																																
090603-090461	90603	90461	1850855	09	04	260	250.09	713	0.0139	2.5	1	0	0	245	276	335	259	239.01	50	83.1	190.8	63.7	63.7	146.9	254.5	181	129	80	181	10-Yr	181	3.75	245	4.25	0	4.25	0
090461-090462	90461	90462	447142.4	09	04	250.09	204.3	843	0.0543	6.5	1	0	0	1425	1642	2099	239.01	203.3	66	76.1	186.7	1002.4	1002.4	1078.5	1189.1	423	564	910	910	50-Yr	910	6.50	1912	8.50	0	8.50	0
090481-090462	90481	90462	658902.6	09	04	342.75	204.3	884	0.1566	2	1	0	0	28	32	39	258.05	203.3	36	282.7	572.2	52.3	52.3	335	624.5				0								
090462-090463	90462	90463	650712.8	09	04	204.3	195.7	218	0.0395	6.5	1	0	0	1450	1675	2131	203.3	194.7	50	140	321.5	967.6	967.6	1107.6	1289	482	567	842	842	50-Yr	842	6.25	1810	8.50	0	8.50	0
090486-090487	90486	90487	197924	09	04	206.62	195.72	357	0.0305	3	1	0	0	13	15	16	197.06	194.72	33	122.5	242.7	50.3	50.3	172.8	293				0								
090487-090463	90487	90463	1674631	09	04	195.72	195.7	329	0.0001	3	1	0	0	59	67	77	194.72	194.06	33	5.5	10.8	27.7	27.7	33.2	38.5	31	34	38	38	10-Yr	38	3.50	66	4.25	0	4.25	0
090463-090464	90463	90464		09	04	195.7	179.86	461	0.0344	6.5	1	0	0	1503	1735	2202	194.7	177.16	50	130.7	300.1	950.3	950.3	1081	1250.3	553	654	952	952	50-Yr	952	6.75	1902	8.50	0	8.50	0
090464-090465	90464	90465	1138021	09	04	179.86	162.77	404	0.0423	6.5	1	0	0	1540	1773	2255	177.16	161.77	50	145	332.8	950.3	950.3	1095.2	1283.590		678	972	972	50-Yr	972	6.75	1922	8.50	0	8.50	0
090465-090466	90465	90466	208772.2	09	04	162.77	140.87	754	0.0291	6.75	1	0	0	1539	1774	2256	161.77	139.87	50	120.2	275.9	918.4	918.4	1038.6	1194.3	621	735	1062	1062	50-Yr	1062	7.25	1980	9.50	0	9.50	0
090466-090407	90466	90407	628115.1	09	04	140.87	103.88	1786	0.0207	6.75	1	0	0	1544	1779	2260	139.87	95.72	0	0	0	846.1	846.1	846.1	846.1	698	933	1414	1414	50-Yr	1414	8.50	2260	10.00	0	10.00	0
090407-090408	90407	90408	1170751	09	04	103.88	82	1658	0.0132	8.75	10	0	0	4892	5556	6834	95.72	81	0	0	0	1453.8	1453.8	1453.8	1453.8	3438	4102	5380	5380	50-Yr	5380	16.50	6834	18.00	0	18.00	0
			8625827.1		04 Total																																
090501-090502	90501	90502	752092.7	09	05	141.48	131.13	564	0.0184	1.5	1	0	0	48	59	64	140.48	126.9	0	0	0	15.1	15.1	15.1	15.1	33	44	49	49	50-Yr	49	2.50	64	2.75	0	2.75	0
090506-090502	90506	90502	2061222	09	05	138.16	131.13	449	0.0157	2.5	1	0	0	73	89	105	137.16	126.9	0	0	0	57.5	57.5	57.5	57.5	15	31	47	47	50-Yr	47	2.50	105	3.25	0	3.25	0
090502-090503	90502	90503		09	05	131.13	106.51	937	0.0263	2.5	1	0	0	120	145	167	126.9	105.51	80	52.9	118.9	57.5	57.5	110.4	176.4	62	35	0	62	10-Yr	62	2.75	120	3.50	0	3.50	0
			2813314.7		05 Total																																
090503-090409	90503	90409	1241716	09	04	106.51	97	537	0.0177	2.75	1	0	0	162	191	225	105.51	94.38	40	96.6	201.8	70.7	70.7	167.2	272.5	91	24	0	91	10-Yr	91	3.25	162	4.00	0	4.00	0
			1241716		04 Total																																
090511-090512	90511	90512	4013326	09	05	127.45	117.68	465	0.021	2.75	1	0	0	120	134	154	126.45	116.68	36	103.5	209.5	71.2	71.2	174.7	280.7	49	0	0	49	10-Yr	49	2.50	120	3.50	0	3.50	0
090512-090513	90512	90513	242262.5	09	05	117.68	107.57	523	0.0193	3	1	0	0	131	146	170	116.68	106.57	36	99.3	201	86	86	185.3	287	45	0	0	45	10-Yr	45	2.50	131	3.75	0	3.75	0
090513-090514	90513	90514	1202643	09	05	107.57	102	524	0.0106	3.25	1	0	0	190	220	249	106.57	100.21	36	73.7	149.1	84.3	84.3	158	233.4	106	62	16	106	10-Yr	106	3.75	190	4.50	0	4.50	0
			5458231.5		05 Total																																
090514-090409	90514	90409	413724.2	09	04	102	97	481	0.0104	3.5	1	0	0	206	238	270	100.21	94.38	36	72.9	147.5	102.8	102.8	175.6	250.3	103	62	20	103	10-Yr	103	3.75	206	4.75	0	4.75	0
090409-090408	90409	90408	1247678	09	04	97	82	1103	0.0136	4	1	0	0	407	476	554	94.38	81	80	38.1	85.5	146.7	146.7	184.8	232.3	260	291	322	322	50-Yr	322	5.50	468	6.25	0	6.25	0
			1661402.2		04 Total																																
			176323477.6		09 Total																																
100106-100101	100106	100101	938816.1	10	01	90.46	80	121	0.0866	1.75	1	0	0	44	53	61	85.62	79	60	96	240.1	34.4	34.4	130.5	274.5	10	0	0	10	10-Yr	10	1.25	44	2.00	0	2.00	0
100101-100102	100101	100102	1878854	10	01	80	73.25	355	0.019	2.5	1	0	0	114	136	158	79	72.25	32	95.8	188.5	52.5	52.5	148.3	241	62	0	0	62	10-Yr	62	2.75	114	3.50	0	3.50	0
100102-100103	100102	100103	1272182	10	01	73.25	57.54	1094	0.0144	2.75	1	0	0	162	194	226	72.25	55	0	0	0	61.7	61.7	61.7	61.7	100	132	164	164	50-Yr	164	4.00	226	4.50	0	4.50	0
100111-100112	100111	100112	2429889	10	01	64.95	57.62	1078	0.0068	0	0	0	0	63	76	91	63.95	55	32	57.3	112.7	0	0	57.3	112.7	63	19	0	63	10-Yr	63	3.25	63	3.25	0	3.25	0
			6519741.1		01 Total																																
100201-100202	100201	100202	196370.1	10	02	370	359.81	663	0.0154	3	1	0	0	13	16	17	321.86	292.71	26	79.2	149.9	129.9	129.9	209.1	279.8				0								
100221-100202	100221	100202	213321.2	10	02	347.84	359.81	506	-0.0237	3	1	0	0	13	15	18	316.14	292.71	0	0	0	133.3	133.3	133.3	133.3				0								
100202-100203	100202	100203	853876.4	10	02	359.81	341.31	655	0.0282	3.5	1	0	0	58	66	78	292.71	263.87	26	107.3	203.1	196	196	303.3	399.1				0								
100203-100204	100203	100204	462104.2	10	02	341.31	339.45	158	0.0118	3	1	0	0	78	86	108	263.87	256.93	26	69.4	131.3	129.9	129.9	199.3	261.2				0								
100204-100205	100204	100205		10	02	339.45	333.44	283	0.0213	2.5	1	0	0	77	86	105	256.93	244.49	26	93.1	176.3	79.9	79.9	173	256.1				0								
100205-100206	100205	100206	120767.3	10	02	333.44	232.68	1281	0.0786	2.25	1	0	0	79	89	110	244.49	188.1	27	182.3	347.1	60.3	60.3	242.6	407.4	19	0	0	19	10-Yr	19	1.50	79	2.50	0	2.50	0
100206-100207	100206	100207	352943	10	02	232.68	165.64	883	0.0759	2.25	1	0	0	81	91	111	188.1	149.24	27	179.1	341	60.3	60.3	239.4	401.4	21	0	0	21	10-Yr	21	1.75	81	2.75	0	2.75	0
100207-100208	100207	100208	650552.3	10	02	165.64	152.42	298	0.0443	2.25	1	0	0	103	119	146	149.24	136.11	23	126.2	234.6	60.3	60.3	186.5	294.9	43	0	0	43	10-Yr	43	2.00	103	2.75	0	2.75	0
100226-100227	100226	100227	331937.4	10	02	186.05	166.53	519	0.0376	2	1	0	0	23	27	29	185.05	150.39	23	116.3	216.2	54.3	54.3	170.6	270.5				0								
100227-100208	100227	100208	581006.5	10	02	166.53	152.42	214	0.066	2	1	0	0	52	59	69	150.39	136.11	23	154	286.3	54.3	54.3	208.3	340.6				0								
100208-100209	100208	100209	78673.95	10	02	152.42	125.89	407	0.0651	2.25	1	0	0	151	174	210	136.11	118.18	40	185.3	387.3	60.3	60.3	245.6	447.6	91	0	0	91	10-Yr	91	2.75	151	3.25	0	3.25	0
100209-100210	100209	100210	3218040	10	02	125.89	120.1	139	0.0415	2.25	1	0	0	231	264	315	118.18	112.04	50	143.6	329.7	60.3	60.3	204	390	171	60	0	171	10-Yr	171	3.50	231	3.75	0	3.75	0
100210-100211	100210	100211	533451.8	10	02	120.1	87.63	578	0.0562	2.25	1	0	0	256	290	346	112.04	86.63	23	142.2	264.3	60.3	60.3	202.5	324.7	196	88	21	196	10-Yr	196	3.50	256	4.00	0	4.00	0
100211-100212	100211	100212	149214	10	02	87.63	70	459	0.0384	2.5	1	0	0	256	292	348	86.63	69	23	117.5	218.4	74.6	74.6	192.1	293	181	100	55	181	10-Yr	181	3.50	256	4.00	0	4.00	0
			7742258.15		02 Total																																
100301-100302	100301	100302	677388.3	10	03	42.59	42.45	124	0.0011	2	1	0	0	36	41	49	41.59	39.32	50	23.7	54.5	28.5	28.5	52.2	83	8	0	0	8	10-Yr	8	1.25	36	2.25	0	2.25	0
100302-100303	100302	100303	283616.3	10	03	42.45	35	289	0.0257	2	1	0	0	54	58	73	39.32	34	34	113.4	226.3	28.5	28.5	141.9	254.8	26	0	0	26	10-Yr	26	2.00	54	2.75	0	2.75	0
			961004.6		03 Total																																
100401-100402	100401	100402	887072.5	10	04	94.52	57.82	280	0.1311	1.5	1	0	0	39	44	57	74.22	56.82	0	0	0	24.3	24.3	24.3	24.3	15	20	33	33	50-Yr	33	1.75	57	2.25	0	2.25	0
			887072.5		04 Total																																
100501-100502	100501	100502	494239	10	05	333.74	289.85	440	0.0997	2	1	0	0	31	35	42	276.18	245.97	23	189.3	351.9	55	55	244.3	406.9				0								
100502-100503	100502	100503	563032.2	10	05	289.85	245.26	544	0.0819	2	1	0	0	67	76	87	245.97	208.65	28	189.1	362.3	55	55	244.1	417.3	12	0	0	12	10-Yr	12	1.25	67	2.25	0	2.25	0
100521-100522	100521	100522	233520.4	10	05	338.87	307	542	0.0588	1	1	0	0	17	20	22	311.65	279.31	0	0	0	8.1	8.1	8.1	8.1	9	12	14	14	50-Yr	14	1.25	22	1.50	0	1.50	0
100522-100523	100522	100523	341889.2	10	05	307	280.99	231	0.1124	1.5	1	0	0	45	53	58	279.31	265.5	0	0	0	23.8	23.8	23.8	23.8	21	29	34	34	50-Yr	34	1.75	58	2.25	0	2.25	0
100523-100524	100523	100524	284859.6	10	05	280.99	264.19	478	0.0352	2	1	0	0	67	78	86	265.5	237	0	0	0	51.3	51.3	51.3	51.3	16	27	35	35	50-Yr	35	1.75	86	2.50	0	2.50	0
100524-100503	100524	100503	235406.8	10	05	264.19	245.26	475	0.0398	2.5	1	0	0	80	90	102	237	208.65	23	119.7	222.5	93.1	93.1	212.7	315.5				0								

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEV	TOPO	DSELEV	TOPO	LENGTH	TOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
090232-090204	90232	90204	962639.3	09	02	900	860	839	0.0477	0	0	0	0	265	293	365	899	859	36	156	315.7	0	0	156	315.7	265	137	49	265	10-Yr	265	4.00	265	4.00	0	4.00	0
090204-090205	90204	90205	2853241	09	02	860	850	657	0.0152	0	0	0	0	741	837	1050	859	815.56	36	88.2	178.4	0	0	88.2	178.4	741	749	872	872	50-Yr	872	5.75	872	5.75	0	5.75	0
090205-090206	90205	90206	2697316	09	02	850	750	2214	0.0452	0	0	0	0	827	932	1167	815.56	669.07	36	151.8	307.3	0	0	151.8	307.3	827	780	860	860	50-Yr	860	5.75	860	5.75	0	5.75	0
090206-090207	90206	90207	2159159	09	02	750	500	2571	0.0972	0	0	0	0	896	1013	1255	669.07	499	36	222.8	450.9	0	0	222.8	450.9	896	790	804	896	10-Yr	896	5.75	896	5.75	0	5.75	0
090246-090247	90246	90247	2224200	09	02	600	510	2156	0.0418	0	0	0	0	90	100	127	599	509	36	146	295.5	0	0	146	295.5	90	0	0	90	10-Yr	90	2.75	90	2.75	0	2.75	0
090247-090207	90247	90207	2091525	09	02	510	500	368	0.0272	0	0	0	0	166	187	228	509	499	36	117.8	238.5	0	0	117.8	238.5	166	69	0	166	10-Yr	166	3.75	166	3.75	0	3.75	0
090207-090208	90207	90208	1532409	09	02	500	430	1200	0.0583	0	0	0	0	1072	1217	1501	499	421.99	36	172.5	349.2	0	0	172.5	349.2	1072	1044	1152	1152	50-Yr	1152	6.50	1152	6.50	0	6.50	0
090208-090209	90208	90209	2263655	09	02	430	370	826	0.0726	0	0	0	0	1150	1306	1604	421.99	369	36	192.6	389.7	0	0	192.6	389.7	1150	1113	1214	1214	50-Yr	1214	6.50	1214	6.50	0	6.50	0
090251-090252	90251	90252	2618561	09	02	800	750	965	0.0518	0	0	0	0	125	141	170	773.05	686.89	36	162.6	329.1	0	0	162.6	329.1	125	0	0	125	10-Yr	125	2.75	125	2.75	0	2.75	0
090252-090253	90252	90253	1985734	09	02	750	725	436	0.0573	0	0	0	0	202	228	273	686.89	647.95	36	171	346.1	0	0	171	346.1	202	57	0	202	10-Yr	202	3.25	202	3.25	0	3.25	0
090253-090254	90253	90254	2066004	09	02	725	700	484	0.0516	0	0	0	0	279	315	381	647.95	604.74	36	162.4	328.6	0	0	162.4	328.6	279	153	52	279	10-Yr	279	3.50	279	3.50	0	3.50	0
090254-090256	90254	90256	2091756	09	02	700	520	961	0.1874	0	0	0	0	359	404	492	604.74	519	36	309.2	625.9	0	0	309.2	625.9	359	95	0	359	10-Yr	359	4.00	359	4.00	0	4.00	0
090256-090257	90256	90257	2852923	09	02	520	500	1293	0.0155	0	0	0	0	453	509	626	519	450.31	36	88.8	179.8	0	0	88.8	179.8	453	420	446	453	10-Yr	453	4.75	453	4.75	0	4.75	0
090261-090262	90261	90262	1521872	09	02	920	720	1335	0.1499	0	0	0	0	73	82	99	842.69	719	36	276.6	559.7	0	0	276.6	559.7	73	0	0	73	10-Yr	73	2.25	73	2.25	0	2.25	0
090262-090263	90262	90263	2537121	09	02	720	580	2024	0.0692	0	0	0	0	160	181	223	719	579	36	187.9	380.3	0	0	187.9	380.3	160	0	0	160	10-Yr	160	3.00	160	3.00	0	3.00	0
090263-090257	90263	90257	1497922	09	02	580	500	1912	0.0418	0	0	0	0	215	245	296	579	450.31	36	146.1	295.8	0	0	146.1	295.8	215	99	0	215	10-Yr	215	3.50	215	3.50	0	3.50	0
090257-090209	90257	90209	2319930	09	02	500	370	1531	0.0849	0	0	0	0	743	842	1015	450.31	369	36	208.2	421.4	0	0	208.2	421.4	743	634	594	743	10-Yr	743	5.75	743	5.75	0	5.75	0
090216-090209	90216	90209	1797901	09	02	442	370	1112	0.0647	0	0	0	0	85	95	116	441	369	36	181.8	367.9	0	0	181.8	367.9	85	0	0	85	10-Yr	85	2.50	85	2.50	0	2.50	0
090209-090210	90209	90210	1842535	09	02	370	320	1533	0.0326	0	0	0	0	2022	2282	2797	369	304.98	36	129	261.1	0	0	129	261.1	2022	2153	2536	2536	50-Yr	2536	9.50	2536	9.50	0	9.50	0
090210-090211	90210	90211	1635029	09	02	320	300	2019	0.0099	0	0	0	0	2043	2313	2830	304.98	220.71	36	71.1	143.9	0	0	71.1	143.9	2043	2242	2686	2686	50-Yr	2686	9.50	2686	9.50	0	9.50	0
090266-090267	90266	90267	1651670	09	02	680	450	2383	0.0965	0	0	0	0	82	93	112	671.59	449	36	222	449.2	0	0	222	449.2	82	0	0	82	10-Yr	82	2.25	82	2.25	0	2.25	0
090271-090272	90271	90272	1988790	09	02	750	580	1401	0.1213	0	0	0	0	83	93	114	705.76	579	36	248.8	503.6	0	0	248.8	503.6	83	0	0	83	10-Yr	83	2.25	83	2.25	0	2.25	0
090272-090267	90272	90267	2924715	09	02	580	450	1503	0.0865	0	0	0	0	180	201	249	579	449	36	210.1	425.2	0	0	210.1	425.2	180	0	0	180	10-Yr	180	3.00	180	3.00	0	3.00	0
090267-090268	90267	90268	4268999	09	02	450	370	1672	0.0479	0	0	0	0	379	427	526	449	338.72	36	156.3	316.3	0	0	156.3	316.3	379	271	210	379	10-Yr	379	4.25	379	4.25	0	4.25	0
090268-090211	90268	90211	1686786	09	02	370	300	1789	0.0391	0	0	0	0	444	504	614	338.72	220.71	36	141.3	286.1	0	0	141.3	286.1	444	363	328	444	10-Yr	444	4.50	444	4.50	0	4.50	0
090276-090211	90276	90211	1437110	09	02	380	300	1731	0.0462	0	0	0	0	84	94	113	365.23	220.71	36	153.6	310.9	0	0	153.6	310.9	84	0	0	84	10-Yr	84	2.50	84	2.50	0	2.50	0
090281-090282	90281	90282	3340851	09	02	486	420	1129	0.0585	0	0	0	0	108	122	153	479.83	403.28	36	172.7	349.6	0	0	172.7	349.6	108	0	0	108	10-Yr	108	2.75	108	2.75	0	2.75	0
090282-090283	90282	90283	3930125	09	02	420	330	1096	0.0821	0	0	0	0	223	252	319	403.28	329	36	204.8	414.4	0	0	204.8	414.4	223	47	0	223	10-Yr	223	3.50	223	3.50	0	3.50	0
090283-090284	90283	90284	2002156	09	02	330	260	2260	0.031	0	0	0	0	308	349	433	329	258.76	36	125.7	254.5	0	0	125.7	254.5	308	223	179	308	10-Yr	308	4.50	308	4.50	0	4.50	0
090286-090287	90286	90287	1049403	09	02	500	360	1809	0.0774	0	0	0	0	70	79	94	480.31	325.85	36	198.7	402.2	0	0	198.7	402.2	70	0	0	70	10-Yr	70	2.25	70	2.25	0	2.25	0
090287-090284	90287	90284	2306554	09	02	360	260	786	0.1273	0	0	0	0	155	177	213	325.85	258.76	36	254.9	515.8	0	0	254.9	515.8	155	0	0	155	10-Yr	155	3.00	155	3.00	0	3.00	0
090284-090211	90284	90211	2287342	09	02	260	300	1224	-0.0327	0	0	0	0	542	616	753	258.76	220.71	0	0	0	0	0	0	0	542	616	753	753	50-Yr	753	6.25	753	6.25	0	6.25	0
			86928221.3		02 Total																																		
090211-090400	90211	90400	5830997	09	04	300	300	106	0	0	0	0	0	3175	3596	4409	220.71	216.29	0	0	0	0	0	0	0	3175	3596	4409	4409	50-Yr	4409	11.50	4409	11.50	0	11.50	0
090400-090401	90400	90401		09	04	300	200	414	0.2414	8	10	0	0	3173	3595	4409	216.29	199	30	333.6	647.7	2756.1	2756.1	3089.7	3403.7	417	505	1005	1005	50-Yr	1005	6.75	3761	11.00	0	12.00	0
090401-090402	90401	90402	247840.1	09	04	200	192.28	525	0.0147	11	10	0	0	3175	3599	4412	199	184.86	20	67	122.5	3396	3396	3463.	3518.5	0	136	893	893	50-Yr	893	7.00	4290	12.50	0	13.00	0
090402-090403	90402	90403	565227.3	09	04	192.28	148.49	1388	0.0316	12	9	0	0	3175	3604	4414	184.86	147.49	32	123.3	242.7	3293.8	3293.8	3417.1	3536.5	0	187	878	878	50-Yr	878	6.75	4171	12.50	0	13.00	0
090403-090404	90403	90404	582367.7	09	04	148.49	121.49	1230	0.022	12	10	0	0	3172	3605	4413	147.49	120.49	32	102.9	202.5	3442.1	3442.1	3545	3644.5	0	60	768	768	50-Yr	768	6.75	4211	13.00	0	13.50	0
090411-090412	90411	90412	466039.8	09	04	260.23	227.68	426	0.0763	2.75	1	0	0	37	41	45	259.23	226.68	32	191.8	377.5	135.7	135.7	327.5	513.2				0									
090412-090413	90412	90413	201254.9	09	04	227.68	218.45	192	0.0481	3	1	0	0	52	58	65	226.68	213.7	0	0	0	161	161	161	161				0									
090421-090413	90421	90413	673927.2	09	04	232.61	218.45	1206	0.0117	2.25	1	0	0	39	46	52	231.61	213.7	50	76.4	175.4	35.1	35.1	111.5	210.5	4	0	0	4	10-Yr	4	1.00	39	2.50	0	2.50	0
090426-090413	90426	90413	444643.7	09	04	216.6	218.45	366	-0.005	2	1	0	0	32	41	44	215.6	213.7	0	0	0	15.2	15.2	15.2	15.2	17	26	29	29	50-Yr	29	2.75	44	3.00	0	3.00	0
090413-090414	90413	90414	419829.4	09	04	218.45	196.57	268	0.0816	3.75	1	0	0	123	139	164	213.7	195.57	0	0	0	292	292	292	292				0									
090414-090415	90414	90415		09	04	196.57	178.24	370	0.0495	4.5	1	0	0	123	139	161	195.57	177.24	0	0	0	406.3	406.3	406.3	406.3				0									
090431-090415	90431	90415	1052843	09	04	184.81	178.24	410	0.016	3	1	0	0	42	49	57	183.81	177.24	0	0	0	78.3	78.3	78.3	78.3				0									
090436-090415	90436	90415	481663.9	09	04	179.55	178.24	216	0.0061	3	1	0	0	35	40	43	178.41	177.24	0	0	0	45.5	45.5	45.5	45.5				0									
090415-090416	90415	90416		09	04	178.24	165.5	259	0.0493	4.5	1	0	0	194	225	259	177.24	164.5	0	0	0	405.4	405.4	405.4	405.4				0									
090416-090417	90416	90417		09	04	165.5	127.03	998	0.0385	5	1	0	0	193	223	258	164.5	126.03	32	136.3	268.2	474.5	474.5	610.8	742.8				0									
090417-090404	90417	90404	1988343	09	04	127.03	121.49	385	0.0144	5.25	1	0	0	249	288	336	126.03	120.49	0	0	0	330.5	330.5	330.5	330.5	0	0	5	5	50-Yr	5	1.25	336	5.50	0	5.50	0
090404-090405	90404	90405	878768.9	09	04	121.49	117.07	348	0.0127	12	10	0	0	3330	3772	4614	120.49	116.07	0	0	0	2615.2	2615.2	2615.2	2615.2	715	1157	1999	1999	50-Yr	1999	11.00	4614	14.50	0	14.50	0
090441-090442	90441	90442	722000.2	09	04	125.56	121.48	327	0.0125	2.75	1	0	0	38	45	51	124.56	120.48	0	0	0	54.9	54.9	54.9	54.9				0									
090442-090443	90442	90443	582177.1	09	04	121.48	118.56	309	0.0094	2.25	3	0	0	74	89	98	120.48	117.56	0	0	0	48.3	48.3	48.3	48.3	26	41	50	50	50-Yr	50	3.00	98	3.75	0	3.75	0
090443-090405	90443	90405	150829.6	09	04	118.56	117.07	186	0.008	3	1	0	0	86	100	113	117.56	116.07	0	0	0	55.4	55.4	55.4	55.4	31	45	58	58	50-Yr	58	3.25	113	4.00	0	4.00	0
090405-090406	90405	90406	368411.6	09	04	117.07	108.59	858	0.0099	8.75	9	0	0	3350	3800	4644	116.07	107.59	0	0	0	1336	1336	1336	1336	2014	2464	3308	3308	50-Yr	3308	13.50	4644	15.50	0	15.50	0
090446-090406	90446	90406	294012.7	09	04	125.16	108.59	1179	0.0141	2.5	1	0	0	26	30	32	123.35	107.59	0	0	0	44.1	44.1	44.1	44.1				0									
090406-090407	90406	90407	956950.8	09	04	108.59	103.88	1337	0.0035	8.75	9	0	0	3368	3819	4665	107.59	95.72	0	0	0	1266.7	1266.7	1266.7	1266.7	2101	2552	3398	3398	50-Yr	3398	14.00	4665	16.00	0	16.00	0
090451-090452	90451	90452	1756887	09	04	1140	900	1210	0.1984	0	0	0	0	68	76	94	1139	899	36	318.2	644.1	0	0	318.2	644.1	68	0	0	68	10-Yr	68	2.00	68	2.00	0	2.00	0
090452-090453	90452	90453	3985974	09	04	900	800	1398	0.0715	0	0	0	0	176	198	243	899	785.17	36	191.1	386.8	0	0	191.1	386.8	176	7	0	176	10-Yr	176	3.00	176	3.00	0	3.00	0
090611-090453	90611	90453	2230121	09	04	980	800	1713	0.1051	0	0	0	0	84	94	119	979	785.17	36	231.6	468.7	0	0	231.6	468.7	84	0	0	84	10-Yr	84	2.25	84	2.25	0	2.25	0
090453-090454	90453	90454		09	04	800	700	1663	0.0601	0	0	0	0	330	371	456	785.17	649.76	36	175.2	354.6	0	0	175.2	354.6	330	196	101	330	10-Yr	330	4.00	330	4.00	0	4.00	0
090454-090455	90454	90455	1770599	09	04	700	500	1851	0.108	0	0	0	0	392	447	552	649.76	499	36	234.8	475.3	0	0	234.8	475.3	392	212	77	392	10-Yr	392	4.25	392	4.25	0	4.25	0
090455-090456	90455	90456	1723137	09	04	500	380	2271	0.0528	0	0	0	0	450	505	650	499	379	36	164.2	332.4	0	0	164.2	332.4	450	341	318	450	10-Yr	450	4.75	450	4.75	0	4.75	0
090491-090492	90491	90492	1959673	09	04	890	640	1579	0.1583	0	0	0	0	82	92	112	827.48	639	36	284.2	575.3	0	0	284.2	575.3	82	0	0	82	10-Yr	82	2.25	82	2.25	0	2.25	0
090496-090492	90496	90492	1494207	09	04	840	640	1468	0.1363	0	0	0	0	75	84	102	827.31	639	36	263.7	533.8	0	0	263.7	533.8	75	0	0	75	10-Yr	75	2.00	75	2.00	0	2.00	0
090492-090493	90492	90493	1409353	09	04	640	520	1286	0.0933	0	0	0	0	225	256	306	639	519	36	218.3	441.8	0	0	218.3	441.8	225	38	0	225	10-Yr	225	3.25	225	3.25	0	3.25	0
090493-090456	90493	90456	502819.6	09	04	520	380	2221	0.063	0	0	0	0	228	261	317	519	379	36	179.4	363	0	0	179.4	363	228	82	0	228	10-Yr	228	3.50	228	3.50	0	3.50	0
090456-090457	90456	90457	1901100	09	04	380	360	884	0.0226	0	0	0	0	723	819	1040	379	341.55	36	107.5	217.5	0	0	107.5	217.5	723	712	823	823	50-Yr	823	6.25	823	6.25	0	6.25	0
			35641998.5		04 Total																																		
090616-090617	90616	90617	1468001	09	06	1080	740	2422	0.1404	0	0	0	0	71	80	96	1058.59	725.67	36	267.7	541.8	0	0	267.7	541.8	71	0	0	71	10-Yr	71	2.00	71	2.00	0	2.00	0
			1468001		06 Total																																		

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
100503-100504	100503	100504	323548.8	10	05	245.26	176.72	679	0.101	2.5	1	0	0	165	184	213	208.65	168.14	28	209.9	402.1	93.1	93.1	302.9	495.2	72	0	0	72	10-Yr	72	2.50	165	3.25	0	3.25	0
100504-100505	100504	100505	598518.7	10	05	176.72	131	639	0.0715	2.5	1	0	0	192	217	251	168.14	130	28	176.6	338.5	93.1	93.1	269.7	431.5	99	0	0	99	10-Yr	99	2.75	192	3.50	0	3.50	0
100531-100532	100531	100532	433431.9	10	05	206.09	144.45	778	0.0792	2.25	1	0	0	28	31	38	205.09	143.45	23	168.8	313.8	80.9	80.9	249.7	394.7				0								
100532-100533	100532	100533	778343.9	10	05	144.45	133.25	271	0.0413	2.5	1	0	0	64	73	88	143.45	132.25	0	0	0	77.4	77.4	77.4	77.4	0	0	11	11	50-Yr	11	1.25	88	2.75	0	2.75	0
100533-100505	100533	100505	315615.8	10	05	133.25	131	475	0.0047	2.75	1	0	0	82	91	112	132.25	130	23	41.2	76.7	33.7	33.7	74.9	110.4	48	16	2	48	10-Yr	48	3.25	82	4.00	0	4.00	0
100505-100506	100505	100506	264113.6	10	05	131	112.67	581	0.0315	3	1	0	0	275	313	366	130	111.67	23	106.5	197.9	109.9	109.9	216.4	307.9	165	97	58	165	10-Yr	165	3.50	275	4.25	0	4.25	0
100506-100507	100506	100507	326765.1	10	05	112.67	96.58	903	0.0178	3.5	1	0	0	276	319	376	111.67	95.58	23	80	148.8	124.6	124.6	204.7	273.4	151	114	103	151	10-Yr	151	4.00	276	4.75	0	4.75	0
100507-100508	100507	100508	1086613	10	05	96.58	94.97	277	0.0058	4.25	1	0	0	311	359	423	95.58	91.41	23	45.7	85	192.7	192.7	238.4	277.7	118	121	145	145	50-Yr	145	4.00	338	5.25	0	5.25	0
100508-100509	100508	100509	904609.3	10	05	94.97	100	872	-0.0058	6	1	0	0	343	396	463	91.41	78.27	0	0	0	483.2	483.2	483.2	483.2				0								
100509-100510	100509	100510	3125005	10	05	100	66	1115	0.0305	6.75	1	0	0	419	479	566	78.27	61.47	60	57	142.5	661.6	661.6	718.6	804				0								
			10309512.3		05 Total																																	
			26419588.65	10 Total																																		
110101-110102	110101	110102	1238725	11	01	360	340	188	0.1061	2	1	0	0	36	41	50	323.89	319.9	0	0	0	30.6	30.6	30.6	30.6	5	10	19	19	50-Yr	19	1.75	50	2.50	0	2.50	0
110102-110103	110102	110103		11	01	340	300	986	0.0406	0	0	0	0	36	41	50	319.9	299	0	0	0	0	0	0	0	36	41	50	50	50-Yr	50	2.50	50	2.50	0	2.50	0
			1238725	11 Total																																		
			1238725		01 Total																																	
			712220993	Grand Total																																		

STORM DRAIN SYSTEM DEFICIENCIES USING 50 YEAR DESIGN STORM

(1997 L.A. COUNTY METHODOLOGY)

NON-DEFICIENT LINKS

DRAINAGE LINKS DEFICIENT IN A 50 YR DESIGN STORM

- 1 - 10 CFS
- 10 - 20 CFS
- 20- 40 CFS
- 40 - 70 CFS
- 70 - 100 CFS
- 100 - 250 CFS
- >250 CFS

Linknodes

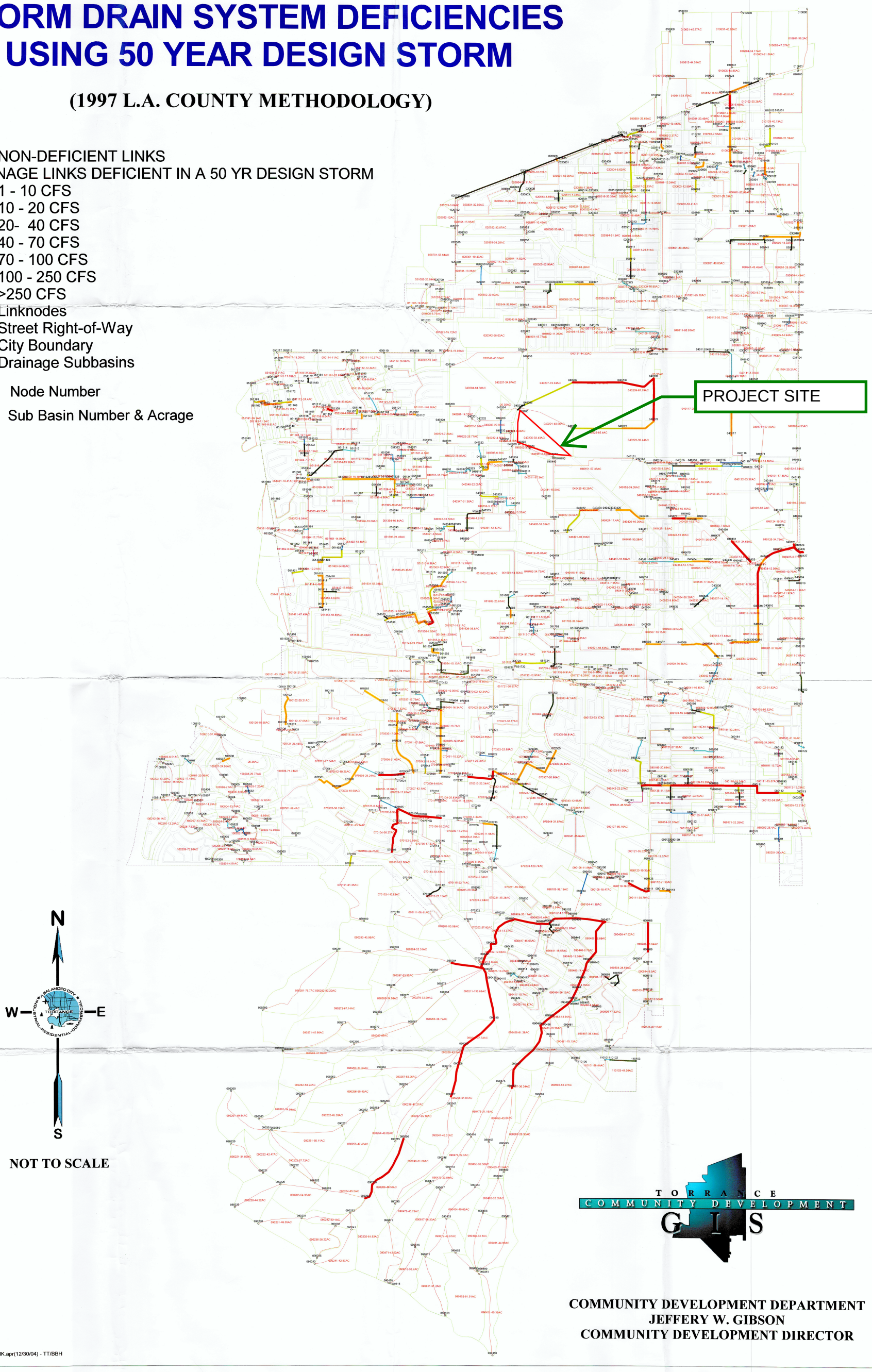
Street Right-of-Way

City Boundary

Drainage Subbasins

040222 : Node Number

031001-25.16AC : Sub Basin Number & Acrage



NOT TO SCALE

TORRANCE COMMUNITY DEVELOPMENT GIS

COMMUNITY DEVELOPMENT DEPARTMENT
JEFFERY W. GIBSON
COMMUNITY DEVELOPMENT DIRECTOR

G:\data\production\AVProjects\sd_LINK.apr(12/30/04) - TT/BBH

APPENDIX B

Bentley Flowmaster

Worksheet for Box Pipe - PARKWAY DRAIN

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.018 ft/ft
Normal Depth	1.70 in
Height	4.0 in
Bottom Width	72.00 in

Results	
Discharge	3.43 cfs
Flow Area	0.9 ft²
Wetted Perimeter	75.4 in
Hydraulic Radius	1.62 in
Top Width	72.00 in
Critical Depth	2.60 in
Percent Full	42.5 %
Critical Slope	0.004 ft/ft
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	0.40 ft
Froude Number	1.893
Discharge Full	8.96 cfs
Slope Full	0.018 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 in
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	42.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.70 in
Critical Depth	2.60 in
Channel Slope	0.018 ft/ft
Critical Slope	0.004 ft/ft

APPENDIX C

HydroCalc Results

Peak Flow Hydrologic Analysis

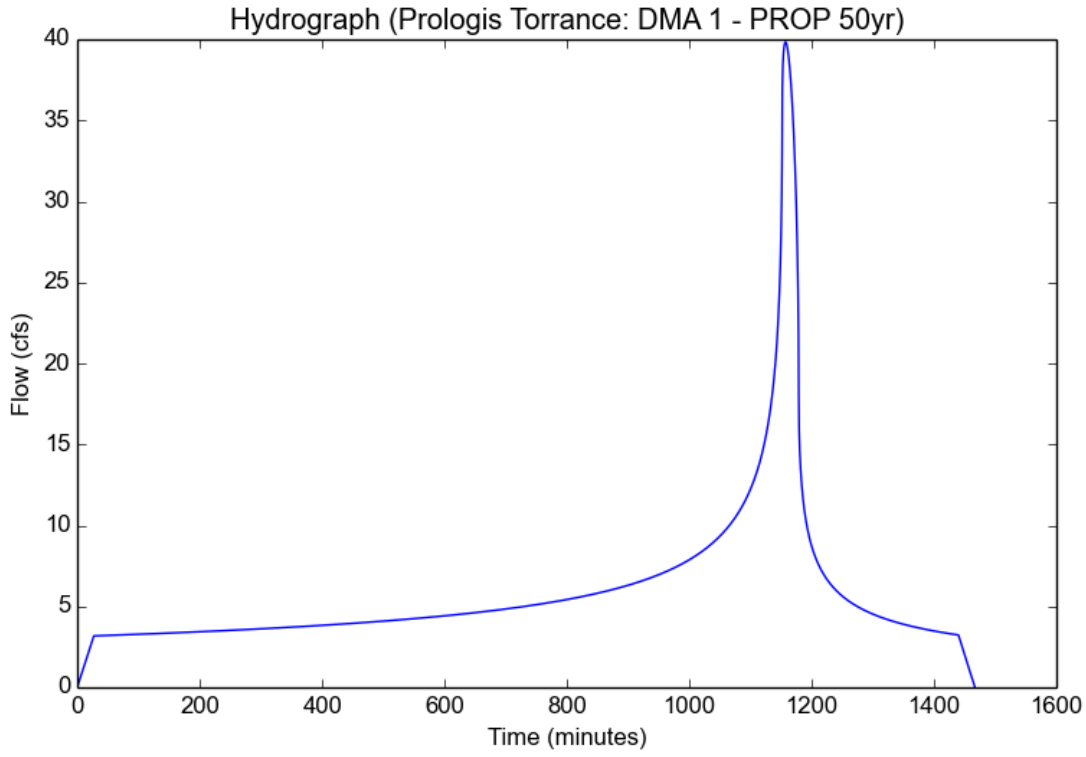
File location: K:/ORA_LDEV/194187001 - Prologis Torrance/Reports/H&H/Calculations/HydroCalc/Prologis Torrance - DMA 1 - PROP 50yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Prologis Torrance
Subarea ID	DMA 1 - PROP 50yr
Area (ac)	31.32
Flow Path Length (ft)	3043.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.877
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	1.5394
Undeveloped Runoff Coefficient (Cu)	0.3004
Developed Runoff Coefficient (Cd)	0.8262
Time of Concentration (min)	27.0
Clear Peak Flow Rate (cfs)	39.8367
Burned Peak Flow Rate (cfs)	39.8367
24-Hr Clear Runoff Volume (ac-ft)	11.862
24-Hr Clear Runoff Volume (cu-ft)	516707.2491



Peak Flow Hydrologic Analysis

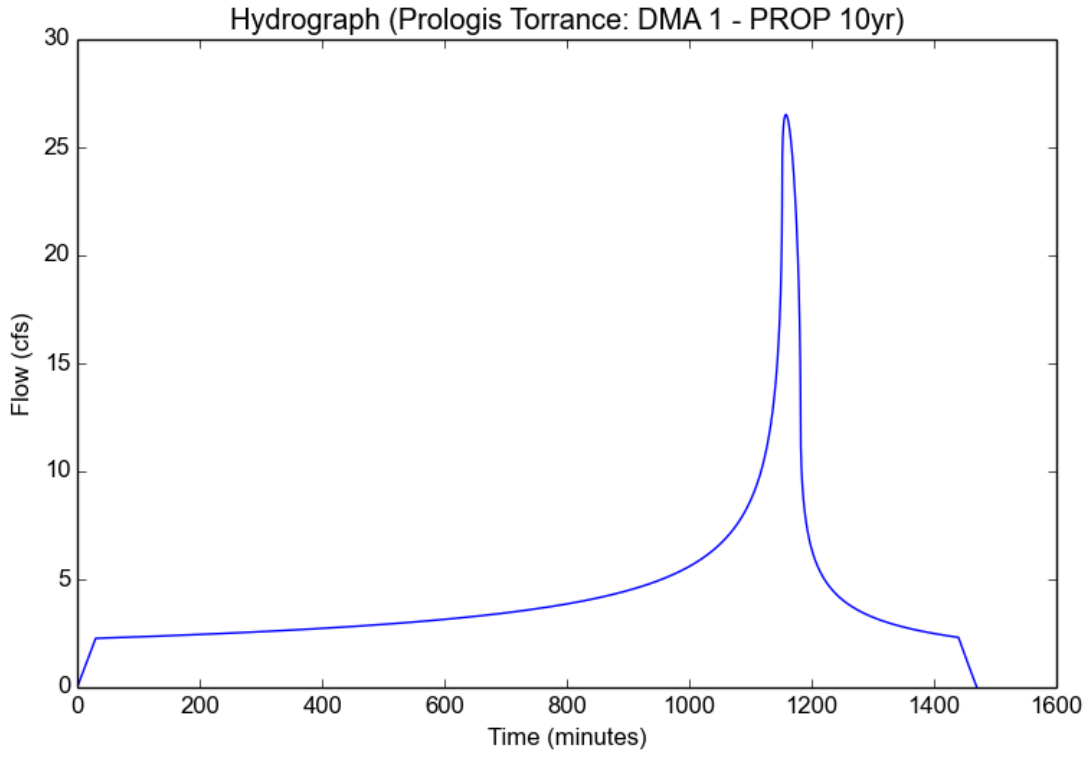
File location: K:/ORA_LDEV/194187001 - Prologis Torrance/Reports/H&H/Calculations/HydroCalc/Prologis Torrance - DMA 1 - PROP 10yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Prologis Torrance
Subarea ID	DMA 1 - PROP 10yr
Area (ac)	31.32
Flow Path Length (ft)	3043.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.877
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.0698
Peak Intensity (in/hr)	1.046
Undeveloped Runoff Coefficient (Cu)	0.1641
Developed Runoff Coefficient (Cd)	0.8095
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	26.5202
Burned Peak Flow Rate (cfs)	26.5202
24-Hr Clear Runoff Volume (ac-ft)	8.4507
24-Hr Clear Runoff Volume (cu-ft)	368111.4057



Peak Flow Hydrologic Analysis

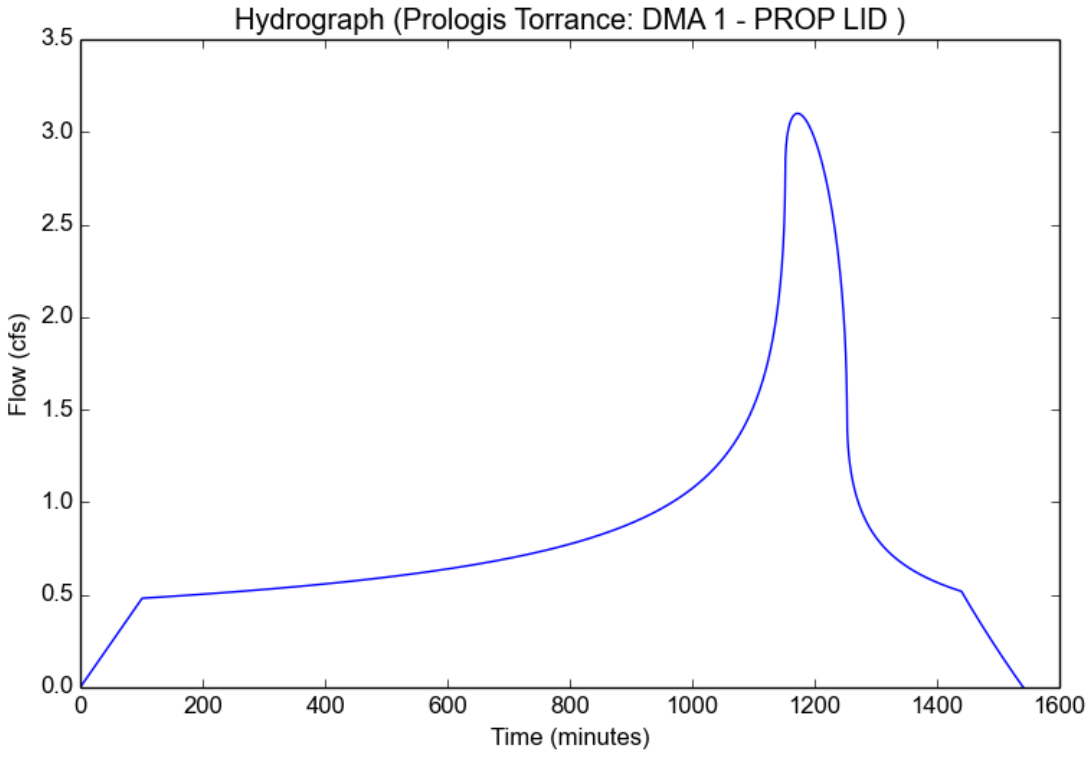
File location: K:/ORA_LDEV/194187001 - Prologis Torrance/Reports/WQMP/Calculations/Hydrocalc/Prologis Torrance - DMA 1 - PROP LID.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Prologis Torrance
Subarea ID	DMA 1 - PROP LID
Area (ac)	31.32
Flow Path Length (ft)	3043.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.877
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1235
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.8016
Time of Concentration (min)	101.0
Clear Peak Flow Rate (cfs)	3.1002
Burned Peak Flow Rate (cfs)	3.1002
24-Hr Clear Runoff Volume (ac-ft)	1.7639
24-Hr Clear Runoff Volume (cu-ft)	76835.1853



APPENDIX D

PondPack Calculations

SEE FULL H&H SUBMITTAL, REMOVED TO ELIMINATE REDUNDANCY

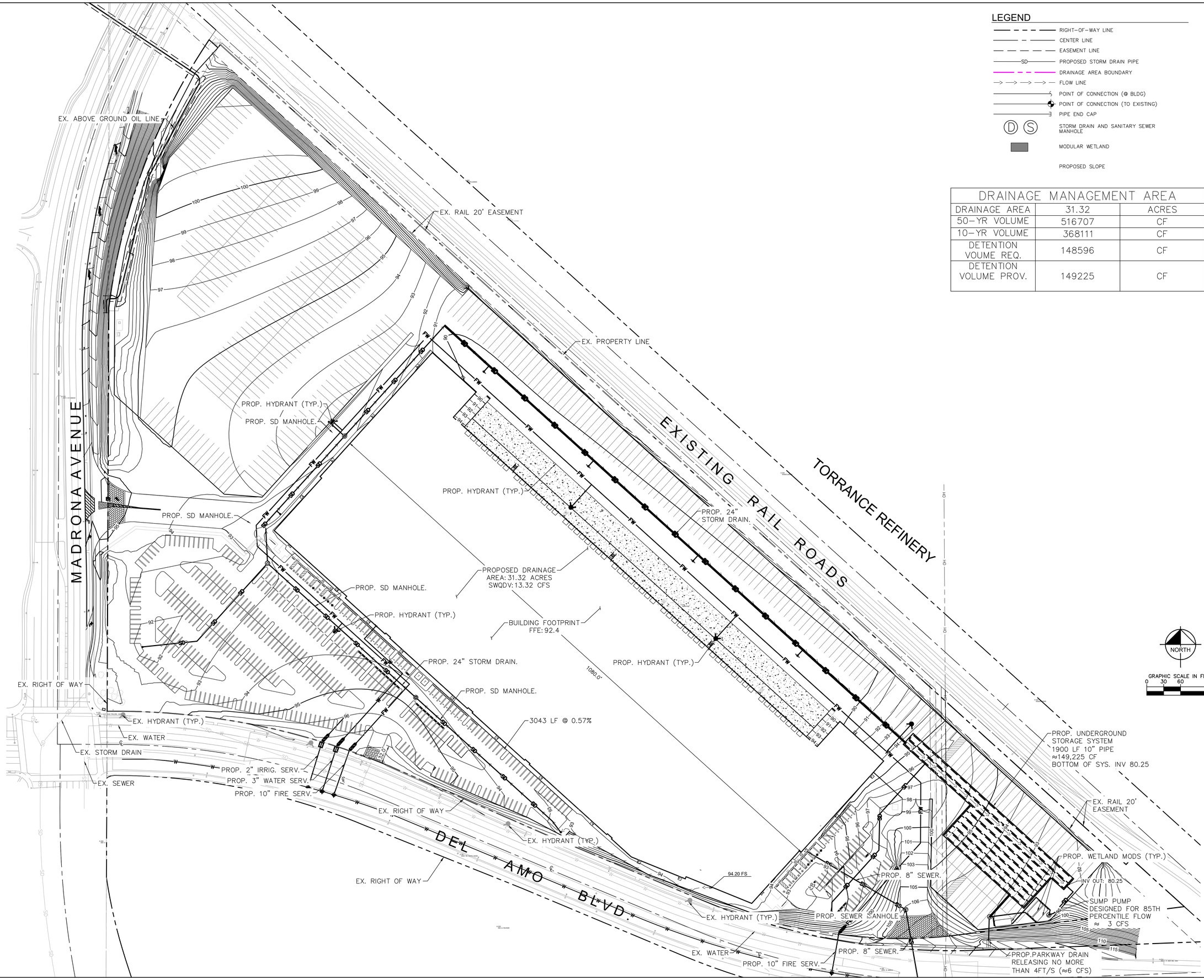
APPENDIX E

Psomas Due Diligence Report

SEE FULL H&H SUBMITTAL, REMOVED TO ELIMINATE REDUNDANCY

APPENDIX F

Preliminary Layout



DRAINAGE MANAGEMENT AREA		
DRAINAGE AREA	31.32	ACRES
50-YR VOLUME	516707	CF
10-YR VOLUME	368111	CF
DETENTION VOUME REQ.	148596	CF
DETENTION VOLUME PROV.	149225	CF

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 THE CITY DRIVE, SUITE 200, ORANGE, CA 92868
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

NOT FOR CONSTRUCTION

KHA PROJECT 194187001
DATE 9/23/2024
SCALE AS SHOWN
DESIGNED BY ---
DRAWN BY ---
CHECKED BY ---

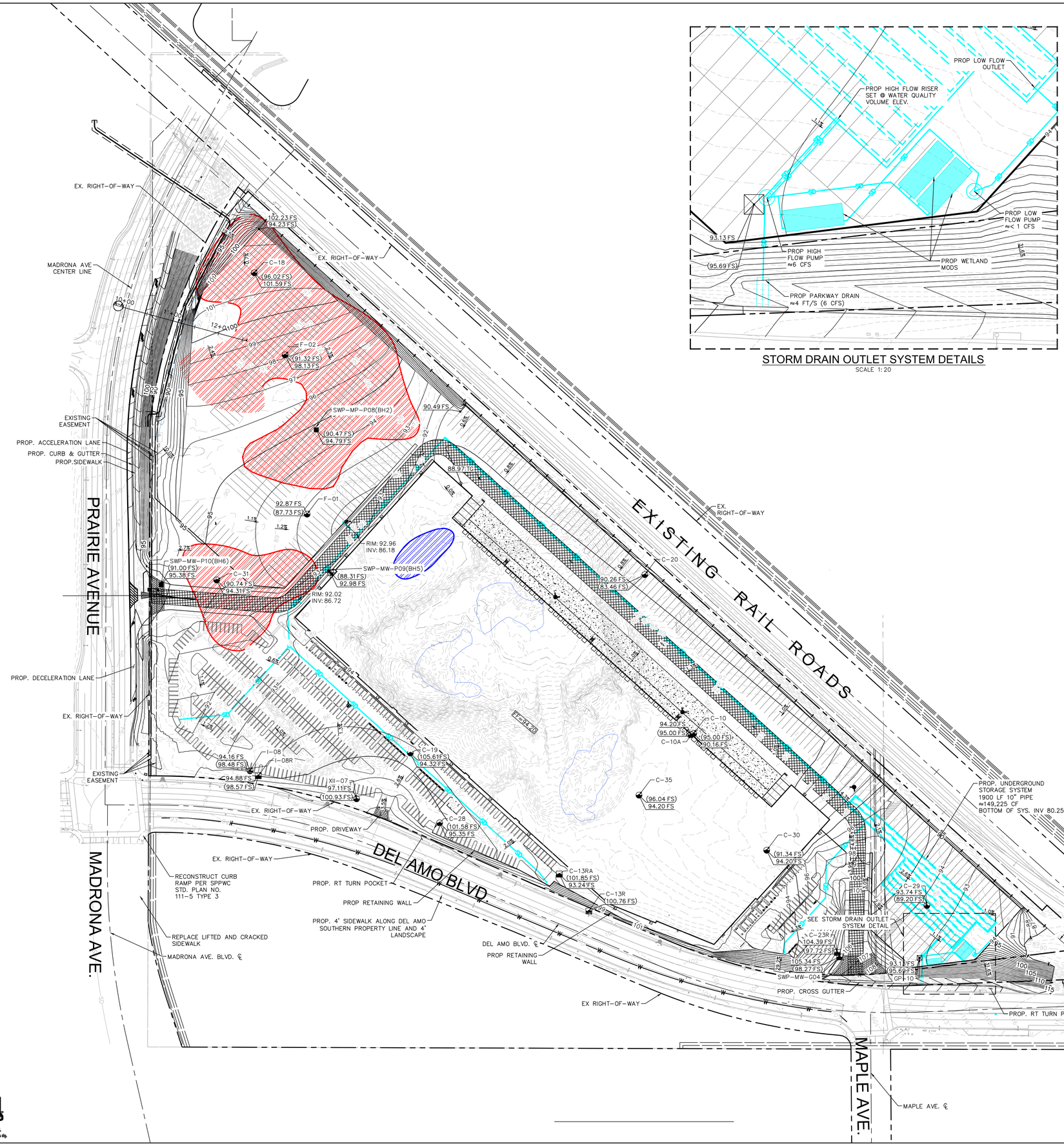
PRELIMINARY H&H EXHIBIT

TORRANCE INDUSTRIAL

PREPARED FOR PROLOGIS

CITY OF TORRANCE CA

Plotted By: Gutierrez, Kevin Sheet Set: Kha Layout: SUSMP EXH September 23, 2024 02:00:55pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\Exhibits\EXH-02 — Hydrology Exhibit_PROP.dwg
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
811 Know what's below. Call 811 before you dig.



STORM DRAIN OUTLET SYSTEM DETAILS

SCALE 1:20

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTER LINE
- EASEMENT LINE
- LIMITS OF GRADING
- PROPOSED STORM DRAIN PIPE
- FLOW LINE
- POINT OF CONNECTION (@ BLDG)
- POINT OF CONNECTION (TO EXISTING)
- PIPE END CAP
- PROPOSED CLEANOUT
- STORM DRAIN AND SANITARY SEWER MANHOLE
- WETLAND MODS
- MONITORING WELLS

SITE DATA

SITE AREA:	1,364,209 SF (31.318 AC)
BUILDING AREA:	403,033 SF (9.252 AC)
FLOOR AREA RATIO (FAR):	403,033 SF/1,364,209 SF = 0.30 FAR

NOTE

PER CONDITIONS OF APPROVAL FOR FUTURE EQUESTRIAN FACILITY ON THE SOUTH SIDE OF DEL AMO BLVD:

1. REPLACE LIFTED, AND CRACKED SIDEWALK ON MADRONA AVE. AND SOUTH SIDE OF DEL AMO BLVD. ALONG FUTURE EQUESTRIAN FACILITY FRONTAGE PER CITY OF TORRANCE STD. NO. T102.
2. REPLACE EXISTING WHEELCHAIR RAMP AT SOUTHEAST CORNER OF MADRONA AVE. AND DEL AMO BLVD.
3. MAINTAIN 4' SIDEWALK ALONG DEL AMO SOUTHERN PROPERTY LINE AND REPLACE REMAINING 4' WITH APPROVED DROUGHT TOLERANT LANDSCAPING.
4. MAINTAIN AND REPAIR EXISTING PERIMETER CHAIN LINK FENCE AND PRIVACY SCREEN ON THE SOUTH SIDE OF DEL AMO BLVD.

NOTE

ALL EXISTING TREES WITHIN THE LIMITS OF IMPROVEMENTS WILL BE DEMOLISHED. ALL EXISTING TREES WITHIN THE PUBLIC RIGHT-OF-WAY, NOT AFFECTED BY PROPOSED DRIVEWAY APPROACH AND DECELERATION/ACCELERATION LANES, WILL BE PROTECTED IN PLACE.

ESTIMATED EARTHWORK QUANTITIES

CUT:	49,200 CY
FILL:	340,700 CY
NET:	291,500 CY (FILL)

NOTE: THE EARTHWORK QUANTITIES ABOVE ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR IS NOT AUTHORIZED TO USE THE ESTIMATES HEREIN FOR BIDDING AND CONSTRUCTION PURPOSES WITHOUT THE EXPLICIT WRITTEN PERMISSION OF THE ENGINEER OF RECORD. NO REPRESENTATIONS OF SUCH QUANTITIES OR A BALANCED SITE CONDITION ARE MADE BY THE ENGINEER OF RECORD.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE QUANTITIES ARE APPROXIMATE, IN PLACE VOLUMES CALCULATED FROM THE EXISTING GROUND TO THE PROPOSED FINISHED GRADE. EXISTING GROUND IS DEFINED BY THE CONTOURS AND SPOT GRADES ON THE BASE SURVEY. PROPOSED FINISHED GRADE IS DEFINED AS THE FINAL GRADE AS INDICATED ON THE GRADING PLAN(S) AS FINISHED GROUND, FINISHED SURFACE, AND FINISHED FLOOR ELEVATIONS.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE GRADING QUANTITIES HAVE NOT BEEN FACTORED TO ACCOUNT FOR CHANGES IN VOLUME DUE TO BULKING, CLEARING AND GRUBBING, SHRINKAGE, SUBSIDENCE, OVER-EXCAVATION AND RE-COMPACTION, AND CONSTRUCTION METHODS. NOR DO THEY ACCOUNT FOR THE THICKNESS OF PAVEMENT SECTIONS, STORMWATER QUALITY MEDIA SECTIONS, UTILITY PIPES, TRENCHING AND BEDDING MATERIALS, BUILDING OR WALL FOOTINGS, BUILDING SLAB THICKNESSES AND UNDERLYING BASE OR SAND LAYERS, REUSE OF PULVERIZED MATERIALS THAT WILL UNDERLIE NEW PAVEMENTS, ETC.

ANY OVEREXCAVATION AND RECOMPACTION DEPTHS AND VOLUMES, SHRINKAGE FACTORS, PAVEMENT SECTIONS, BUILDING PAD SECTIONS, AND BULKING FACTORS ARE BASED ON A SEPARATE GEOTECHNICAL REPORT. ANY BUILDING SLAB THICKNESSES ARE BASED ON THE SEPARATE BUILDING STRUCTURAL ENGINEERING PLANS. ANY UTILITY, STORMWATER MITIGATION, AND FOOTING SPOILS ARE BASED ON ESTIMATES PROVIDED BY THE OWNER OR CONTRACTOR.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 E THIRD ST, LONG BEACH, CA 92802
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

LICENSED PROFESSIONAL

NOT FOR CONSTRUCTION

DATE:

KHA PROJECT 194187001
DATE 9/23/2024
SCALE AS SHOWN
DESIGNED BY ML
DRAWN BY CL
CHECKED BY JM

PRELIMINARY DRAINAGE PLAN

TORRANCE REFINERY

PREPARED FOR
TORRANCE BLACK BEAUTY, LLC

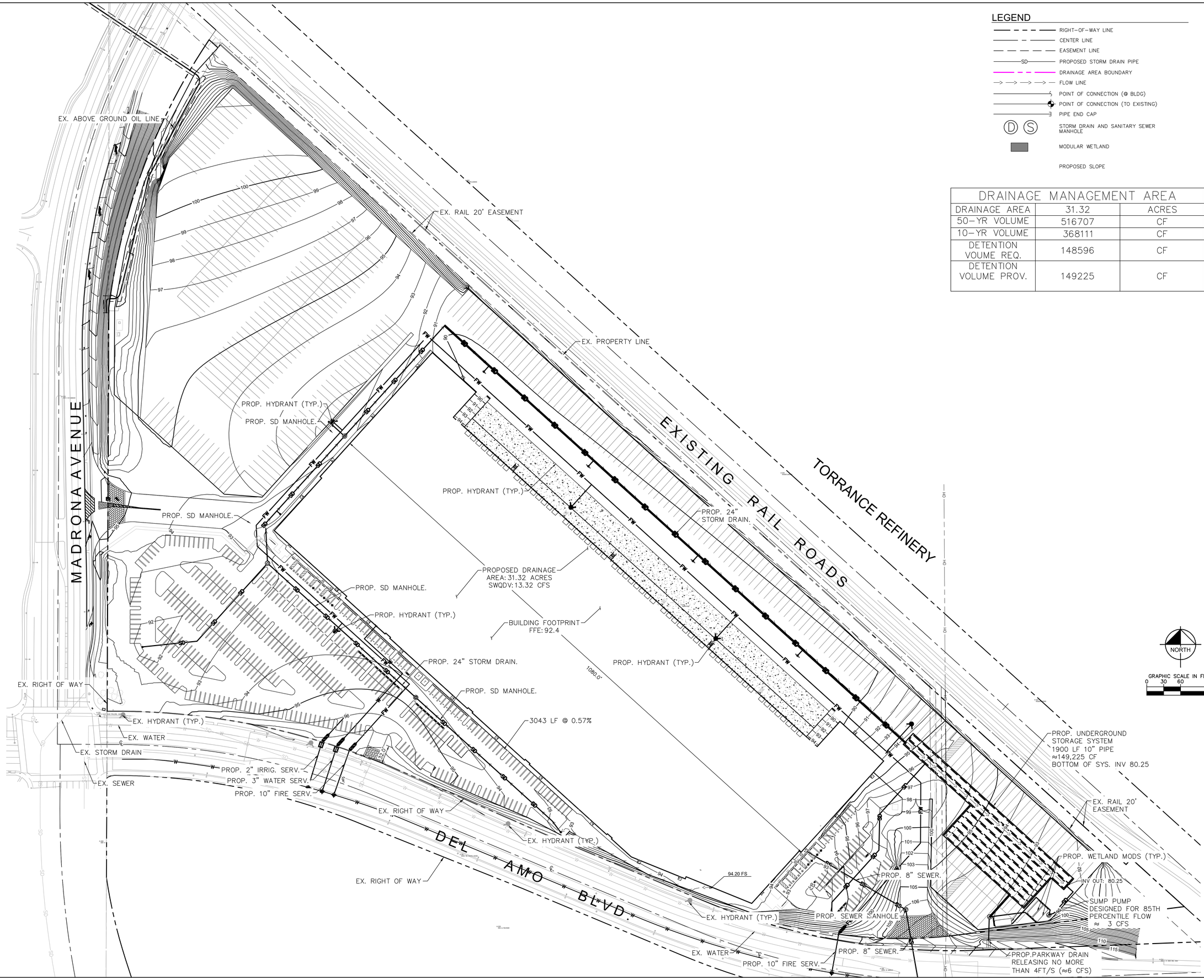
CITY OF TORRANCE CA

C3

Plotted By:Gutierrez, Kevin Sheet Set:Kha Layout:C1 PRELIMINARY GRADING PLAN September 23, 2024 01:55:33pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\PlanSheets\PRELIM GRADING\DRAINAGE PLAN.dwg
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
811 Know what's below. Call 811 before you dig.

APPENDIX F

Preliminary Layout



DRAINAGE MANAGEMENT AREA		
DRAINAGE AREA	31.32	ACRES
50-YR VOLUME	516707	CF
10-YR VOLUME	368111	CF
DETENTION VOUME REQ.	148596	CF
DETENTION VOLUME PROV.	149225	CF

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 THE CITY DRIVE, SUITE 200, ORANGE, CA 92868
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

NOT FOR CONSTRUCTION

KHA PROJECT 194187001
DATE 9/23/2024
SCALE AS SHOWN
DESIGNED BY ---
DRAWN BY ---
CHECKED BY ---

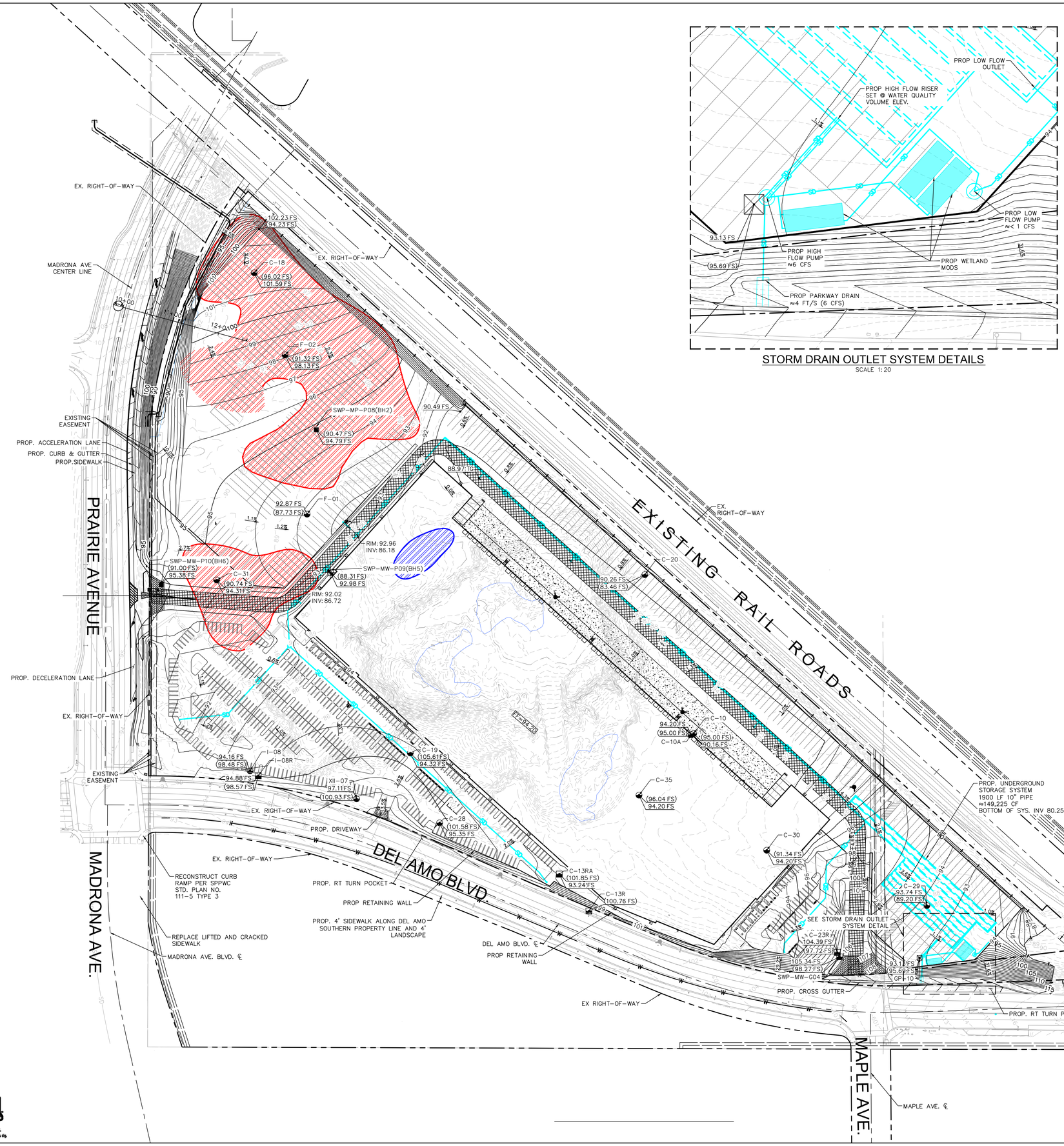
PRELIMINARY H&H EXHIBIT

TORRANCE INDUSTRIAL

PREPARED FOR PROLOGIS

CITY OF TORRANCE CA

Plotted By: Gutierrez, Kevin Sheet Set: Kha Layout: SUSMP EXH September 23, 2024 02:00:55pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\Exhibits\EXH-02 — Hydrology Exhibit_PROP.dwg
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
811 Know what's below. Call 811 before you dig.



STORM DRAIN OUTLET SYSTEM DETAILS

SCALE 1:20

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTER LINE
- EASEMENT LINE
- LIMITS OF GRADING
- PROPOSED STORM DRAIN PIPE
- FLOW LINE
- POINT OF CONNECTION (@ BLDG)
- POINT OF CONNECTION (TO EXISTING)
- PIPE END CAP
- PROPOSED CLEANOUT
- STORM DRAIN AND SANITARY SEWER MANHOLE
- WETLAND MODS
- MONITORING WELLS

SITE DATA

SITE AREA:	1,364,209 SF (31.318 AC)
BUILDING AREA:	403,033 SF (9.252 AC)
FLOOR AREA RATIO (FAR):	403,033 SF/1,364,209 SF = 0.30 FAR

NOTE

PER CONDITIONS OF APPROVAL FOR FUTURE EQUESTRIAN FACILITY ON THE SOUTH SIDE OF DEL AMO BLVD:

1. REPLACE LIFTED, AND CRACKED SIDEWALK ON MADRONA AVE. AND SOUTH SIDE OF DEL AMO BLVD. ALONG FUTURE EQUESTRIAN FACILITY FRONTAGE PER CITY OF TORRANCE STD. NO. T102.
2. REPLACE EXISTING WHEELCHAIR RAMP AT SOUTHEAST CORNER OF MADRONA AVE. AND DEL AMO BLVD.
3. MAINTAIN 4' SIDEWALK ALONG DEL AMO SOUTHERN PROPERTY LINE AND REPLACE REMAINING 4' WITH APPROVED DROUGHT TOLERANT LANDSCAPING.
4. MAINTAIN AND REPAIR EXISTING PERIMETER CHAIN LINK FENCE AND PRIVACY SCREEN ON THE SOUTH SIDE OF DEL AMO BLVD.

NOTE

ALL EXISTING TREES WITHIN THE LIMITS OF IMPROVEMENTS WILL BE DEMOLISHED. ALL EXISTING TREES WITHIN THE PUBLIC RIGHT-OF-WAY, NOT AFFECTED BY PROPOSED DRIVEWAY APPROACH AND DECELERATION/ACCELERATION LANES, WILL BE PROTECTED IN PLACE.

ESTIMATED EARTHWORK QUANTITIES

CUT:	49,200 CY
FILL:	340,700 CY
NET:	291,500 CY (FILL)

NOTE: THE EARTHWORK QUANTITIES ABOVE ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR IS NOT AUTHORIZED TO USE THE ESTIMATES HEREIN FOR BIDDING AND CONSTRUCTION PURPOSES WITHOUT THE EXPLICIT WRITTEN PERMISSION OF THE ENGINEER OF RECORD. NO REPRESENTATIONS OF SUCH QUANTITIES OR A BALANCED SITE CONDITION ARE MADE BY THE ENGINEER OF RECORD.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE QUANTITIES ARE APPROXIMATE, IN PLACE VOLUMES CALCULATED FROM THE EXISTING GROUND TO THE PROPOSED FINISHED GRADE. EXISTING GROUND IS DEFINED BY THE CONTOURS AND SPOT GRADES ON THE BASE SURVEY. PROPOSED FINISHED GRADE IS DEFINED AS THE FINAL GRADE AS INDICATED ON THE GRADING PLAN(S) AS FINISHED GROUND, FINISHED SURFACE, AND FINISHED FLOOR ELEVATIONS.

UNLESS EXPLICITLY STATED OTHERWISE HEREIN, THE ABOVE GRADING QUANTITIES HAVE NOT BEEN FACTORED TO ACCOUNT FOR CHANGES IN VOLUME DUE TO BULKING, CLEARING AND GRUBBING, SHRINKAGE, SUBSIDENCE, OVER-EXCAVATION AND RE-COMPACTION, AND CONSTRUCTION METHODS. NOR DO THEY ACCOUNT FOR THE THICKNESS OF PAVEMENT SECTIONS, STORMWATER QUALITY MEDIA SECTIONS, UTILITY PIPES, TRENCHING AND BEDDING MATERIALS, BUILDING OR WALL FOOTINGS, BUILDING SLAB THICKNESSES AND UNDERLYING BASE OR SAND LAYERS, REUSE OF PULVERIZED MATERIALS THAT WILL UNDERLIE NEW PAVEMENTS, ETC.

ANY OVEREXCAVATION AND RECOMPACTION DEPTHS AND VOLUMES, SHRINKAGE FACTORS, PAVEMENT SECTIONS, BUILDING PAD SECTIONS, AND BULKING FACTORS ARE BASED ON A SEPARATE GEOTECHNICAL REPORT. ANY BUILDING SLAB THICKNESSES ARE BASED ON THE SEPARATE BUILDING STRUCTURAL ENGINEERING PLANS. ANY UTILITY, STORMWATER MITIGATION, AND FOOTING SPOILS ARE BASED ON ESTIMATES PROVIDED BY THE OWNER OR CONTRACTOR.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2019 KIMLEY-HORN AND ASSOCIATES, INC.
765 E THIRD ST, LONG BEACH, CA 92802
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

LICENSED PROFESSIONAL

NOT FOR CONSTRUCTION

DATE:

KHA PROJECT 194187001
DATE 9/23/2024
SCALE AS SHOWN
DESIGNED BY ML
DRAWN BY CL
CHECKED BY JM

PRELIMINARY DRAINAGE PLAN

TORRANCE REFINERY

PREPARED FOR
TORRANCE BLACK BEAUTY, LLC

CITY OF TORRANCE CA

C3

Plotted By:Gutierrez, Kevin Sheet Set:Kha Layout:C1 PRELIMINARY GRADING PLAN September 23, 2024 01:55:33pm K:\ORA_LDEV\194187001 — Prologis Torrance\CAD\PlanSheets\PRELIM GRADING\DRAINAGE PLAN.dwg
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
811 Know what's below. Call 811 before you dig.

APPENDIX C

Psomas Due Diligence Report

DEL AMO BLVD. & MADRONA AVENUE

DUE DILIGENCE REPORT

July 13, 2018

Prepared for:
PROLOGIS
3546 Concours Street, Suite 100
Ontario, CA 91764
Telephone: (909) 673-8730

Prepared by:

Ion Cretu, P.E.
PSOMAS
555 South Flower Street, Suite 4300
Los Angeles, California 90071
Telephone: (213) 223-1400
Fax: (213) 223-1444

TABLE OF CONTENTS

SECTION		PAGE
1.0	OVERVIEW	2
2.0	METHODOLOGY	2
3.0	STREETS	
3.1	Existing Infrastructure	3
3.2	Proposed Infrastructure	3
4.0	GRADING	
4.1	Existing Infrastructure	3
4.2	Proposed Infrastructure	3
5.0	UTILITIES	3
6.0	STORM DRAIN	
6.1	Existing Infrastructure	4
6.2	Proposed Infrastructure	4
7.0	SEWER	
7.1	Existing Infrastructure	4
7.2	Proposed Infrastructure	4
8.0	WATER	
8.1	Existing Infrastructure	4
8.2	Proposed Infrastructure	5
9.0	DRY UTILTIES	
10.0	APPENDICES	7

1.0 OVERVIEW

The Del Amo Boulevard & Madrona Avenue Project, known herein as the "Project" is located on the northeast corner of the intersection of Prairie Avenue and Del Amo Boulevard and south of the railroad right of way in the City of Torrance. The project proposes to develop an existing mostly undeveloped site of approximately 33.9 acres of land that is zoned M2, Heavy Manufacturing. A small equestrian facility currently occupies a portion of the site, adjacent to Del Amo Blvd. The proposed project will consist of warehouse/office buildings with truck/automobile parking stalls utilizing the remainder of the site. The conceptual site plan is included in the appendix.

2.0 METHODOLOGY

This infrastructure analysis, as supporting information to the Client's due diligence analysis, documents the results of Psomas' research regarding the Project.

Psomas performed a conceptual level review of the capacities of the nearby infrastructure and reviewed the need for potential upgrades. Final capacity confirmation should include will serve letters and capacity requests from City of Torrance Public Works and a Fire Flow Availability from City of Torrance Public Works as well as responses from various utility companies with facilities in the area.

3.0 STREETS

3.1 Existing Infrastructure

The project is located on the northeast corner of the intersection of Prairie Avenue and Del Amo Boulevard in the City of Torrance. Del Amo Boulevard pavement width varies from 76ft to 94ft that includes a raised paved median. The parkway is improved with a sidewalk and landscape between Maple Ave. and Prairie Ave, and landscape only east of Maple Ave.

Prairie Avenue pavement width varies from 84ft to 107ft that includes a raised paved/landscaped median. The parkway is improved with a sidewalk and landscape.

3.2 Proposed Infrastructure

The project proposes four driveways along Del Amo Blvd. and one along Prairie Ave. on driveway along Del Amo Blvd. is located across Maple Avenue, therefore the traffic signal at that intersection will have to be upgraded. The traffic engineer should review if widening or striping revision will be required to provide a right turn lane for the westbound traffic along Del Amo Blvd. The proposed driveway will also require the relocation of four street lights.

4.0 GRADING

4.1 Existing Site

A small equestrian facility currently occupies a portion of the site. The site grades re lower than the adjoining streets: Prairie Avenue and Del Amo Boulevard. The site slopes from south to north from 108 elevation to about 82 elevation. There are also borrow pits with elevation as low as elevation 59. The borrow pits were created by the Torrance refinery when the soil was used to build the berm around the storage tanks.

There are also oil pipelines and gas lines through the property. Based on the available maps attached these lines are in the easements that crosses the property north of Maple Ave. towards the railroad right of way and along the northerly and westerly property lines. There are also power poles for SCE transmission lines in an easement north of Maple Ave. towards the railroad right of way (see dry utility section of the report).

Oil wells risers were found but there is no information available about on-site oil wells.

Monitoring wells were also found on site.

4.2 Proposed Site

Per Geotechnical Feasibility Study Proposed Commercial/Industrial Development NEC Del Amo Boulevard and Madrona Avenue, Torrance, California by Southern California Geotechinical:

Artificial Fill

Artificial fill soils were encountered at the ground surface at Boring Nos. B-1 through B-4, B-8, B-9, and B-12 and all of the trench locations. The fill soils generally consist of very loose to medium dense silty fine to coarse sands, clayey sands, and medium stiff to stiff fine sandy clays and silty clays to clayey silts, extending to depths of 12 to 22± feet below existing site grades. These fill soils contained varying amounts of debris including what appeared to be remnants of the previous on-site operations including asphaltic concrete, brick, coke fragments and what was identified to us as catalyst pellets. These catalyst pellets are rounded particles approximately 0.1 to 0.2 inches in diameter and appeared to be comprised of a ceramic-type material. The concentration of these particles, when encountered during our subsurface exploration, ranged from 20 to near 100

percent. The approximate range of percentage of pellets versus soil are described in our logs as: "trace," "little," and "abundant" are less than 10 percent, 10 to 30 percent, and 30 to 50 percent, respectively. In addition, layers that are described as "catalyst pellets in a soil matrix" were estimated to possess over 50 percent pellets relative to soil. The fill soils possess a disturbed and mottled appearance resulting in their classification as artificial fill. The approximate locations of the undocumented fill soils, including the maximum depths artificial fill soils were encountered are included on Plate 2 – Geotechnical Map, in the appendix of this report.

Alluvium

Native alluvium was encountered beneath the fill soils or at the ground surface at all of the boring and trench locations, extending to at least the maximum depth explored of 30± feet below existing site grades. The alluvium generally consists of loose to very dense silty fine sands, fine sands, and very stiff fine sandy clays.

Groundwater

Free water was not encountered during drilling of any of the borings or trenches. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 30± feet at the time of the subsurface exploration.

As part of our research, we reviewed readily available groundwater data in order to determine regional groundwater depths. Recent water level data was obtained from the California Department of Water Resources website, http://geotracker.waterboards.ca.gov. Several monitoring wells are located at the subject site. Water level readings within these monitoring wells indicate groundwater levels ranging from 48 to 77± feet (2005 to 2017) below the ground surface.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the undocumented fill soils, extending to depths of up to 10± feet, is estimated to result in an average shrinkage of 16 to 25 percent. The undocumented fill soils encountered below this layer, extending to a depth of up to 22± feet, will likely possess an average shrinkage of up to 44 percent. Removal and recompaction of the native alluvial soils extending to depths of up to 10± feet is estimated to result in an average shrinkage of 8 to 12 percent.

The grading operation will consist of cuts, removal and recompaction of exiting uncertified fill, and fill of borrow pits and slopes to provide pads for the buildings and parking areas.

Building 1 will be built on caissons and a structural slab and therefore will not require removal and recompaction per soils report. However, Buildings 2, 3, 4, 5, and 6 will require 6 feet of removal and recompaction below the building and extending an additional 5' beyond the building footprint per soils report.

Onsite parking and drive areas will require the existing grade to be scarified to a depth of 12 inches per soils report.

Before grading operations Did Alert should be called and potholing should be performed to confirm utility locations and depth.

The additional fill that will be placed will require that the oil pipelines which have a maximum 18" cover to be removed and installed at a new elevation. Some easement agreements require the pipeline owner to relocate the pipes at their expenses. ← do we know which ones?

The soils report estimates a 10% to 25% shrinkage, therefore a 10% shrinkage was applied to the proposed removal and recompaction volume. See enclosed Grading Plan for earthwork quantities.

The site is not located in an Earthquake-induced liquefaction area per soils report.s site is considered to be in a "Zone X" which is an area determined to be outside the 0.2% annual chance of floodplain flooding zone; therefore, this property should not require additional flood insurance.

5.0 UTILITIES

The following is a list of existing utilities and their service providers that are within the proximity of the project site found from a DigAlert request:

- Storm Drain – City of Torrance
- Sanitary Sewer – City of Torrance Public Works
- Water – City of Torrance Water Department
- Electricity – Southern California Edison
- Natural Gas – Southern California Gas Company
- Communications / Telephone –AT&T
- Cable – Charter

6.0 STORM DRAIN

6.1 Existing Infrastructure

There is an existing City of Torrance catch basin and storm drain main at the southeast corner of Del Amo Blvd. and Prairie Ave.

6.2 Proposed Infrastructure

In the proposed condition because the site elevation is lower than the adjoining streets and no storm water is currently leaving the site a proposed storm drain detention system is proposed. Since infiltration is not an option on this site the detention system is design to detain the 100yr storm event, approximately 615,000 cubic feet of storm water. A sump pump will discharge the storm water detained at a slow rate of approximately 1cfs in to the catch basin at the southeast corner of Del Amo Blvd. and Prairie Ave. The detention system will be drained in about seven days.

7.0 SEWER

7.1 Existing Infrastructure

There is an existing 8" public main in Del Amo Blvd. at the intersection with Prairie Ave. that drains west away from the property.

There is also an existing 8" public main in Oregon Court east of Maple Ave.

7.2 Proposed Infrastructure

Based on the Sewer Area study the sewer in Oregon Court has enough capacity for the proposed development, therefore the 8" sewer main will be extended through Maple Ave. up to the intersection with Del Amo Bvd. Because the site is lower than the street a lift station and force main will also be installed on the project site to lift the sewerage up to an elevation that will allow to drain by gravity to the proposed public sewer in Del Amo Blvd.

8.0 WATER

8.1 Existing Infrastructure

There is an existing 16" water main on Del Amo Blvd. Pressure and flow results are pending a fire flow test report. There is an existing fire hydrant on Kittridge St. on the south side just west of the property and one just south of southwest corner of Kittridge St. and Independence Ave. There is also a fire hydrant about 258' north of Kittridge St. on Independence Ave. and one about 65' north of the northerly property line..

8.2 Proposed Infrastructure

Based on the Fire Hydrant Flow provided by the City of Torrance Water Department the existing water pressure is enough to service the proposed project should. See enclosed Fire Hydrant Flow. Additional on-site private fire hydrants may be required.

9.0 DRY UTILITIES

APPENDICIES

APPENDIX D

BMP Fact Sheets

MWS Linear Plant Selections

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more – they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants.

The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna. A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Plant Lists By Hardy Zone

Click on a Zone below to View PDF details

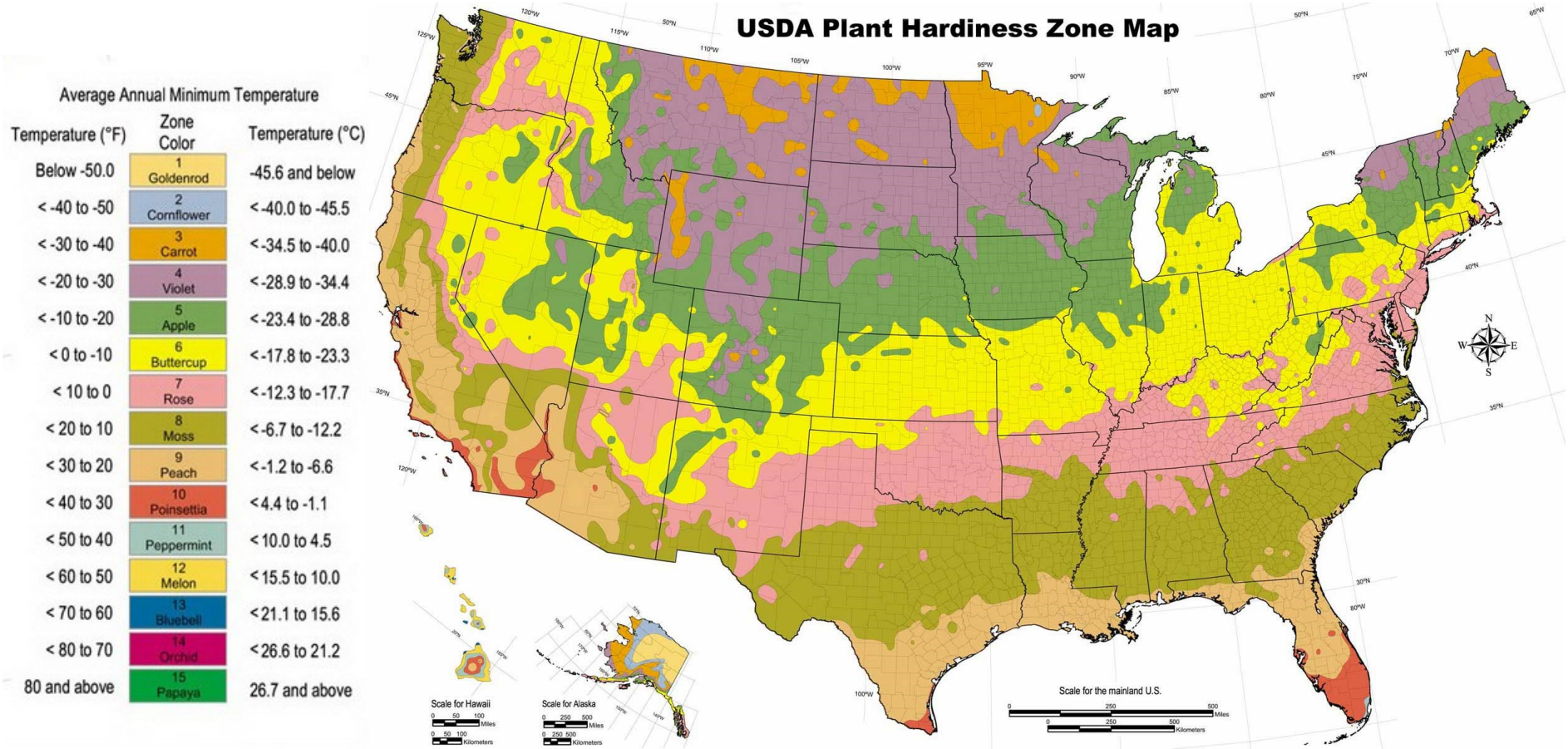
Hardy Zone 2 Hardy Zone 3 Hardy Zone 4 Hardy Zone 5

Hardy Zone 6 Hardy Zone 7 Hardy Zone 8 Hardy Zone 9

Hardy Zone 10

Average Annual Minimum Temperature Table & Map

(continue below for map)



Most Commonly Used Plants

We recommend plants that have deep roots and are adapted to course soil textures, so we have compiled this “most commonly used” species list for your convenience.

Yarrow - Achillea Millefolium

Western Giant Hyssop - Agastache occidentalis

Pacific Anemone - Anemone multifidi

Side Oats Grama - Bouteloua curtipendula

California Oatgrass - Danthia californica

Idaho Fescue - Festuca idahoensis

(LIST CONTINUES ON NEXT PAGE)

Coastal Strawberry - Fragaria chiloensis

Penstemon - Penstemon spp **Phlox -** Phlox spp. **Sandberg Bluegrass -** Poa secunda **Sedum -** Sedum spp.

Yellow-Eyed Grass - Sisyrinchium idahoense

Non-Stormwater Discharges SC-10



Graphic by: Margie Winter

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. For municipalities non-stormwater discharges present themselves in two situations. One is from fixed facilities owned and/or operated by the municipality. The other situation is non-stormwater discharges that are discovered during the normal operation of a field program. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, and surface cleaning. However, there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances (such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants) into storm drains. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges.

Approach

The municipality must address non-stormwater discharges from its fixed facilities by assessing the types of non-stormwater discharges and implementing BMPs for the discharges determined to pose environmental concern. For field programs

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

the field staff must be trained to now what to look for regarding non-stormwater discharges and the procedures to follow in investigating the detected discharges.

Suggested Protocols

Fixed Facility

General

- Post "No Dumping" signs with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Landscaping and beautification efforts of hot spots might also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.

Illicit Connections

- Locate discharges from the fixed facility drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Use techniques such as smoke testing, dye testing and television camera inspection (as noted below) to verify physical connections.
- Isolate problem areas and plug illicit discharge points.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for several days following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- Review the "as-built" piping schematic as a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.

- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Storm Sewer

- TV Cameras can be employed to visually identify illicit connections to the fixed facility storm drain system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Clean up spills on paved surfaces with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See fact sheet SC-11 Spill Prevention, Control, and Clean Up.

Field Program

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially ones that involve more than one jurisdiction and those that are not classified as hazardous, which are often not responded to as effectively as they need to be.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- See SC-74 Stormwater Drainage System Maintenance for additional information.

Field Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- During routine field program maintenance field staff should look for evidence of illegal discharges or illicit connection:
  - Is there evidence of spills such as paints, discoloring, etc.
  - Are there any odors associated with the drainage system
  - Record locations of apparent illegal discharges/illicit connections and notify appropriate investigating agency.
- If trained, conduct field investigation of non-stormwater discharges to determine whether they pose a threat to water quality.

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms.
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms

- Educational materials

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any onsite drainage points observed.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Enforcement

- Educate the responsible party if identified on the impacts of their actions, explain the stormwater requirements, and provide information regarding Best Management Practices (BMP), as appropriate. Initiate follow-up and/or enforcement procedures.
- If an illegal discharge is traced to a commercial, residential or industrial source, conduct the following activities or coordinate the following activities with the appropriate agency:
  - Contact the responsible party to discuss methods of eliminating the non-stormwater discharge, including disposal options, recycling, and possible discharge to the sanitary sewer (if within POTW limits).
  - Provide information regarding BMPs to the responsible party, where appropriate.
  - Begin enforcement procedures, if appropriate.
  - Continue inspection and follow-up activities until the illicit discharge activity has ceased.
- If an illegal discharge is traced to a commercial or industrial activity, coordinate information on the discharge with the jurisdiction's commercial and industrial facility inspection program.

Training

- Train technical staff to identify and document illegal dumping incidents.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Train employees to identify non-stormwater discharges and report them to the appropriate departments.
- Train staff who have the authority to conduct surveillance and inspections, and write citations for those caught illegally dumping.

- Train municipal staff responsible for surveillance and inspection in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and federal OSHA 29 CFR 1910.146).
  - Procedural training (field screening, sampling, smoke/dye testing, TV inspection).
- Educate the identified responsible party on the impacts of his or her actions.

Spill Response and Prevention

- See SC-11 Spill Prevention Control and Clean Up

Other Considerations

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Many facilities do not have accurate, up-to-date schematic drawings.
- Can be difficult to locate illicit connections especially if there is groundwater infiltration.

Requirements

Costs

- Eliminating illicit connections can be expensive especially if structural modifications are required such re-plumbing cross connections under an existing slab.
- Minor cost to train field crews regarding the identification of non-stormwater discharges. The primary cost is for a fully integrated program to identify and eliminate illicit connections and illegal dumping. However, by combining with other municipal programs (i.e. pretreatment program) cost may be lowered.
- Municipal cost for containment and disposal may be borne by the discharger.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
  - Diverted stream flows;
  - Rising found waters;
  - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
  - Uncontaminated pumped ground water;
  - Foundation drains;
  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Illegal Dumping

- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties

Outreach

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people on the street who are aware of the problem and who have the tools to at least identify the incident, if not correct it. There we a number of ways of accomplishing this:

- Train municipal staff from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report the incidents.
- Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act (see below).
- Educate the public. As many as 3 out of 4 people do not understand that in most communities the storm drain does not go to the wastewater treatment plant. Unfortunately, with the heavy emphasis in recent years on public education about solid waste management, including recycling and household hazardous waste, the sewer system (both storm and sanitary) has been the likely recipient of cross-media transfers of waste.
- Provide the public with a mechanism for reporting incidents such as a hot line and/or door hanger (see below).
- Help areas where incidents occur more frequently set up environmental watch programs (like crime watch programs).
- Train volunteers to notice and report the presence and suspected source of an observed pollutant to the appropriate public agency.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
  - Diverted stream flows;
  - Rising found waters;
  - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
  - Uncontaminated pumped ground water;
  - Foundation drains;
  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence

of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Storm Drain Stenciling

- Stencil storm drain inlets with a message to prohibit illegal dumpings, especially in areas with waste handling facilities.
- Encourage public reporting of improper waste disposal by a HOTLINE number stenciled onto the storm drain inlet.
- See Supplemental Information section of this fact sheet for further detail on stenciling program approach.

Oil Recycling

- Contract collection and hauling of used oil to a private licensed used oil hauler/recycler.
- Comply with all applicable state and federal regulations regarding storage, handling, and transport of petroleum products.
- Create procedures for collection such as; collection locations and schedule, acceptable containers, and maximum amounts accepted.
- The California Integrated Waste Management Board has a Recycling Hotline, (800) 553-2962, that provides information and recycling locations for used oil.

Household Hazardous Waste

- Provide household hazardous waste (HHW) collection facilities. Several types of collection approaches are available including permanent, periodic, or mobile centers, curbside collection, or a combination of these systems.

Training

- Train municipal employees and contractors in proper and consistent methods for waste disposal.
- Train municipal employees to recognize and report illegal dumping.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Federal Regulations (RCRA, SARA, CERCLA) and state regulations exist regarding the disposal of hazardous waste.
- Municipalities are required to have a used oil recycling element and a HHW element within their integrated waste management plan.
- Significant liability issues are involved with the collection, handling, and disposal of HHW.

Examples

The City of Palo Alto has developed a public participation program for reporting dumping violations. When a concerned citizen or public employee encounters evidence of illegal dumping, a door hanger (similar in format to hotel "Do Not Disturb" signs) is placed on the front doors in the neighborhood. The door hanger notes that a violation has occurred in the neighborhood, informs the reader why illegal dumping is a problem, and notes that illegal dumping carries a significant financial penalty. Information is also provided on what citizens can do as well as contact numbers for more information or to report a violation.

The Port of Long Beach has a state of the art database incorporating storm drain infrastructure, potential pollutant sources, facility management practices, and a pollutant tracking system.

The State Department of Fish and Game has a hotline for reporting violations called CalTIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).

The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program,
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program
(http://www.projectcleanwater.org)

Santa Clara Valley Urban Runoff Pollution Prevention Program
http://www.scvurppp-w2k.com/pdf%20documents/PS_ICID.PDF

Waste Handling & Disposal SC-34



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing runon and runoff.

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Approach

Pollution Prevention

- Reduction in the amount of waste generated can be accomplished using the following source controls such as:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Suggested Protocols

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater runon and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage or leaks regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Place waste containers under cover if possible.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be

disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g. sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Runon/Runoff Prevention

- Prevent stormwater runon from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff pollution prevention measures and proper disposal methods.
- Train employees and contractors proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.
- Vehicles transporting waste should have spill prevention equipment that can prevent spills during transport. The spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

Other Considerations

- Hazardous waste cannot be re-used or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs

- Capital and operation and maintenance costs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP

Land Treatment System

- Minimize the runoff of polluted stormwater from land application of municipal waste on-site by:
  - Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, there is a closed drainage system.
  - Avoiding application of waste to the site when it is raining or when the ground is saturated with water.
  - Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site.
  - Maintaining adequate barriers between the land application site and the receiving waters. Planted strips are particularly good.
  - Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins.
  - Performing routine maintenance to ensure the erosion control or site stabilization measures are working.

References and Resources

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Associations (BASMAA). On-line: http://www.basmaa.org

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, and abnormal pH. Utilizing the following protocols will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a waste water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash water runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in he catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement. Ensure that this practice does not kill grass.

Landscaping Activities

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the state.
- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.
- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paint brushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.
- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. In which case you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover with secondary containment during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water; do not put it in the storm drain, pour over landscaped areas.
- Use hand or mechanical weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Follow manufacturers' recommendations and label directions. Pesticides must never be applied if precipitation is occuring or predicted. Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.
- Use less toxic pesticides that will do the job, whenever possible. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Overall costs should be low in comparison to other BMPs.

Maintenance

- Sweep paved areas regularly to collect loose particles, and wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping but it is subject to rusting and results in lower quality water. Initially the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time, typically a year, between flushes and may accumulate iron, manganese, lead, copper, nickel and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASSMA) http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basmaa.org/

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Parking/Storage Area Maintenance SC-43



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The following protocols are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook).
- Keep accurate maintenance logs to evaluate BMP implementation.

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel and dispose of litter in the trash.

Surface cleaning

- Use dry cleaning methods (e.g. sweeping or vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- If water is used follow the procedures below:
  - Block the storm drain or contain runoff.
  - Wash water should be collected and pumped to the sanitary sewer or discharged to a pervious surface, do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- When cleaning heavy oily deposits:
  - Use absorbent materials on oily spots prior to sweeping or washing.
  - Dispose of used absorbents appropriately.

Surface Repair

- Pre-heat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff.
- Cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc., where applicable. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of the parking facilities and stormwater conveyance systems associated with them on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, nad implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

Requirements

Costs

Cleaning/sweeping costs can be quite large, construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities on a regular basis to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

SC-43 Parking/Storage Area Maintenance

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Use only as much water as necessary for dust control, to avoid runoff.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality control Board. July 1998 (Revised February 2002 by the California Coastal Commission).

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basma.org

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP)
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Housekeeping Practices SC-60

Description

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals. Related information is provided in BMP fact sheets SC-11 Spill Prevention, Control & Cleanup and SC-34 Waste Handling & Disposal.

Approach

Pollution Prevention

- Purchase only the amount of material that will be needed for foreseeable use. In most cases this will result in cost savings in both purchasing and disposal. See SC-61 Safer Alternative Products for additional information.
- Be aware of new products that may do the same job with less environmental risk and for less or the equivalent cost. Total cost must be used here; this includes purchase price, transportation costs, storage costs, use related costs, clean up costs and disposal costs.

Suggested Protocols

General

- Keep work sites clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Dispose of wash water, sweepings, and sediments, properly.
- Recycle or dispose of fluids properly.
- Establish a daily checklist of office, yard and plant areas to confirm cleanliness and adherence to proper storage and security. Specific employees should be assigned specific inspection responsibilities and given the authority to remedy any problems found.
- Post waste disposal charts in appropriate locations detailing for each waste its hazardous nature (poison, corrosive, flammable), prohibitions on its disposal (dumpster, drain, sewer) and the recommended disposal method (recycle, sewer, burn, storage, landfill).
- Summarize the chosen BMPs applicable to your operation and post them in appropriate conspicuous places.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Require a signed checklist from every user of any hazardous material detailing amount taken, amount used, amount returned and disposal of spent material.
- Do a before audit of your site to establish baseline conditions and regular subsequent audits to note any changes and whether conditions are improving or deteriorating.
- Keep records of water, air and solid waste quantities and quality tests and their disposition.
- Maintain a mass balance of incoming, outgoing and on hand materials so you know when there are unknown losses that need to be tracked down and accounted for.
- Use and reward employee suggestions related to BMPs, hazards, pollution reduction, work place safety, cost reduction, alternative materials and procedures, recycling and disposal.
- Have, and review regularly, a contingency plan for spills, leaks, weather extremes etc. Make sure all employees know about it and what their role is so that it comes into force automatically.

Training

- Train all employees, management, office, yard, manufacturing, field and clerical in BMPs and pollution prevention and make them accountable.
- Train municipal employees who handle potentially harmful materials in good housekeeping practices.
- Train personnel who use pesticides in the proper use of the pesticides. The California Department of Pesticide Regulation license pesticide dealers, certify pesticide applicators and conduct onsite inspections.
- Train employees and contractors in proper techniques for spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and Countermeasure (SPCC) plant up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- There are no major limitations to this best management practice.
- There are no regulatory requirements to this BMP. Existing regulations already require municipalities to properly store, use, and dispose of hazardous materials

Requirements

Costs

- Minimal cost associated with this BMP. Implementation of good housekeeping practices may result in cost savings as these procedures may reduce the need for more costly BMPs.

Maintenance

- Ongoing maintenance required to keep a clean site. Level of effort is a function of site size and type of activities.

Supplemental Information

Further Detail of the BMP

- The California Integrated Waste Management Board's Recycling Hotline, 1-800-553-2962, provides information on household hazardous waste collection programs and facilities.

Examples

There are a number of communities with effective programs. The most pro-active include Santa Clara County and the City of Palo Alto, the City and County of San Francisco, and the Municipality of Metropolitan Seattle (Metro).

References and Resources

British Columbia Lake Stewardship Society. Best Management Practices to Protect Water Quality from Non-Point Source Pollution. March 2000.
http://www.nalms.org/bclss/bmphome.html#bmp

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities, Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July, 1998, Revised by California Coastal Commission, February 2002.

Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Mateo STOPPP - (http://stoppp.tripod.com/bmp.html)

Landscape Maintenance SC-73



Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm

Drainage System Maintenance SC-74



Photo Credit: Geoff Brosseau

Objectives

- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Approach

Suggested Protocols

Catch Basins/Inlet Structures

- Municipal staff should regularly inspect facilities to ensure the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC-75 Waste Handling and Disposal).
- Clean catch basins, storm drain inlets, and other conveyance structures in high pollutant load areas just before the wet season to remove sediments and debris accumulated during the summer.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Record the amount of waste collected.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed of. Do not dewater near a storm drain or stream.
- Except for small communities with relatively few catch basins that may be cleaned manually, most municipalities will require mechanical cleaners such as eductors, vacuums, or bucket loaders.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect flushed effluent and pump to the sanitary sewer for treatment.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge from cleaning a storm drain pump station or other facility to reach the storm drain system.
- Conduct quarterly routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.
- Sample collected sediments to determine if landfill disposal is possible, or illegal discharges in the watershed are occurring.

Open Channel

- Consider modification of storm channel characteristics to improve channel hydraulics, to increase pollutant removals, and to enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies

(SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS

Illicit Connections and Discharges

- During routine maintenance of conveyance system and drainage structures field staff should look for evidence of illegal discharges or illicit connections:
  - Is there evidence of spills such as paints, discoloring, etc.
  - Are there any odors associated with the drainage system
  - Record locations of apparent illegal discharges/illicit connections
  - Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of up gradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
  - Once the origin of flow is established, require illicit discharger to eliminate the discharge.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

- The State Department of Fish and Game has a hotline for reporting violations called Cal TIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).
- The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Only properly trained individuals are allowed to handle hazardous materials/wastes.
- Train municipal employees from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report illegal dumping.
- Train municipal employees and educate businesses, contractors, and the general public in proper and consistent methods for disposal.
- Train municipal staff regarding non-stormwater discharges (See SC-10 Non-Stormwater Discharges).

Spill Response and Prevention

- Refer to SC-11, Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Cleanup activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and disposal of flushed effluent to sanitary sewer may be prohibited in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Private property access rights may be needed to track illegal discharges up gradient.

- Requirements of municipal ordinance authority for suspected source verification testing for illicit connections necessary for guaranteed rights of entry.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget. A careful study of cleaning effectiveness should be undertaken before increased cleaning is implemented. Catch basin cleaning costs are less expensive if vacuum street sweepers are available; cleaning catch basins manually can cost approximately twice as much as cleaning the basins with a vacuum attached to a sweeper.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary. Encouraging reporting of illicit discharges by employees can offset costs by saving expense on inspectors and directing resources more efficiently. Some programs have used funds available from "environmental fees" or special assessment districts to fund their illicit connection elimination programs.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.

- Identifying illicit discharges requires teams of at least two people (volunteers can be used), plus administrative personnel, depending on the complexity of the storm sewer system.

- Arrangements must be made for proper disposal of collected wastes.

- Requires technical staff to detect and investigate illegal dumping violations, and to coordinate public education.

Supplemental Information

Further Detail of the BMP

Storm Drain flushing

Sanitary sewer flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in sanitary sewer systems. The same principles that make sanitary sewer flushing effective can be used to flush storm drains. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as to an open channel, to another point where flushing will be initiated, or over to the sanitary sewer and on to the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. The deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to

cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce the impacts of stormwater pollution, a second inflatable device, placed well downstream, may be used to re-collect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to re-collect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75 percent for organics and 55-65 percent for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm drain flushing.

Flow Management

Flow management has been one of the principal motivations for designing urban stream corridors in the past. Such needs may or may not be compatible with the stormwater quality goals in the stream corridor.

Downstream flood peaks can be suppressed by reducing through flow velocity. This can be accomplished by reducing gradient with grade control structures or increasing roughness with boulders, dense vegetation, or complex banks forms. Reducing velocity correspondingly increases flood height, so all such measures have a natural association with floodplain open space. Flood elevations laterally adjacent to the stream can be lowered by increasing through flow velocity.

However, increasing velocity increases flooding downstream and inherently conflicts with channel stability and human safety. Where topography permits, another way to lower flood elevation is to lower the level of the floodway with drop structures into a large but subtly excavated bowl where flood flows we allowed to spread out.

Stream Corridor Planning

Urban streams receive and convey stormwater flows from developed or developing watersheds. Planning of stream corridors thus interacts with urban stormwater management programs. If local programs are intended to control or protect downstream environments by managing flows delivered to the channels, then it is logical that such programs should be supplemented by management of the materials, forms, and uses of the downstream riparian corridor. Any proposal for steam alteration or management should be investigated for its potential flow and stability effects on upstream, downstream, and laterally adjacent areas. The timing and rate of flow from various tributaries can combine in complex ways to alter flood hazards. Each section of channel is unique, influenced by its own distribution of roughness elements, management activities, and stream responses.

Flexibility to adapt to stream features and behaviors as they evolve must be included in stream reclamation planning. The amenity and ecology of streams may be enhanced through the landscape design options of 1) corridor reservation, 2) bank treatment, 3) geomorphic restoration, and 4) grade control.

Corridor reservation - Reserving stream corridors and valleys to accommodate natural stream meandering, aggradation, degradation, and over bank flows allows streams to find their own form and generate less ongoing erosion. In California, open stream corridors in recent urban developments have produced recreational open space, irrigation of streamside plantings, and the aesthetic amenity of flowing water.

Bank treatment - The use of armoring, vegetative cover, and flow deflection may be used to influence a channel's form, stability, and biotic habitat. To prevent bank erosion, armoring can be done with rigid construction materials, such as concrete, masonry, wood planks and logs, riprap, and gabions. Concrete linings have been criticized because of their lack of provision of biotic habitat. In contrast, riprap and gabions make relatively porous and flexible linings. Boulders, placed in the bed reduce velocity and erosive power.

Riparian vegetation can stabilize the banks of streams that are at or near a condition of equilibrium. Binding networks of roots increase bank shear strength. During flood flows, resilient vegetation is forced into erosion-inhibiting mats. The roughness of vegetation leads to lower velocity, further reducing erosive effects. Structural flow deflection can protect banks from erosion or alter fish habitat. By concentrating flow, a deflector causes a pool to be scoured in the bed.

Geomorphic restoration – Restoration refers to alteration of disturbed streams so their form and behavior emulate those of undisturbed streams. Natural meanders are retained, with grading to gentle slopes on the inside of curves to allow point bars and riffle-pool sequences to develop. Trees are retained to provide scenic quality, biotic productivity, and roots for bank stabilization, supplemented by plantings where necessary.

A restorative approach can be successful where the stream is already approaching equilibrium. However, if upstream urbanization continues new flow regimes will be generated that could disrupt the equilibrium of the treated system.

Grade Control - A grade control structure is a level shelf of a permanent material, such as stone, masonry, or concrete, over which stream water flows. A grade control structure is called a sill, weir, or drop structure, depending on the relation of its invert elevation to upstream and downstream channels.

A sill is installed at the preexisting channel bed elevation to prevent upstream migration of nick points. It establishes a firm base level below which the upstream channel can not erode.

A weir or check dam is installed with invert above the preexisting bed elevation. A weir raises the local base level of the stream and causes aggradation upstream. The gradient, velocity, and erosive potential of the stream channel are reduced. A drop structure lowers the downstream invert below its preexisting elevation, reducing downstream gradient and velocity. Weirs and drop structure control erosion by dissipating energy and reducing slope velocity.

When carefully applied, grade control structures can be highly versatile in establishing human and environmental benefits in stabilized channels. To be successful, application of grade control structures should be guided by analysis of the stream system both upstream and downstream from the area to he reclaimed.

Examples

The California Department of Water Resources began the Urban Stream Restoration Program in 1985. The program provides grant funds to municipalities and community groups to implement stream restoration projects. The projects reduce damages from streambank aid watershed instability arid floods while restoring streams' aesthetic, recreational, and fish and wildlife values.

In Buena Vista Park, upper floodway slopes are gentle and grassed to achieve continuity of usable park land across the channel of small boulders at the base of the slopes.

The San Diego River is a large, vegetative lined channel, which was planted in a variety of species to support riparian wildlife while stabilizing the steep banks of the floodway.

References and Resources

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

Los Angeles County Stormwater Quality. Public Agency Activities Model Program. On-line: http://ladpw.org/wmd/npdes/public_TC.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) Municipal Activities Model Program Guidance. 2001. Project Clean Water. November.

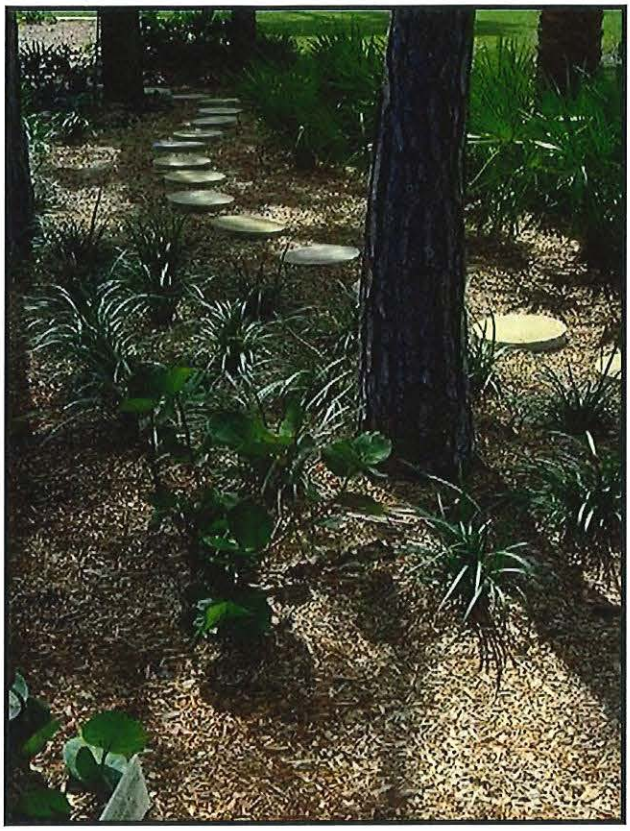
United States Environmental Protection Agency (USEPA). 1999. Stormwater Management Fact Sheet Non-stormwater Discharges to Storm Sewers. EPA 832-F-99-022. Office of Water, Washington, D.C. September.

United States Environmental Protection Agency (USEPA). 1999. Stormwater O&M Fact Sheet Catch Basin Cleaning. EPA 832-F-99-011. Office of Water, Washington, D.C. September.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Illegal Dumping Control. On line: http://www.epa.gov/npdes/menuofbmps/poll_7.htm

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line: http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Site Design & Landscape Planning SD-10



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

APPENDIX E

Stormwater Volume Quality Calculations

Peak Flow Hydrologic Analysis

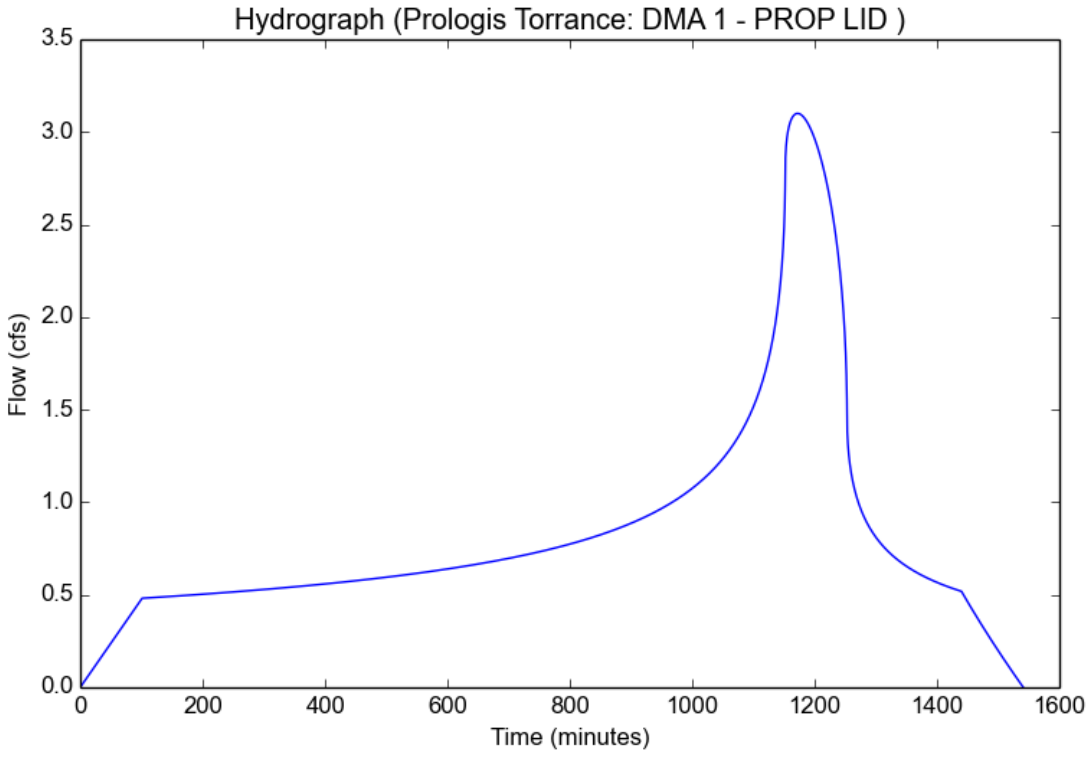
File location: K:/ORA_LDEV/194187001 - Prologis Torrance/Reports/WQMP/Calculations/Hydrocalc/Prologis Torrance - DMA 1 - PROP LID.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Prologis Torrance
Subarea ID	DMA 1 - PROP LID
Area (ac)	31.32
Flow Path Length (ft)	3043.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.877
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1235
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.8016
Time of Concentration (min)	101.0
Clear Peak Flow Rate (cfs)	3.1002
Burned Peak Flow Rate (cfs)	3.1002
24-Hr Clear Runoff Volume (ac-ft)	1.7639
24-Hr Clear Runoff Volume (cu-ft)	76835.1853



APPENDIX F

Operations and Maintenance Plans

RECORDING REQUESTED BY AND MAIL TO:

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUILDING AND SAFETY DIVISION
900 S. FREMONT AVENUE, 3RD FLOOR
ALHAMBRA, CA 91803-1331

Space above this line is for Recorder's use

MAINTENANCE COVENANT FOR STANDARD URBAN STORMWATER MITIGATION PLAN (SUSMP) REQUIREMENTS

Pursuant to Section 106.4.3 of the County of Los Angeles Building Code and Title 12, Chapter 12.80 of the Los Angeles County Code relating to the control of pollutants carried by stormwater runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

ASSESSOR'S ID #_____ TRACT NO._____ LOT NO._____ ADDRESS:

_____

REFERENCE

PLAN CHECK NO.: _____ DISTRICT OFFICE NO.: _____

I (we)_____, hereby certify that I (we) am (are) the legal owner(s) of
(Legal Name of Property Owners)
property indicated above, and as such owners for the mutual benefit of future purchasers, their heirs, successors, and assigns, do hereby fix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed.

That owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, downdrains, pipes, and water quality devices on the property indicated above and as shown on plans permitted by the Los Angeles County Department of Public Works and as outlined in the attached "OPERATION AND MAINTENANCE GUIDELINES", in a good and functional condition to safeguard the property owners and adjoining properties from damage and pollution.

That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. Said maintenance inspection shall verify the legibility of all required stencils and signs and shall repaint and label as necessary.

That owner(s) shall provide printed educational materials with any sale of the property that provide information on what stormwater management facilities are present, the type(s) and location(s) of maintenance signs that are required, and how the necessary maintenance can be performed.

Owner(s):

By:_____ Date:_____

By:_____ Date:_____

(PLEASE ATTACH NOTARY)

BMP Inspection and Maintenance Log

Inspection Date	BMP Inspected	Maintenance Performed? (Y/N)	Inspector