
APPENDIX I: GEOTECHNICAL REPORT



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GEOTECHNICAL REPORT FOR ENVIRONMENTAL IMPACT REPORT

**PROPOSED BREW YARD DEVELOPMENT
15801 FIRST STREET
IRWINDALE, CALIFORNIA**

PREPARED FOR

**IBY PROPERTY OWNER
110 EAST HOUSTON STREET, 3RD FLOOR
SAN ANTONIO, TEXAS**

PREPARED BY

**HD GEOSOLUTIONS, INC.
9300 OSO AVENUE, UNIT A
CHATSWORTH, CALIFORNIA 91311**



January 14, 2026

IBY Property Owner
110 East Houston Street, 3rd Floor
San Antonio, TX 78205

Attention: Mr. Adam Sher

Subject: Geotechnical Report for Environmental Impact Report
Proposed Brew Yard Development
15801 First Street
Irwindale, California
HDGeo Project No. 71005

Dear Mr. Sher:

HD Geosolutions, Inc. (HDGeo) is pleased to submit this report presenting our geotechnical findings and conclusions in support of an Environmental Impact Report, which will address future development at the site.

We appreciate the opportunity to be of service. If you have any questions about this report, please call at your convenience.

Respectfully submitted,
HD GEOSOLUTIONS, INC.

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cc: Yellow Iron Real Estate – Owner Representative
 Attn: Mr. Philip Bruttig

hdgeoinc.com

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1. EXECUTIVE SUMMARY

This report presents the results of our geotechnical Environmental Impact Report (EIR) study for the subject project located in Irwindale, California. The site is depicted on Figure 1.

Two areas of the site were previously used as sand and gravel quarries. Each area will be filled either as Inert Debris Engineered Fill Operation (IDEFO) or an engineered soil fill. The areas will be filled to approximately the original grade, with the objective of future development. Our studies were authorized to evaluate the geotechnical conditions, including geologic hazards, within the property. Our evaluation will be used to inform the assessment of environmental impacts on the site and its surroundings as a result of the site's reclamation from a geotechnical standpoint.

As a result of the planned filling activities at the site, seismically-induced landslide hazards identified by the California Geological Survey (CGS) will be mitigated once the site is filled. Preliminary development plans indicate that future structures will be located within the limits of the engineered fill, either due to the IDEFO or anticipated overexcavations in unquarried areas. We anticipate that utilities passing from the engineered fill into the natural materials at the perimeter of the engineered fills will require flexible connections at the fill/native transitions to accommodate potential differential movement. The native materials at the margins of the site should be evaluated for seismically- induced settlement in the future as development plans dictate.

2. SCOPE OF SERVICES

This report presents the results of our geotechnical EIR study for the subject site. The location of the site is depicted on Figure 1. The site includes two mined sand and gravel quarries, and it is planned to transition each of these quarries to either an IDEFO or an engineered soil fill. The eventual goal of the reclamation is to create a higher and better use in compliance with the the Brew Yard Specific Plan and the final, approved grading plan. The Conceptual Land Use Plan for the site is depicted on Figure 2.

The primary purpose of this study is to address the geotechnical and geological issues pertinent to future site development. Herein we present preliminary recommendations to mitigate potential geologic hazards, as well as recommendations for design of building foundations, grading, and paving. This report is based on our review of available documents by others, and available published and unpublished geologic and seismic literature.

3. PROJECT AND SITE DESCRIPTION

3.1 PROJECT LOCATION

The project site is located in the central San Gabriel Valley within the northeasterly part of the City of Irwindale. The site consists of approximately 150 acres and is subdivided into six parcels consisting of Parcels 1-4, Parcel A at the southwest area of the site, and the Commercial Parcel at the southeast area of the site (Figure 2). The project site is adjacent to the existing brewery parcel under the same ownership. The site is located just south of the I-210 Freeway and approximately ¼ mile east of the San Gabriel River. The site is bounded to the east by Irwindale Avenue, to the south by W. 1st Street, and to the west by the Santa Fe Dam Recreation Area.

3.2 SITE CONDITIONS AND USE

We have reviewed several historic topographic maps dating back to 1894 that depict the site development history. The site was relatively level prior to the quarry activity. Pre-quarry elevation differences across the site of up to approximately 40 feet existed (approx. EL510-550).

Based on our review of historic topography, it appears that Quarry activities at the site began during the 1930s (USGS, 1939). Two now-abandoned quarries are located in the northwestern and southeastern site areas (Figure 2). The northwestern quarry spans Parcels 3 and 4. It is approximately 52 acres at the surface grade and will require approximately 6 million cubic yards to fill. The southeastern quarry is located in Parcel 2, is approximately 25 acres at the surface grade, and will require approximately 2 million cubic yards to fill. The maximum depths of the northwest and southeast quarry pits are approximately 270 feet and 140 feet, respectively.

Parcels 1 and 2, located along the south side of the site, are relatively level and representative of the original ground surface (Figure 2). This area is primarily used for truck access and parking that services the brewery. A solar panel array covering approximately 8 acres is located within Parcel 2 and was constructed circa 2014 (Figure 2).

3.3 FUTURE DEVELOPMENT

After the completion of the proposed filling operations, the site will be developed in conformance with zoning restrictions. The site is currently zoned as “Heavy Manufacturing”. The preliminary development design shown on Figure 2 may include commercial, industrial, business park, and retail use. The proposed design includes a single building within each of the four parcels, new drives, and parking.

4. REGULATORY FRAMEWORK

4.1. CITY LEVEL

The City of Irwindale has adopted the 2023 Los Angeles County Building Code. The City's primary seismic regulatory document is contained in the Public Safety Element of the 2020 Irwindale General Plan (City of Irwindale, 2008); these regulations incorporate the State's requirements. The objective of the Safety Element is to better protect occupants and equipment during seismic events. In the Safety Element, specific guidelines are included for the evaluation of liquefaction, tsunamis, seiches, non-structural elements, fault rupture zones, and engineering investigation reports.

Specific to quarry reclamation projects, the Irwindale Brew Yard development will also incorporate the following guidelines during the reclamation analysis of the former quarries within the proposed development.

- Guidelines for Above-Water Backfilling of Open-Pit Mines (dated November 23, 2005)
- Guidelines for Underwater Backfilling of Open-Pit Mines, Irwindale (dated May 20, 2005)
- Irwindale Mining Bulletin – Settlement of Mine Backfills (dated November 22, 2022)

4.2. COUNTY LEVEL

The 2023 County of Los Angeles Building Code is based on the 2022 CBC and the 2021 International Building Code (IBC). The County Department of Building and Safety is responsible for implementing the provisions of the County Code. The County's primary seismic regulatory document is the Safety Element of the County of Los Angeles General Plan (2022).

4.3. STATE LEVEL

The State of California adopted the 2022 CBC, based on the 2021 IBC.

The Alquist-Priolo Special Studies Zones Act was enacted by the State of California in 1972 to address the hazard and damage caused by surface fault rupture during an earthquake. The Act has been amended several times and was renamed the Alquist-Priolo Earthquake Fault Zoning Act, effective January 1, 1994. The Act requires the State Geologist to establish "earthquake fault zones" along known active faults in the state. Cities and counties that include earthquake fault zones are required to regulate development projects within these zones.

The Seismic Hazard Mapping Act of 1990 was enacted, in part, to address seismic hazards not included in the Alquist-Priolo Act, including strong ground shaking, landslides, and liquefaction.

Under this Act, the State Geologist is assigned the responsibility of identifying and mapping seismic hazards zones. The California Geological Survey published Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California in 2008 as part of this effort.

The California Seismic Safety Commission was established by the Seismic Safety Commission Act in 1975 with the intent of providing oversight, review, and recommendations to the Governor and State Legislature regarding seismic issues. The commission's name was changed to Alfred E. Alquist Seismic Safety Commission in 2006. The Commission has adopted several documents addressing specific earthquakes, preparedness, and loss reduction.

Various state and local agencies permit the design and construction and regulate the operation, closure, and development of IDEFOs in the State of California. Those agencies include the Regional Water Quality Control Board, the Integrated Waste Management Board, the Department of Toxic Substance Control Board, the Regional Air Resources Board, the Los Angeles County Department of Public Works, the City of Irwindale, and the South Coast Air Quality Management District.

5. GEOLOGY

5.1. GENERAL

The project site is located in the central San Gabriel Valley along the east bank of the San Gabriel River. The valley is bordered by the San Gabriel Mountains on the north, the San Jose Hills to the east, the Puente Hills on the south, and on the west by the San Rafael and Repetto Hills. The valley sediment consists primarily of fans shed southward from the San Gabriel Mountains, and to a lesser degree from the other nearby ranges. Coarser materials are contained in broad fans below larger mountain drainages and in channels defined along the major drainages including the San Gabriel and Rio Hondo. The surficial geologic materials of the site area are depicted on Figure 3, Regional Geologic Map.

5.2. GEOLOGIC UNITS

5.2.1. General

Alluvial sediments at the site were mined for sand and gravel starting during the 1930s (USGS, 1939). The resulting quarry excavation exposes alluvium with isolated areas of non-engineered fill. It is also anticipated that intermittent non-engineered fill of an unknown thickness may be present within the relatively level areas surrounding the quarries. Where the ground surface has

been undisturbed by previous mining and grading activities, alluvium is expected to be present. The alluvium extends to an unknown depth below the subject site.

5.2.2. *Non-Engineered Fill*

Areas of non-engineered fill are present within the quarry that were placed during and/or following mining operations. In addition to the non-engineered fill within the quarries, we also anticipate that relatively shallow and intermittent non-engineered fill of variable depths may exist within the relatively level portions of the subject site that were not previously quarried. The non-engineered fill should be removed and replaced as engineered fill as a part of site development.

5.2.3. *Alluvium/Stream Gravel*

Most of the San Gabriel Valley is underlain by alluvial fans shed southward primarily from the San Gabriel Mountains and, to a lesser degree, from the other nearby ranges. The basement rock of the San Gabriel Mountains includes Cretaceous-aged quartz-diorite that has been intruded and faulted into older metamorphic rocks. Materials shed from these “basement complex” igneous and metamorphic rocks tend to consist primarily of larger, erosion-resistant gravels and sands with relatively minor amounts of silt and clay. Alluvial deposits outside of and beyond the immediate influence of the major drainage systems consist of sand and gravel with discontinuous lenses of silt and clay.

The site was quarried in the past to extract the gravelly alluvial sediments deposited largely within the braided San Gabriel River drainage and alluvial fans. These materials consist primarily of weakly cemented sand, gravel, and cobbles, and boulders that are beige-tan-brown in color. The coarse-grained alluvium grades laterally into the finer grained materials comprising the adjacent floodplain deposits.

5.3. GROUNDWATER BASIN

Groundwater storage in the San Gabriel Valley groundwater basin occurs primarily in two water-bearing units. These include the alluvial valley sediments and the underlying Fernando Formation. The basin is bounded on the north by the Raymond fault and the basement complex of the San Gabriel Mountains, on the west and south by the Repetto and Puente Hills, respectively, and on the east by the Chino and San Jose faults. The bulk of the groundwater in the basin is contained in the unconsolidated to semi-consolidated alluvial aquifer under unconfined conditions.

Recharge in the basin occurs primarily from direct precipitation and percolation of stream flow carried from the San Gabriel Mountains, with more limited contributions from imported water and underflow from adjacent basins and other groundwater sources. Subsurface flow in the basin is generally from the edges toward the center of the basin and then southward toward Whittier

Narrows. Groundwater levels in the basin fluctuate over a wide range due to numerous infiltration galleries managed by the San Gabriel Watermaster.

Groundwater levels in the site vicinity have been near historic low elevations in recent years. Groundwater levels can also be affected by the decision of the Watermaster to release water from upstream dams for spreading in the San Gabriel basin. The California Department of Water Resources website depicts Well SF 1 (Site Code 341214N1179430W001) just south of the site. The water level at Well SF 1 was reported at 283.73 feet below ground surface on January 31, 2024.

The Key Well, located approximately 2½ miles south of the site, is a widely-accepted measure of the San Gabriel Basin groundwater level. As of October 3, 2024, the Main San Gabriel Basin Watermaster reported the groundwater level in the Key Well to be EL243.7. The historic high groundwater level in the Key Well is reportedly EL295.3, measured on July 20, 1983. The historic low groundwater level is reportedly EL169.4, measured on November 21, 1983.

Based on publicly-available data (Geotracker), the groundwater depths circa 2009 within approximately 1 mile of the site were reportedly on the order of 260 feet. Such a depth would correspond to groundwater elevations of approximately EL250-290 at the site. According to Seismic Hazard Zone Reports for the Azusa and Baldwin Park 7.5-minute Quadrangles (CDMG, 1998a and 1998b) the historic-high groundwater level is between EL330 and EL380 for the subject site. Therefore, it appears that during past high groundwater levels, groundwater could have been exposed in the bottoms of both pits.

6. GEOLOGIC HAZARDS

6.1. FAULTING AND SEISMICITY

The numerous faults in southern California include active, potentially active, and inactive faults. Regional faults of significance are depicted on Figure 4, Regional Fault Map. Classifications for these major groups are based upon criteria developed by the California Division of Mines and Geology (CDMG), now known as the California Geological Survey (CGS) for the AP Zone Act program. By definition, an active fault has ruptured within the Holocene geologic time (about the last 11,000 years). Active faults are not known to extend through or to project toward the project site. Surface rupture from fault plane displacement propagating to the surface is therefore considered remote.

Faults that display latest movement during Quaternary but prior to the Holocene are generally considered to be “potentially active”. The Quaternary includes the Holocene and Pleistocene

Epochs and represents the last 1.6 to 2.0 million years of geologic time. Potentially active faults are not considered an imminent fault rupture hazard, but the potential cannot be completely dismissed. Inactive faults are those faults where the latest displacement is older than the Pleistocene.

The closest active faults to the site are those of the Sierra Madre fault zone. The closest faults to the subject site being part of the aforementioned zone are the Duarte fault, the Upper Duarte fault, and the Sierra Madre fault. These faults are located approximately 0.5 to 2 miles north of the project site along the southern edge of the San Gabriel Mountains, along with others that occur within a narrow zone that extends along the base of the San Gabriel Mountains. These faults are north-dipping structures that accommodate active uplift of the San Gabriel Mountains. The Clamshell-Sawpit Canyon fault which extends just north of the Duarte and Sierra Madre faults is believed to be the source of the June 28, 1991 Sierra Madre Earthquake (Caltech, 2023). All of these faults are included as Alquist-Priolo Earthquake Fault Zones.

The site is located approximately 4 miles southeast of the Raymond fault. The Raymond fault is mapped for about 14 miles from the Sierra Madre fault zone at the base of the San Gabriel Mountains north of Monrovia, southwestward through the communities of Arcadia, San Marino and South Pasadena, and then westward along York Boulevard. The fault is coincident with prominent geomorphic scarps across the communities of Pasadena and Highland Park. The fault is part of an east-west trending system that also includes the Malibu Coast fault, the Santa Monica fault and Hollywood fault. The Raymond fault dips north and is generally considered to have a left-lateral, reverse sense of slip. Crook et. Al. (1987) suggests there have been at least three earthquake events on the Raymond fault during the Holocene with the most recent occurring between 1,500 and 2,000 years ago. The Raymond fault is included as an Alquist-Priolo Earthquake Fault Zone by the State Geologist.

The site is located approximately 9 miles northeast of the boundary of the Elysian Park Fold and Thrust Belt. The Elysian Park fault is actually a blind fault (i.e., a buried fault that does not extend to the surface) capped by a fold and thrust structure. The axial trend of the fold extends approximately 12 miles through the Elysian Park-Repetto Hills from about Silver Lake on the west to the Whittier Narrows on the east. The 1987 Whittier Narrows earthquake (magnitude 5.9) has been attributed to subsurface thrust faults, which are reflected at the earth's surface by a west-northwest trending anticline known as the Elysian Park Anticline, or the Elysian Park Fold and Thrust Belt. The subsurface faults that create the structure are not exposed at the surface and do not present a potential surface rupture hazard; however, as demonstrated by the 1987 earthquake and two smaller earthquakes on June 12, 1989, the faults are a source for future seismic activity. As such, the Elysian Park Fold and Thrust Belt should be considered an active feature capable of generating future earthquakes.

The East Montebello fault is a short fault segment included in an Alquist-Priolo Earthquake Fault Zone located about 9 miles southwest of the site. The fault extends northwest over a distance of about 1½ miles from just east of the intersection of I-60 and San Gabriel Boulevard to about ¼ mile south of the intersection of San Gabriel Boulevard and Garvey Avenue. Dibblee (1999) maps this fault as the Workman Hill fault, and extends the fault northwestward into Alhambra, 2.5 miles beyond the north end of the Alquist-Priolo Earthquake Fault Zone. Yeats (2001) considers the fault to be a northwestward extension of the Whittier fault with a reduced slip rate due to accommodation of slip in the Montebello Anticline.

The Whittier segment of the Whittier-Elsinore fault zone approaches within about 10.5 miles south of the site. This fault zone extends nearly 200 miles from Laguna Salada in northern Mexico to just north of Whittier. The zone accommodates major right lateral slip and is considered to be a part of the San Andreas fault system. The Whittier segment extends about 24 miles from near Corona to north of Whittier. The fault is included in Alquist-Priolo Earthquake Fault Zones over most of this distance.

A list of known active faults and their distances from the project site are presented in Table 1, Major Faults Considered to be Active in Southern California.

**TABLE 1 – MAJOR FAULTS CONSIDERED TO BE
ACTIVE IN SOUTHERN CALIFORNIA**

Fault	Maximum Credible Earthquake			Slip Rate (mm/yr)	Distance from Site (miles)	Direction from Site
Duarte	6.7	(a)	RO	0.1	0.5	N
Sierra Madre	7.3	(c)	RO	4.0	2	N
Raymond	6.7	(f)	RO	0.4	4	NW
Elysian Park Fold and Thrust Belt	7.1	(c)	RO	1.7	9	SSW
East Montebello	NA		SS		9	SW
Whittier	7.1	(b)	SS	3.0	10.5	S
Verdugo	6.75	(d)	RO	0.5	16	WNW
Hollywood	7.0	(c)	RO	1.5	19	W
Cucamonga	7.0	(g)	RO	5	16	ENE
Newport-Inglewood Zone	7.0	(d)	SS	1.0	24	SW
Northridge	6.9	(h)	RO	1.5	31	WNW
San Fernando	6.8	(g)	RO	5.0	24	NW
San Andreas (Mojave Segment)	8.2	(e)	SS	30.0	22	NE

(a) Greensfelder, CDMG Map Sheet 23, 1974.

(b) Blake, 1995

(c) Dolan et al., 1995

(d) Maulchin & Jones, 1992

(e) OSHPD, 1995

(f) Wesnousky, 1986

(g) SDEDC

(h) Peterson et al., 1996

SS Strike Slip

NO Normal Oblique

RO Reverse Oblique

Site to fault distances measured using location of late Quaternary fault rupture map by Ziony and Jones, 1989 at a scale of 1:250,000.

A list of known potentially active faults and their distances from the project site are presented in Table 2, Major Faults Considered to be Potentially Active:

TABLE 2 – MAJOR FAULTS CONSIDERED TO BE POTENTIALLY ACTIVE

Fault	Maximum Credible Earthquake			Slip Rate (mm/yr)	Distance from Site (Miles)	Direction from Site
San Jose	6.7	(d)	RO	0.5	7	SE
Indian Hill	N/A				3.5	E
Norwalk	6.7	(a)	RO	0.1	15	S
Chino-Central Avenue	7.0	(c)	NO	1.0	12.5	SE
Rialto-Colton	6.4	(e)	SS	n/d	32.5	E
Los Alamitos	6.2	(b)	SS	0.1	22	SSW

- (a) Slemmons, 1979
(b) Mark, 1977
(c) Blake, 1995
(d) Dolan et al., 1995
(e) Wesnousky, 1986
SS Strike Slip
NO Normal Oblique
RO Reverse Oblique
n/d Not determined

Site to fault distances measured using location of late Quaternary fault rupture map at a scale of 1:250,000 as documented by Ziony and Jones, 1989

Several earthquakes of moderate to large magnitude (greater than 5.3) have occurred in the southern California area within the last 90 years. A list of these earthquakes is included in Table 3, List of Major Historic Earthquakes.

TABLE 3 – LIST OF MAJOR HISTORIC EARTHQUAKES

Earthquake	Date of Earthquake	Magnitude	Distance to Epicenter (miles)	Direction to Epicenter
Long Beach	March 11, 1933	6.4	29	S
San Fernando	February 9, 1971	6.6	31	NW
Whittier Narrows	October 1, 1987	5.9	9	WSW
Sierra Madre	June 28, 1991	5.4	9	N
Big Bear	June 28, 1992	6.4	64	E
Landers	June 28, 1992	7.3	86	E
Northridge	January 17, 1994	6.7	32	WNW
Hector Mine	October 16, 1999	7.1	94	ENE
Ridgecrest	July 4, 2019	6.4	113	NNE

It should be noted that major earthquakes have not been recorded within historic time on every fault considered to be active in southern California. Evidence of the fault's potential activity is

based on the fault's rupturing materials younger than about 11,000 years. Historic records are limited to a few hundred years.

The project site is not exposed to a greater than normal seismic risk as compared to other areas of southern California. However, based on the active and potentially active faults in the region, the project site could be subjected to significant ground shaking in the event of an earthquake. This hazard is common to southern California and can be mitigated if the buildings are designed and constructed in conformance with applicable building codes and sound engineering practices.

6.2. SLOPE STABILITY

Figure 5, Seismic Hazards Map, depicts earthquake-induced landslide zones generally along the perimeter of the two pits, corresponding to the existing quarry slopes. These slopes are comprised primarily of alluvium. Filling associated with the planned IDEFO/engineered soil fill activities will raise the grade within the two pits, thus reducing the slope heights and improving the site from its quarried condition. When the reclamation of the two pits is completed, the existing slopes at the site will no longer remain. Therefore, slope stability issues will not impact future development.

6.3. SOIL LIQUEFACTION AND SEISMIC SETTLEMENT

6.3.1. *Soil Liquefaction*

Liquefaction potential is greatest where the groundwater level is shallow, and loose sands or silts occur within a depth of about 50 feet or less. In general, liquefaction potential decreases as grain size and clay and gravel content increase. As ground acceleration and shaking duration increase during an earthquake, liquefaction potential increases. Soil liquefaction can cause significant structural damage.

The site is not located within a zone designated by the State Geologist as being susceptible to soil liquefaction. More detailed, site-specific geotechnical investigations are required for sites within a liquefaction hazard zone, as required by the 1990 Seismic Hazards Mapping Act. The liquefaction hazard zoning for the site vicinity is depicted on Figure 5.

In addition to the site grading and soil characteristics, future groundwater levels are not anticipated to rise above approximately 200 feet below the final site grade. Based on the typical density of engineered fill and the anticipated future high groundwater depths, we consider the potential for liquefaction at the site to be low.

6.3.2. *Dry/Partially-Saturated Seismic Settlement*

Seismically-induced settlement is often caused by the densification of dry to partially-saturated, loose to medium-dense granular soils during ground shaking. While uniform settlement beneath a structure may not cause significant damage, the variations in distribution, density, and confining conditions of natural soils, seismic settlement is generally non-uniform and can cause serious structural damage.

We anticipate that the planned structures at the site will be located within the limits of engineered fill—either in the mine reclamation areas, or in areas of recommended overexcavation—while utilities will pass from the engineered fill into the native materials located at the site perimeter. In areas of engineered fill, we anticipate a low potential for dry/partially-saturated seismic settlements. Based on our experience with nearby projects, we anticipate that the alluvial areas surrounding the site will generally be susceptible to seismic settlement somewhat greater than the engineered fill. We recommend a program of subsurface exploration and testing to characterize the perimeter materials to develop specific recommendations for utilities, and structures if applicable, where these will cross from alluvium to engineered fill.

6.4. EXPANSION POTENTIAL

Expansive soils tend to shrink and swell with changes in the soil moisture content. The materials at the site will mainly consist of engineered blended rubble fill, engineered soil fill, and alluvium. The blended rubble fill and alluvium are anticipated to behave like coarse grained materials. Soil fill, whether derived from onsite non-engineered fill sources or various import sources, should be evaluated on a case-by-case basis. Where fill sources may be expansive, recommendations may include blending with other soils of very low to low expansion to avoid potential special earthwork measures related to soil expansion. The Geotechnical Engineer of Record may reject the use of certain source materials upon evaluation prior to import.

We anticipate that the soils surrounding the pits to be backfilled consist of natural alluvial soils and fill soils derived from natural alluvium. These soils are sandy with little to some silt, and include gravel and cobbles. Based on our observations, laboratory test results, and experience with similar soils, the alluvial soils are non-expansive.

6.5. FLOODING AND INUNDATION

The project site is located in a 100-year flood zone according to the Irwindale General Plan due to the property being near the Santa Fe Dam Flood Control Basin. However, the vast majority of the site, except for the southwesternmost portion of Parcel 3 beyond the existing perimeter road

(Figure 6), is or will be at a higher elevation than the crest of the Santa Fe Dam. We therefore consider the potential for flooding and inundation at the site to be low.

6.6. TSUNAMIS AND SEICHES

The subject site is located approximately 27 miles inland from the Pacific Ocean and at an elevation of approximately 530 feet above the mean sea level. As a result, the site is not considered to be susceptible to tsunamis.

The northwest quarry could contain water as high as the historic high groundwater level between EL330 and EL380. However, the borders of the quarry would be approximately 150 feet higher in case of such an event. As a result, the subject site is not likely to be adversely affected in the event of earthquake-induced seiches (wave oscillations in an enclosed or semi-enclosed body of water) during filling. After the pits are fully reclaimed, the risk of the site being affected by seiches would be remote.

6.7. OIL WELLS

According to the State of California Department of Conservation, California Geologic Energy Management Division (CalGEM), abandoned or active oil wells are not located within the subject site. The site is not located within the limits of a known oil field. The nearest well is approximately 500 feet east of Lot A and was abandoned as a dry hole in 1963 (Figures 7 and 8).

6.8. SUBSIDENCE

The site is not located within an area of known subsidence (ground surface settlement) associated with fluid withdrawal (groundwater or petroleum), peat oxidation, or hydrocompaction (USGS, 2023; Figure 9). Therefore, subsidence is not considered a significant impact to the site.

6.9. METHANE GAS

The site is not located within any known Methane Hazard Zone. In addition, the site is not located within a known oil field, and active or previously active oil or gas wells are not reported to be located within or near the site limits.

7. OTHER HAZARDS OR IMPACTS

7.1. INFILTRATION

Where infiltration of stormwater is proposed, we recommend infiltration into the natural alluvium via a system of dry wells and/or detention basins. Planned infiltration of storm water into the engineered fill is not allowed based on the current codes. We recommend that cross sections at each detention basin be prepared when the detention basin design is finalized. We also recommend that infiltration testing within the constructed detention basins and of at least one full-scale dry well, as applicable, be performed to obtain as-built infiltration results.

The permeability of the engineered fill is typically significantly less than that of the native alluvium in the development area, infiltration of stormwater into asphalt-containing fill materials is expected to be minimal, and the likelihood of stormwater infiltrating directly through the engineered fill to the groundwater table is not likely. Furthermore, based upon our experience, incidental infiltration into the engineered fill is not anticipated to impact the proposed structures; however, we recommend a final review be performed once planning is complete.

7.2. CORROSIVITY

Corrosion potential of the engineered fill materials should be evaluated as part of our ongoing scope of services. As the design is developed for the site, the geotechnical scope of services should include this evaluation of the near-surface soils, or deeper soils, if necessary. Corrosion mitigation measures should be incorporated, as appropriate.

8. HAZARD MITIGATION

8.1. SEISMICALLY-INDUCED SETTLEMENT

The developed site will be relatively flat and sloped for drainage after the completion of the pit reclamation, and the potential for liquefaction and seismic settlement are expected to be low within the fill materials, as previously discussed. However, the seismic settlement potential of the natural materials outside of the engineered fill should be evaluated. The potential for seismic settlement should be screened in the context of future development, and quantitative estimates of seismic settlement should be developed, as necessary. These estimates should be compared to total and differential settlement tolerances for utilities and structures, and project-specific mitigation should be developed, as necessary. We anticipate that mitigation measures may be

appropriate for utilities entering the site, and flexible connections and/or some remedial grading may be appropriate.

8.2. GRADING REQUIREMENTS

New structures should be supported on foundations developing their support entirely within either the engineered inert debris or soil fill. The capability of the engineered fills to support new foundations should be checked with a comprehensive geotechnical investigation. Retaining walls or screen walls planned around the property may also be supported on spread footings in either the inert debris engineered fill or compacted fill cap material. Native soils will require overexcavation and recompaction to provide foundation support.

8.3. FOOTINGS IN COMPACTED FILL

We anticipate that spread footings carried at least 2 feet below the lowest adjacent grade or floor level can be designed to impose a net dead-plus-live load pressure of 4,000 psf in the engineered inert debris fill, and 2,500 psf in engineered soil fill. A one-third increase in the bearing value can be used for wind or seismic loads. These recommended bearing values may be finalized during the geotechnical evaluation of the development at the site.

Estimations of settlement will vary depending on specific structural loads; however, we anticipate that that tolerable settlements on the order of 1 inch or less will be estimated for the types of structures planned. The settlement of footings in compacted fill should be quantitatively estimated during the geotechnical evaluation for development at the site. The results of seismic settlement analyses should be added to the static foundation settlements, as applicable.

8.4. CODE-BASED SEISMIC DESIGN

Structures located at the site can be designed to resist earthquake forces following the 2023 County of Los Angeles Building Code. The mapped acceleration parameters corresponding to the site location can be obtained using the applicable version of ASCE 7. The design spectral response acceleration parameters should be developed during the site-specific geotechnical evaluation for the proposed development.

8.5. FLOOR SLAB SUPPORT

Building floor slabs can be supported on grade on the engineered inert debris or properly compacted, engineered fill. Imported soils intended for use in the upper 15 feet of the site should be evaluated by the project Geotechnical Engineer prior to import. Specific recommendations for support of floor slabs on grade, including considerations of moisture-sensitive flooring, dynamic

loads, etc., should be developed during the site-specific geotechnical evaluation for the proposed development.

8.6. BASEMENT AND RETAINING WALLS

Basement construction is not currently anticipated as part of the future development. Retaining walls may be included in the design. Specific recommendations for retaining walls and, if necessary, basement walls should be developed during the site-specific geotechnical evaluation for proposed development.

8.7. PAVING

Development of the site will include parking and drives. If the site is capped with soil fill with few gravel or cobbles, a preliminary estimate of the R-value may be assumed to be 15. If the site is capped with fill that is closer in nature to blended rubble fill, a preliminary estimate of the R-value may be assumed to be 60. The R-value of the subgrade should be tested prior to final pavement design. The design R-value should reflect the as-placed condition of the soil fill cap, which may vary across the site.

9. LIMITATIONS

Within the limitations of the scope, schedule, and budget, the analyses, conclusions, and preliminary recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this report was prepared. We make no other warranty, either express or implied. This report was prepared for the exclusive use of the IBY Property Owner, and its agents and assigns, and the design team for specific application to this project. This is not a design-level geotechnical report. If there are any changes to the proposed type of development assumed herein, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

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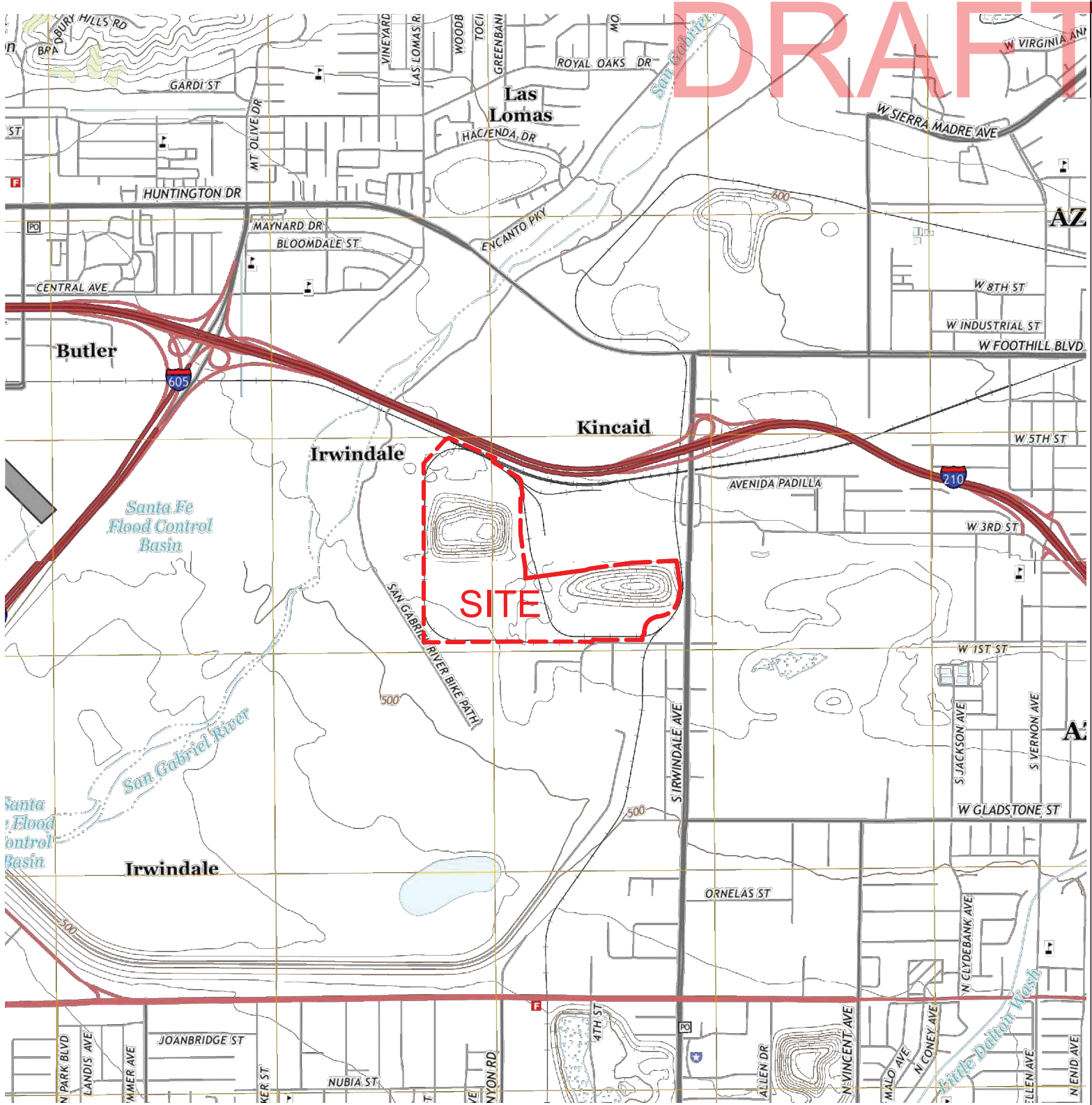
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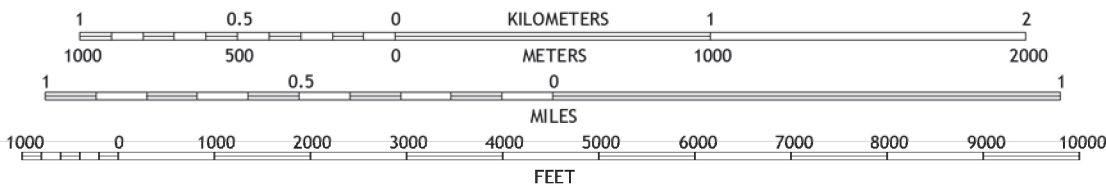
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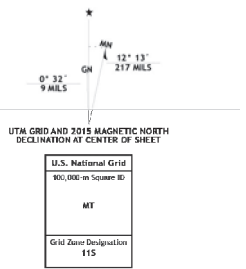
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CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988



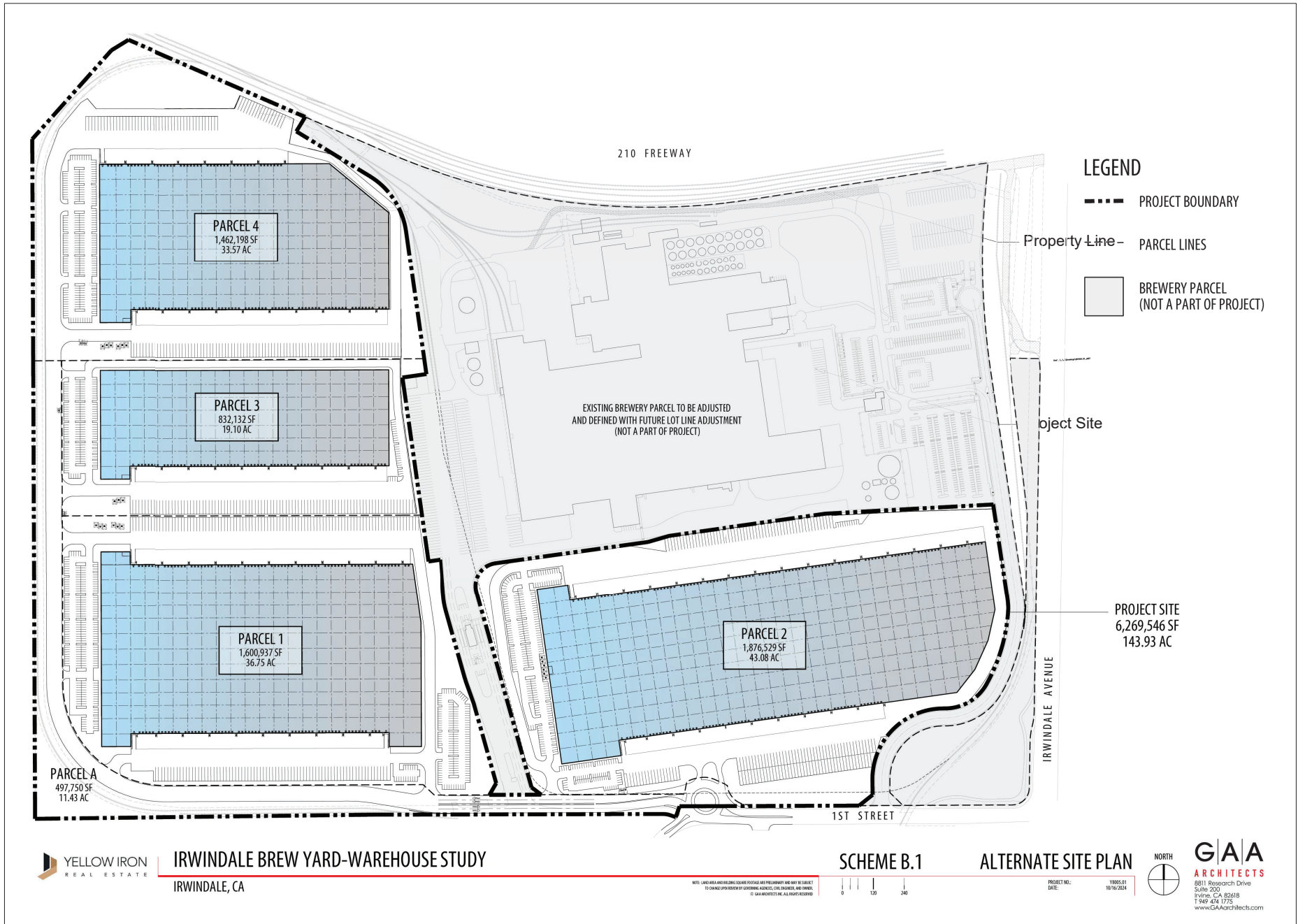
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Quadrangle Maps:
Azusa (2015) & Baldwin Park (2015)
California-Los Angeles CO.
7.5-Minute Series

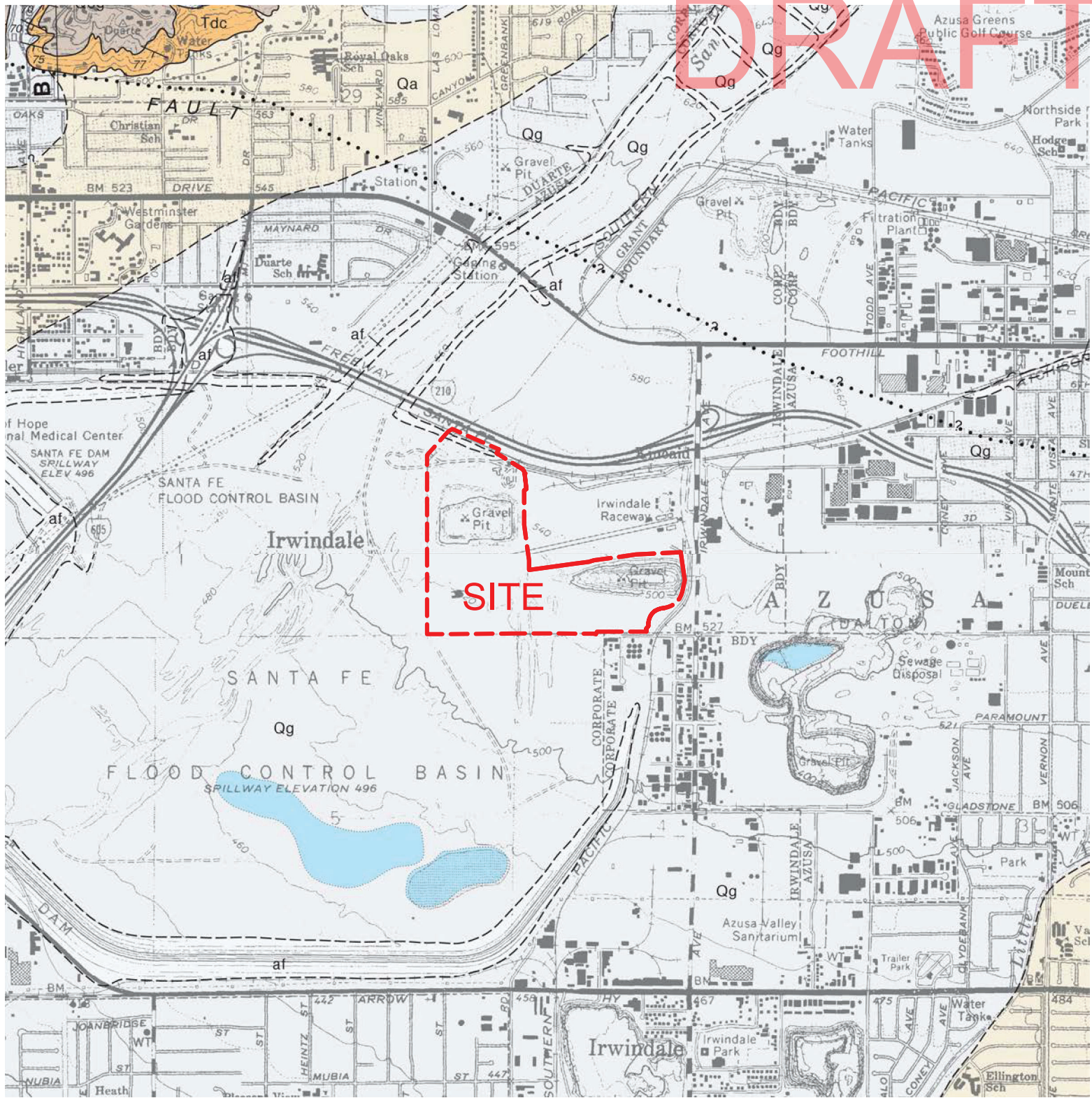
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Site Vicinity Map

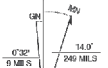
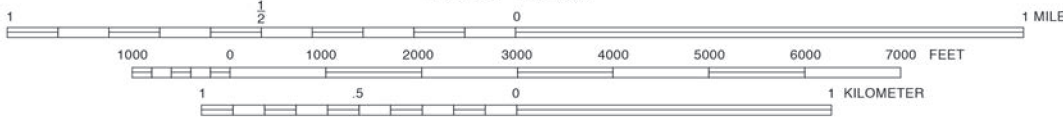
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Date: May 2023
Job No. 70917
Figure 1





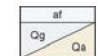
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UTM GRID AND 1983 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

MOUNT WILSON AND AZUSA MAP (DF-67)

LEGEND



SURFICIAL SEDIMENTS

Unconsolidated and unindurated alluvial deposits

af Artificial fill, not all areas shown
Qg Gravel and sand of major stream channels and alluvial fan outwash from major canyons; grades southwest into alluvium (Qa) as sizes of clasts decrease; some alluvial fans named by Cook et al., 1967
Qa Alluvial gravel, sand and silt of valley areas

References:

Geologic Map of the Mount Wilson and Azusa Quadrangles (DF-67)
by Thomas W. Dibble Jr., 1998

Geologic Map of the El Monte and Baldwin Park Quadrangles (DF-69)
by Thomas W. Dibble Jr., 1999

Title:

Regional Geologic Map

15801 1st Street
Irwindale, California

Date:

May 2023

Job No.

70917

Figure 3

DRAFT

Map showing the proposed site location (red outline) near the intersection of the San Gabriel River Fwy (SR 210) and the Foothill Fwy (SR 10). The site is located in the Azusa area, near the Gabriel River and the San Gabriel River Fwy. The map also shows the Los Angeles County boundary and the Mount Bliss area.

Fault Traces

- Accurately Located
- Approximately Located
- ?- Approximately Located, Queried
- Inferred
- Inferred, Queried
- ... Concealed
- ?.. Concealed, Queried
- Aerial Photo Lineament

Fault_Zones



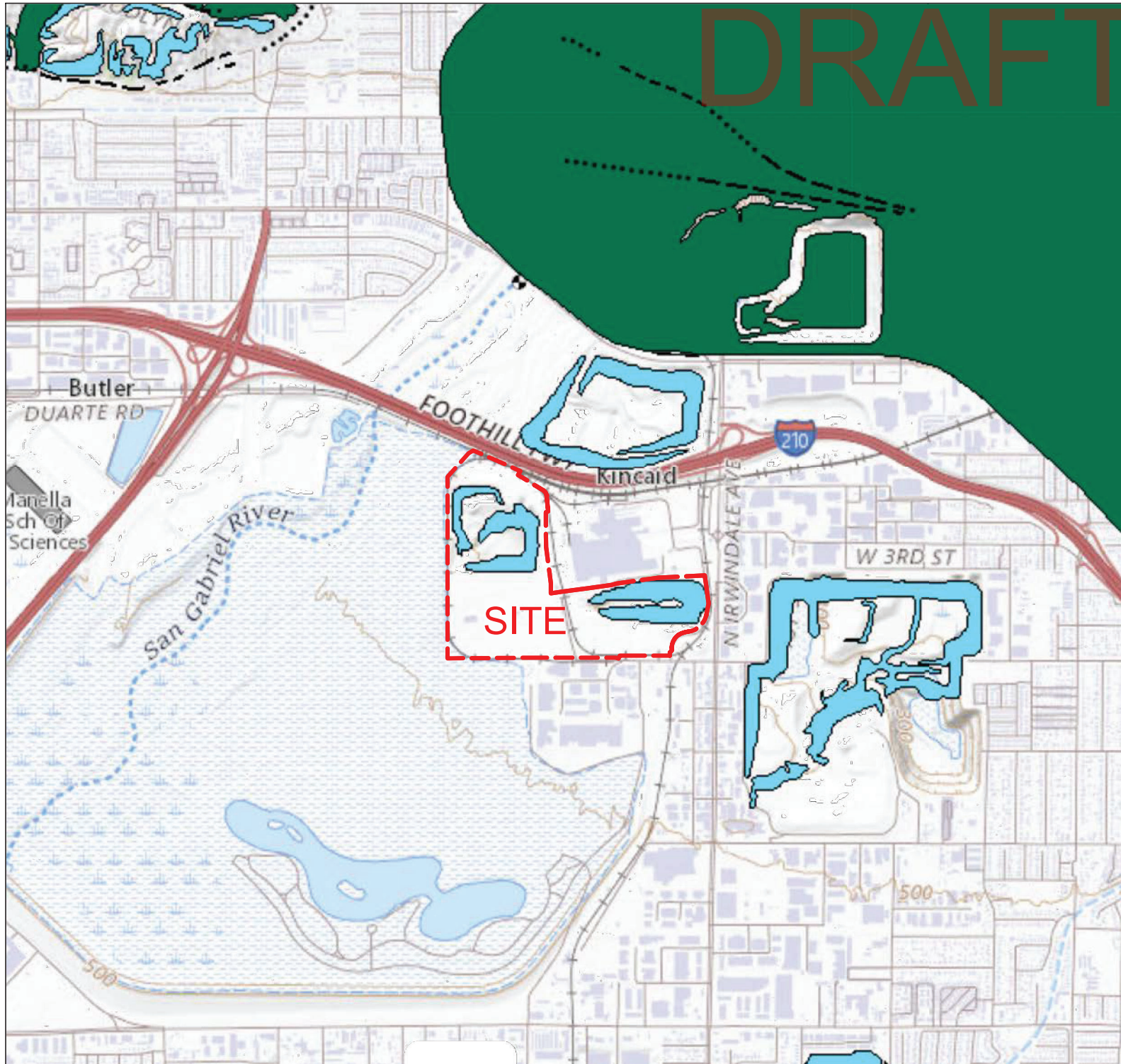
A horizontal graphic scale bar with three segments. The first segment is white, the second is black, and the third is white. Above the bar, the numbers 0, 4000', and 8000' are marked at the beginning, middle, and end respectively.



Title:	Regional Fault Map
	15801 1st Street Irwindale, California

Date:	May 2023
Job No.	70917
	Figure 4

DRAFT



Seismic Hazards Program: Landslide Zones

Landslide Zones



Seismic Hazards Program: Liquefaction Zones

Liquefaction Zones



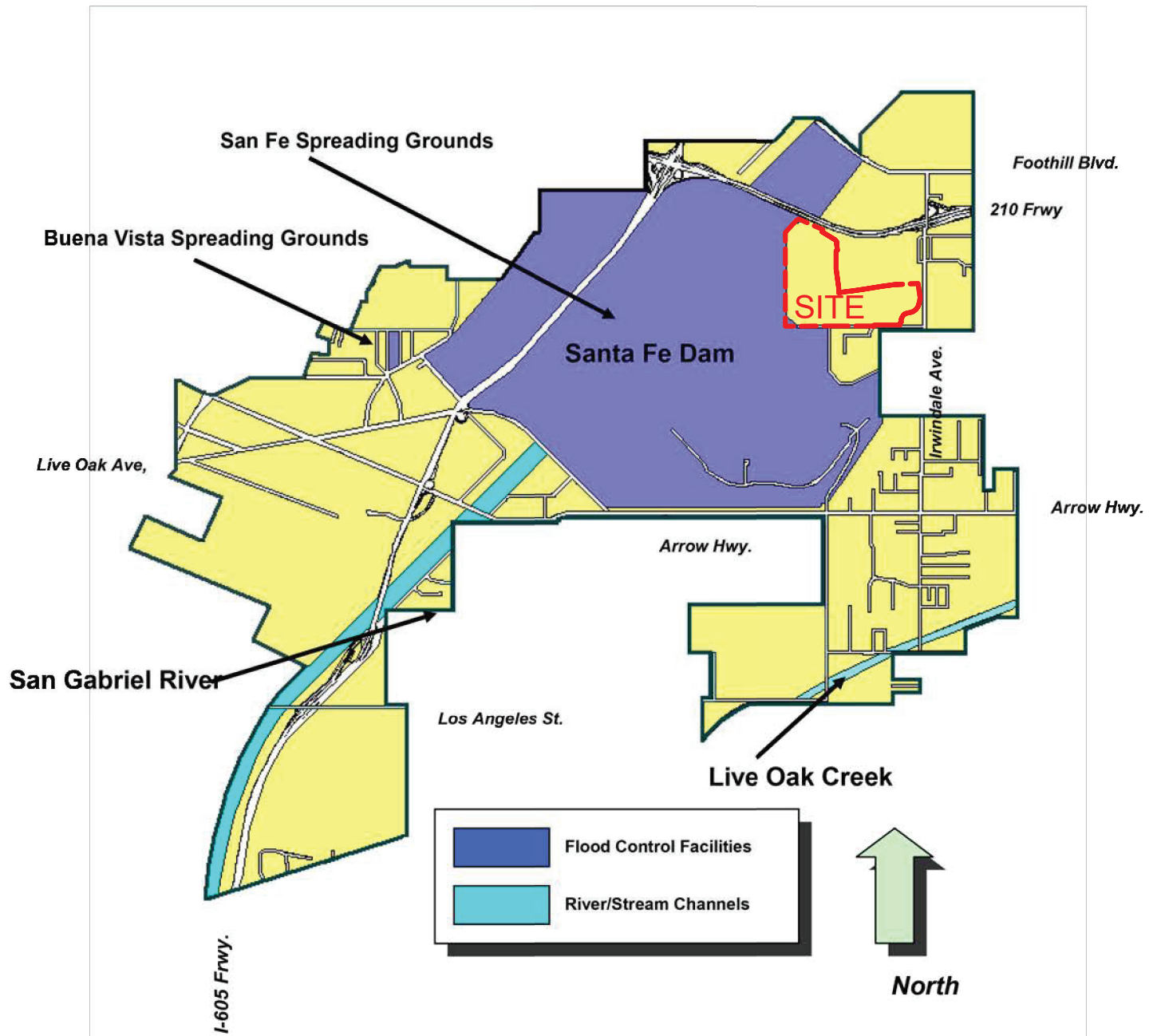
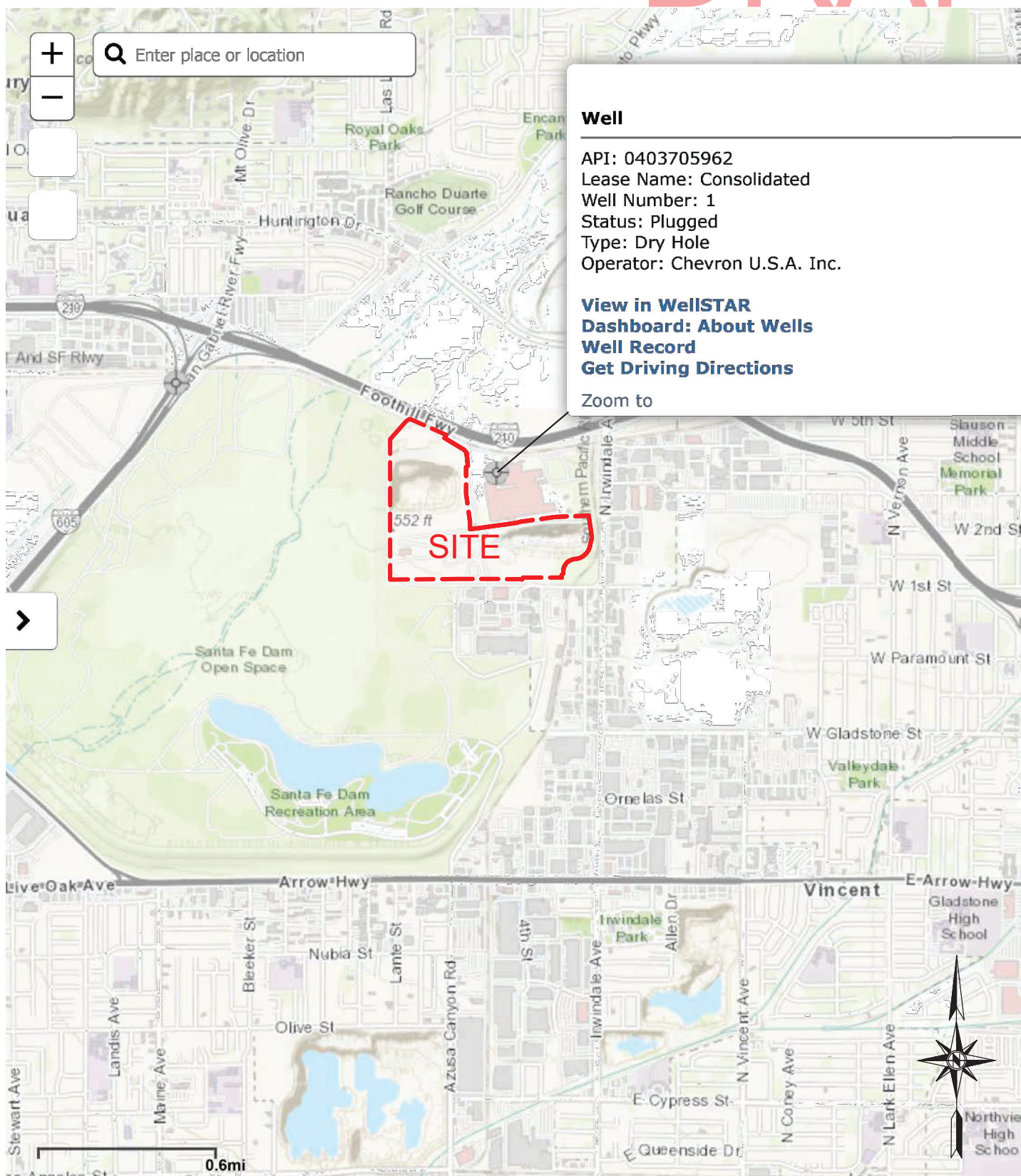


Exhibit 6-3
Flood and Inundation Risk
City of Irwindale General Plan

DRAFT



Legend

California Oil & Gas Fields

Sierra Madre

Monrovia

Arcadia

Azusa

Glendora

Temple City

Vincent

Citrus

Rosemead

Baldwin Park

Covina

El Monte

West Covina

San Gabriel

Lapworth (Abd)

Whittier Heights, North (Abd)

La Puente

Walnut

South San Jose Hills

Rowland (Abd)

Rowland Heights

Diamond Bar

Whittier

