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# DRAFT PRELIMINARY GEOLOGICAL HAZARDS REVIEW OF PROPOSED COLTON COMMUNITY SOCCER PARK, SOUTH OF CONGRESS STREET, NORTHWEST OF SANTA RIVER, CITY OF COLTON, CALIFORNIA

Prepared for:

**PSOMAS, INC.**
1500 Iowa Avenue, Suite 210
City of Riverside, California 92507

Project No. 12269.002

August 8, 2019

DRAFT

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Psomas, Inc.
1500 Iowa Avenue, Suite 210
City of Riverside, California 92507

Attention: Mr. Kent Norton

**Subject: Draft Preliminary Geological Hazards Review of Proposed Colton Community Soccer Park, South of Congress Street, Northwest of Santa River, City of Colton, California**

In response to your request and authorization, Leighton Consulting, Inc. (Leighton) has conducted a preliminary geological hazards review for the proposed Colton Community Soccer Park in the City of Colton, California. Our review of the site has not been completed, and the purpose of this draft review is to present our preliminary geologic and geotechnical findings thus far. Further evaluation of the site will be necessary, and another report will be provided to you once our review has been completed.

Our understanding of the project is based on the City of Colton Soccer Park Master Plan, prepared by ICG, Inc., dated February 2018, provided to us by you. The proposed park is located south of Congress Street and south of the southern terminus of Fernando and Florez Streets (APN's 0163-362-26-0000, 0163-362-12-0000, 0163-381-02-0000, and 0163-381-01-0000). The purpose of this evaluation has been to assess the geologic and geotechnical conditions of the site based on available data and discuss potential geologic and geotechnical impacts associated with the project in accordance with the California Environmental Quality Act (CEQA). Where appropriate, preliminary recommendations to mitigate potential geologic hazards have been provided.

Once plans are developed, additional investigations may be warranted to support design, permitting and construction.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further service, please contact us at ***(866) LEIGHTON***; specifically at the phone extension or e-mail as listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

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BER/SGO/JDH/rsm

Distribution: (1) Addressee

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# 1.0 INTRODUCTION

## 1.1 Site Description and Proposed Development

The proposed park and soccer complex is located in a mixed residential and industrial area in the City of Colton. The park will be accessible from Congress Street and Florez Street. The proposed park will generally be bounded by single-family residences to the north, vacant land and an industrial property to the west, and vacant land and the Santa Ana River to the south and to the east.

An approximately 4- to 6-acre portion of the proposed park property located at the southern terminus of Florez and Fernando Streets contains an unlined waste disposal site referred to as the Guyaux Landfill (see Figure 2). The landfill has historically been used for waste disposal of construction debris, such as used brick, concrete, iron waste (slag), plaster molds, rubber, steel, wood, and other deleterious materials. Aerial photographs suggest this landfill use began around the year 1967 with minor apparent activity through 2005. The master plan for the proposed Colton Soccer Park indicates a parking lot proposed over the landfill area.

The northeastern portion of the site has been used for soil stockpiling from approximately 2002 to 2004, as seen on aerial photographs. Based on our site reconnaissance, minor amounts (remnants) of previously stockpiled soils appeared to still be present in that area.

The city of Colton is proposing to construct a regional soccer complex and community park in an approximately 22-acre undeveloped area in South Colton (Figure 1). We reviewed the City of Colton – Soccer Park Master Plan, prepared by Integrated Consulting Group, dated February 2018. Based on the master plan, proposed improvements include three synthetic turf regulation size soccer fields and two natural turf youth soccer fields, as well as approximately 303 parking stalls, rest room facilities, concession buildings, a children's play area, multipurpose trails, and other associated improvements.

As depicted on San Bernardino County assessor's parcel maps, the site is located in APN's 0163-362-26-0000, 0163-362-12-0000, 0163-381-02-0000, and 0163-381-01-0000.

## 1.2 Scope of Work

Our work included a review of the conditions and analysis of the collected data. We performed the following tasks:

- Reviewed readily available geologic maps, geotechnical reports, and aerial photographs covering the site. We reviewed a preliminary geotechnical report for three of the project's parcels prepared by Ninyo & Moore dated May 18, 2016 provided by you, as well as data available in our in-house library. We also reviewed historical aerial photographs of the site dating back to 1938.
- Visited the site to observe the existing surface conditions.
- Evaluated the collected data based on the current site conditions and prepared this geotechnical review report for the project.

No subsurface or laboratory studies were conducted as part of our work.

## 1.3 Previous Investigations

A preliminary geotechnical evaluation for the site was performed by Ninyo & Moore in 2016. The plan for the soccer park at the time of Ninyo & Moore's 2016 report did not include APN 0163-362-26-0000. Field work performed in the report consisted of a geotechnical site reconnaissance to observe and document the existing surface conditions at the project site. The report assessed the general geologic conditions and seismic hazards affecting the area and evaluated their potential impacts on the project. No subsurface exploration was performed, and no design recommendations were provided in the report.

# 2.0 GEOLOGIC SETTING AND SUBSURFACE CONDITIONS

## 2.1 Geologic Setting

The site is located in the northern Peninsular Ranges Geomorphic Province of southern California along the western margin of the San Bernardino Valley. This is a geologically complex area where the relatively northwest-moving Peninsular Range Province interacts with the relatively southeast-moving Transverse Ranges Province. Strike-slip faults, such as the San Jacinto Fault Zone, dominate the structure of the Peninsular Ranges. Significant faulting near the site include the San Jacinto fault zone approximately 0.8 mile northeast of the site; the San Andreas fault zone, approximately 8 miles northeast of the site; and the Cucamonga fault approximately 11 miles northwest of the site. The San Andreas, San Jacinto, and Cucamonga faults have experienced significant activity in the recent geologic past.

Based on available regional geologic maps, the site and surroundings are underlain by granitic bedrock of Upper Cretaceous age (USGS, 1978 and 2006), (see Figure 3). The bedrock units in the area of the site are mantled by Quaternary alluvial sediment.

The site is located within the flood plain of the Santa Ana River (San Bernardino County, 2010a). Published geologic mapping (Morton, 1978 and Dibblee and Minch, 2003) indicates that the soils underlying the project area consist primarily of young alluvium consisting of unconsolidated deposits of sand, gravel, and boulders. Regional geology relative to the location of the site is depicted in Figure 3.

## 2.2 Earth Units

Undocumented fill onsite was observed as landfill south of the terminus of Florez and Fernando Streets and as remnants of previously stockpiled soils south of Congress Street and east of Fernando Street. Ninyo and Moore (2016) estimated the thickness of the landfill to be approximately 15 feet. Based on aerial photography review and our site reconnaissance, the estimated thickness of the remnants of previously stockpiled soils is less than 3 feet.

Alluvium was observed at the surface on the remaining portions of the site. The alluvium at the surface was observed to consist of loose fine to coarse sand with areas that included gravel and boulders.

## 2.3 Groundwater

Published maps (Fife, 1974) indicated that the generalized groundwater level in 1960 at the location of the site was on the order of 100 to 200 feet below the surface (bgs). Records of a water well maintained by the Western Municipal Water District indicated the highest groundwater level was approximately 77 feet bgs (on March 17, 2016) based on measurements taken from November 2011 through April 2019. Records of a water monitoring well located just outside of the northeastern corner of the site indicated the shallowest groundwater level was approximately 13 feet bgs (on July 27, 2005) based on measurements taken from December 2004 through November 2010.

Based on the data collected, it appears that groundwater levels fluctuate significantly due to seasonal or precipitation variations. Groundwater may be a constraint to development depending on the seasonal conditions.

# 3.0 GEOLOGIC AND SEISMIC HAZARDS

## 3.1 Faulting

The proposed development is not within a currently designated State established Earthquake Fault Zone for active surface faulting, and the County of San Bernardino has not identified any faults or fault zones through the site. No known active faults have been mapped onsite nor trending toward the site. The nearest known active fault is the San Bernardino Valley section of the San Jacinto fault zone, located about 0.8-mile northeast of the site. Considering the locations of these mapped faults relative to the site, the potential impact of surface fault rupture occurrence at the site is considered to be low. Therefore, the impact of fault rupture is less than significant.

## 3.2 Seismic Design Parameters

Moderate to strong ground shaking due to seismic activity is expected at the site during the life span of the project. The following are the current code-based (2016 California Building Code) seismic design parameters for new structures:

| Categorization/Coefficients | Code-Based (1) |
|---|---|
| Site Longitude (decimal degrees) West | -117.322313 |
| Site Latitude (decimal degrees) North | 34.052760 |
| Site Class | D |
| Mapped Spectral Response Acceleration at 0.2s Period, $S_s$ | 2.087 |
| Mapped Spectral Response Acceleration at 1s Period, $S_1$ | 0941 |
| Short Period Site Coefficient at 0.2s Period, $F_a$ | 1.0 |
| Long Period Site Coefficient at 1s Period, $F_v$ | 1.5 |
| Adjusted Spectral Response Acceleration at 0.2s Period, $S_{MS}$ | 2.087 |
| Adjusted Spectral Response Acceleration at 1s Period, $S_{M1}$ | 1.411 |
| Design Spectral Response Acceleration at 0.2s Period, $S_{DS}$ | 1.392 |
| Design Spectral Response Acceleration at 1s Period, $S_{D1}$ | 0.941 |

1. All coefficients in units of g (spectral acceleration)

Based on ASCE 7-10 Equation 11.8-1, the $F_{PGA}$ is 1.0, the PGA is 0.808g, and the $PGA_M$ is 0.808g.

### 3.3 Liquefaction

The California Geological Society has not published areas of seismic hazards for the quadrangle that includes the site. The County of San Bernardino has identified the site to be in a zone of medium liquefaction susceptibility. The 2018 Safety Element of the City of Colton's General Plan has identified the site to have a medium-high liquefaction susceptibility.

### 3.4 Seismically Induced Landslides

The California Geological Society has not published areas of seismic hazards for the quadrangle that includes the site. The County of San Bernardino has identified the site to not be within a zone of landslide susceptibility. The 2018 Safety Element of the City of Colton's General Plan has identified the site to be generally outside area of slope instability except for an approximately 10-foot-high riser of the terrace from the floodplain located in the northeastern portion of the site. The City of Colton has designated this slope to have a low to moderate potential for landsliding.

### 3.5 Flooding

As shown on Figure 6, *Flood Hazard Zone Map*, the site is located within the 100-year flood boundary recognized by the Federal Emergency Management Agency (FEMA). Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of an earthquake. As shown on Figure 7, *Dam Inundation Map*, the site is located within a dam inundation area. Due to the absence of major structures at the site the potential for earthquake-induced flooding at the site is considered low.

### 3.6 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the inland location of the site and its distance from contained water facilities, seiches and tsunamis are not a hazard to the site.

## 3.7 Slope Stability and Landslides

Since the developed site generally consists of relatively level pads, the potential for slope instability and landslides is not considered a geotechnical hazard for the site.

## 3.8 Soil Expansion Potential

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Structures constructed on these soils are subjected to large uplifting forces caused by the swelling. Without proper measures taken, heaving and cracking of both building foundations and slabs-on-grade could result.

Based on published geologic maps and our observations during our site reconnaissance, granular alluvial deposits are expected onsite and are anticipated to possess a very low expansion potential. Evaluation of expansion potential of onsite soils from subsurface exploration should be conducted during design-phase geotechnical investigation of the site.

## 3.9 Sedimentation and Erosion

The erosion characteristics of the unconsolidated alluvial deposits exposed on any future potential temporary cut slopes onsite is expected to be moderately susceptible to erosion. Although not currently anticipated, any manufactured slopes composed of compacted fill would be expected to be moderately susceptible to erosion.

The native soils onsite, as well as fill slopes constructed with native soils, will have a moderate susceptibility to erosion. These materials will be particularly prone to erosion during excavation and site development, especially during heavy rains.

The potential for erosion can be mitigated through the application of best management practices (BMPs) and other Storm Water Pollution Prevention Plan (SWPPPs), such as temporary catchment basins and/or sandbagging to control runoff and contain sediment transport within the project site during construction. Sheetflow should not be allowed to flow over tops of slopes. Following completion of the project, the site will be improved with structures, hardscape, landscaping and appropriate drainage infrastructure. Therefore, sedimentation

and erosion impact upon completion of construction are considered less than significant.

## 3.10 Regional Subsidence

Regional ground subsidence generally occurs due to rapid and intensive removal of subterranean fluids, typically water or oil. It is generally attributed to the consolidation of sediments as the fluid in the sediment is removed. The total load of the soils in partially or fully saturated deposits is born by their granular structure and the fluid. When the fluid is removed, the load is born by the sediment alone and it settles. USGS (2019) has reported historic regional subsidence in the site vicinity from groundwater pumping. However, due to current management groundwater levels by governing agencies, future subsidence in the region will not be a constrain for development.

## 3.11 Summary of Geologic and Seismic Hazard Review

The results of our geologic and seismic hazard review are summarized below.

| GEOLOGIC AND SEISMIC HAZARDS | FINDINGS |
|---|---|
| • Fault rupture | Low Risk |
| • Seismic Ground Shaking | Low Risk |
| • Liquefaction | Medium to High Risk |
| • Seismically induced landslide | Low Risk |
| • Seismically induced flooding and seiches | Low Risk |
| • Tsunamis | Low Risk |
| • Flood hazard | Medium to High Risk |
| • Soil expansion | Low Risk |
| • Slope stability and landslide | Low Risk |
| • Erosion/Sedimentation | Low Risk |
| • Regional Subsidence | Low Risk |

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| | |
|---|---|
| Project: 12269.001 | Eng/Geol: SKO/RBH |
| Scale:1 " = 2,000 ' | Date: August 2019 |

Base Map: ESRI ArcGIS Online 2019
Thematic Information: Leighton
Author: (kmanc)

# SITE LOCATION MAP

Psomas Colton Soccer Park
Colton Community Soccer Park Porject
Southeast of Congress and Fernando Streets
City of Colton, California

Figure 1

Leighton

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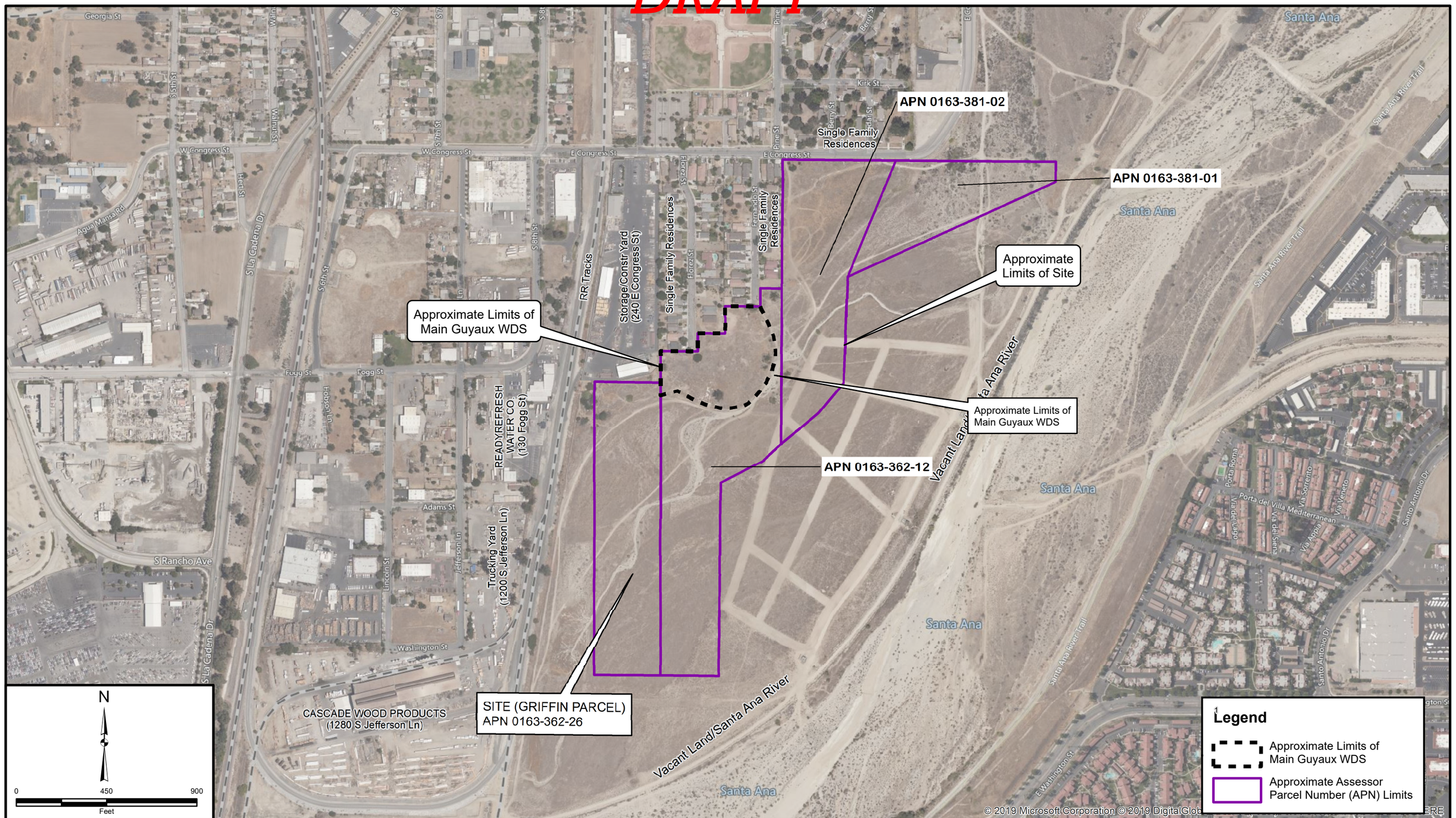


| | |
|---|---|
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| Scale: 1 " = 450 ' | Date: August 2019 |

Base Map: ESRI ArcGIS Online 2019
Thematic Information: Leighton
Author: (kmanc)

# SITE MAP

**Colton Regional Soccer Park Project**
**Colton, California 92324**

Figure 2

Leighton

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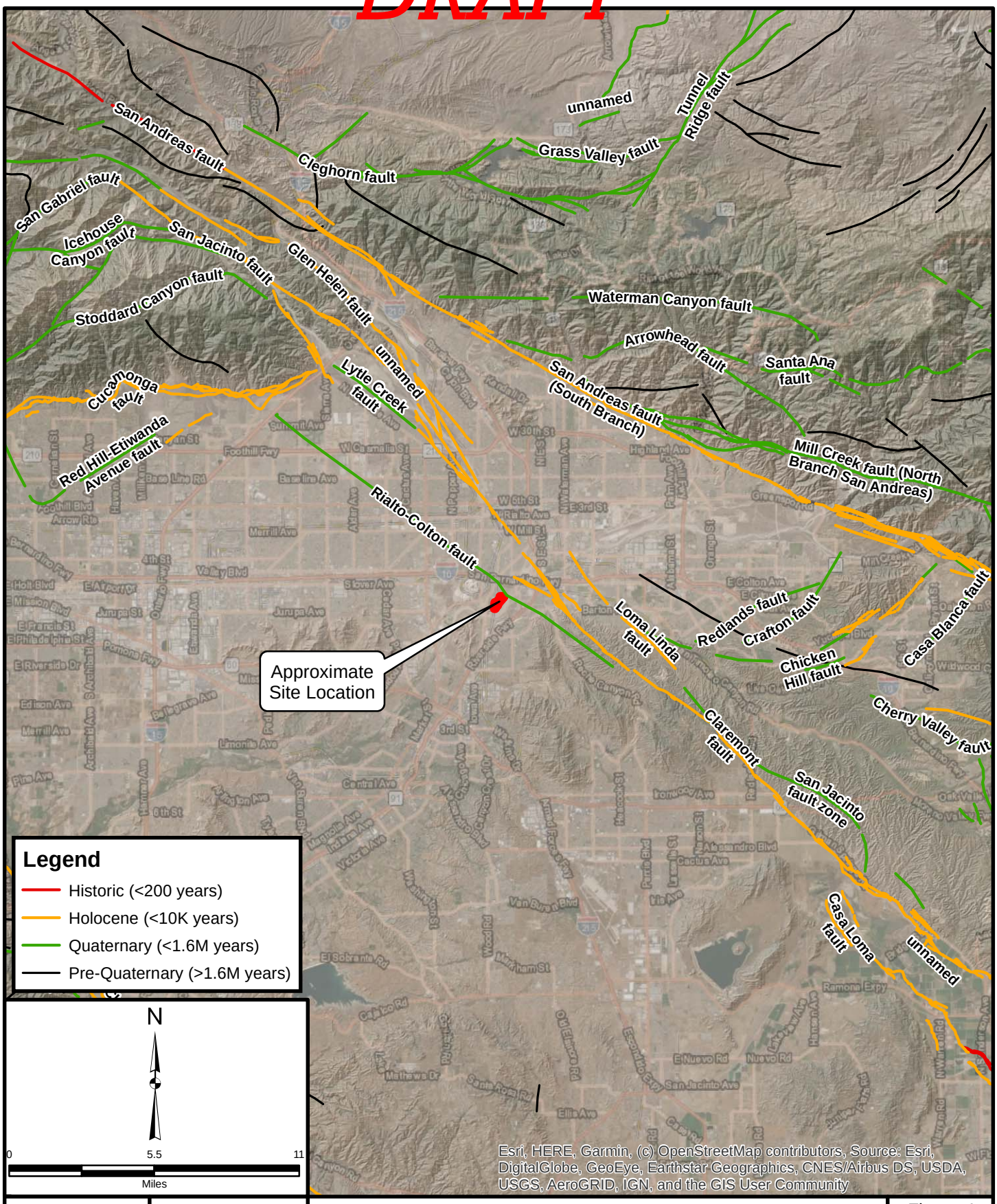


| | |
|---|---|
| Project: 12269.002 | Eng/Geol: SGO |
| Scale:1 " = 5 miles | Date: August 2019 |

Base Map: ESRI ArcGIS Online 2019
Thematic Information: Leighton, Bryant, W. A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: CGS
Author: Leighton Geomatics (btran)

# REGIONAL FAULT MAP

Proposed Colton Soccer Park
South of Congress, Fernando, and Florez Streets
City of Colton, California

Figure 4

Leighton

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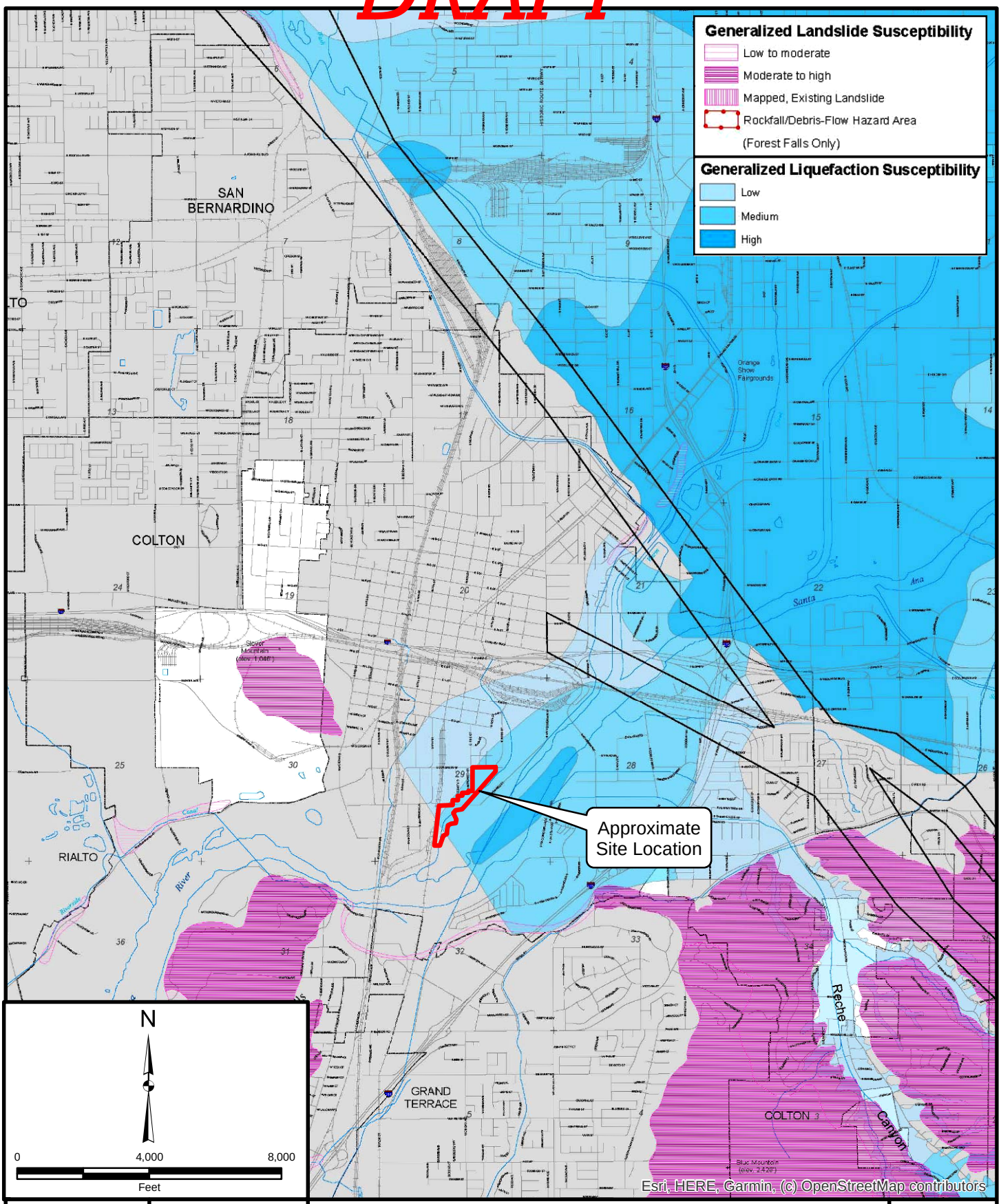


| | |
|---|---|
| Project: 12269.002 | Eng/Geol: SGO |
| Scale:1 " = 4,000 ' | Date: August 2019 |
| Base Map: San Bernardino County Land Use Plan General Plan, Geologic Hazard Overlays<br>Thematic Information: Leighton, CGS<br>Author: Leighton Geomatics (btran) | |

# SEISMIC HAZARD MAP

Proposed Colton Soccer Park
South of Congress, Fernando, and Florez Streets
City of Colton, California

Figure 5

Leighton

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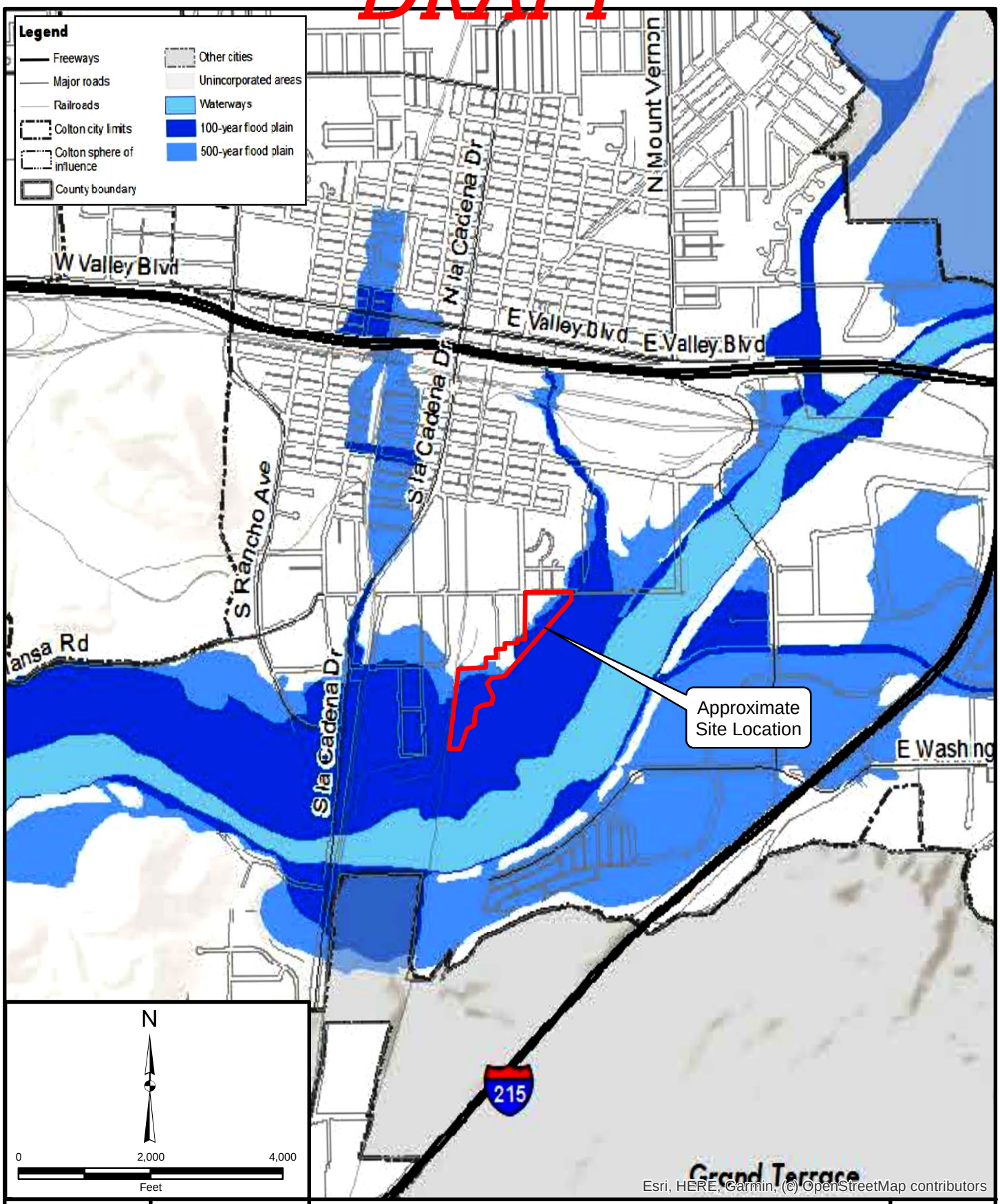


| | |
|---|---|
| Project: 12269.002 | Eng/Geol: SGO |
| Scale:1 " = 2,000 ' | Date: August 2019 |

Base Map: City of Colton - Flood Hazard Zones
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

# FLOOD HAZARD MAP

Proposed Colton Soccer Park
South of Congress, Fernando, and Florez Streets
City of Colton, California

Figure 6

Leighton

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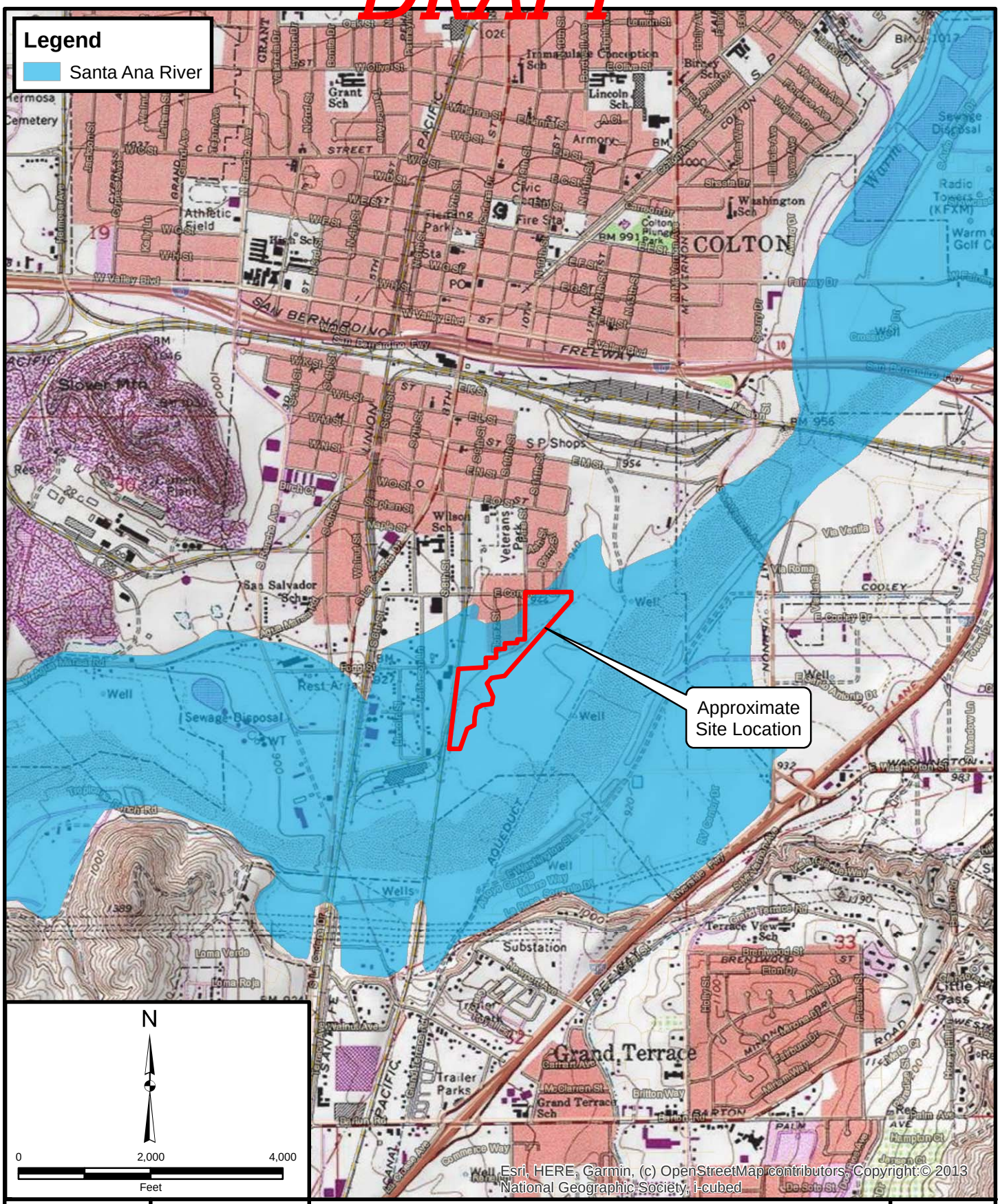


| | |
|---|---|
| Project: 12269.002 | Eng/Geol: SGO |
| Scale:1 " = 2,000 ' | Date: August 2019 |

Base Map: City of Colton - Flood Hazard Zones
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

# DAM INUNDATION MAP

Proposed Colton Soccer Park
South of Congress, Fernando, and Florez Streets
City of Colton, California

Figure 7

Leighton

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# APPENDIX A

# REFERENCES

# APPENDIX A

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## References

| Aerial Photo Review | |
|---|---|
| **Date** | **Source** |
| 1938 | NETR |
| 1948 | NETR |
| 1959 | NETR |
| 1966 | NETR |
| 1967 | NETR |
| 1968 | NETR |
| 1969 | NETR |
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| 8/24/2018 | Google |

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# APPENDIX B

# CEQA QUESTIONNAIRE FOR GEOLOGY AND SOILS