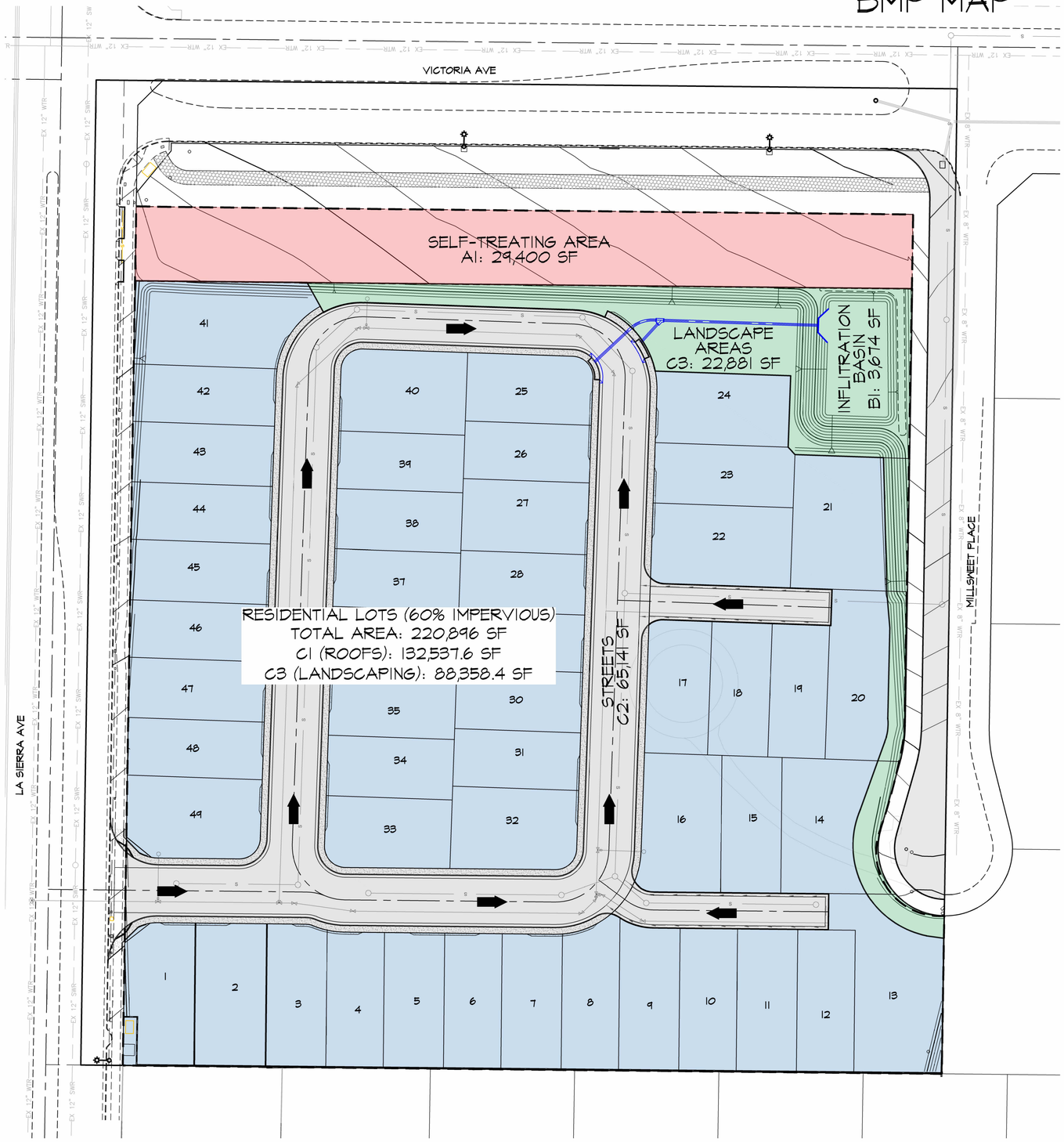
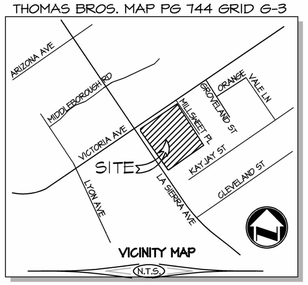
IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT 38921
BMP MAP



DMA 1			
DMA	NAME	SURFACE TYPE	AREA (SF)
A1	EXISTING	SELF-TREATING	29,400
B1	INFILTRATION BASIN	NATURAL A SOIL	3,674
C1	HOMES	ROOF/LANDSCAPE 60% IMPERVIOUS	132,538
C2	STREETS	ASPHALT/CONCRETE	65,141
C3	LANDSCAPING	ORNAMENTAL LANDSCAPING	111,239
TOTAL			341,992

SCALE: 1" = 40'



SEC. 24 T.3S. R.6W

ENGINEER
ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
TELEPHONE: (951) 688-0241
LSAGLIA@ADKAN.COM

OWNER
LA SIERRA VICTORIA DEVELOPMENT LLC
19215 WILD MUSTANG COURT
APPLE VALLEY, CA 92307

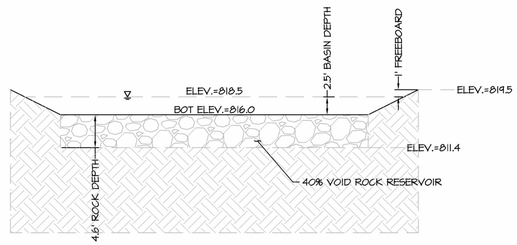
ASSESSORS PARCEL NUMBERS
136-220-016

APPLICANT
WARMINGTON RESIDENTIAL
3090 FULLMAN ST
COSTA MESA, CA 92626
CONTACT: MATTHEW ESQUIVEL
EMAIL: MESQUIVEL@WARMINGTONGROUP.COM

LEGEND

- DRAINAGE FLOWS
- DMA BOUNDARY
- PROP. MAJOR CONTOUR
- PROP. MINOR CONTOUR
- PROP. STORM DRAIN
- PROP. WATER
- PROP. SEWER
- HOMESITES
- LANDSCAPE
- STREETS
- SELF-TREATING AREA

AC	ACRES
CB	CATCH BASIN
CFS	CUBIC FEET PER SECOND
DA	DRAINAGE AREA
DMA	DRAINAGE MANAGEMENT AREA
EX.	EXISTING
PROP.	PROPOSED
SF	SQUARE FEET



TYPICAL BASIN SECTION
SCALE: 1"=10'

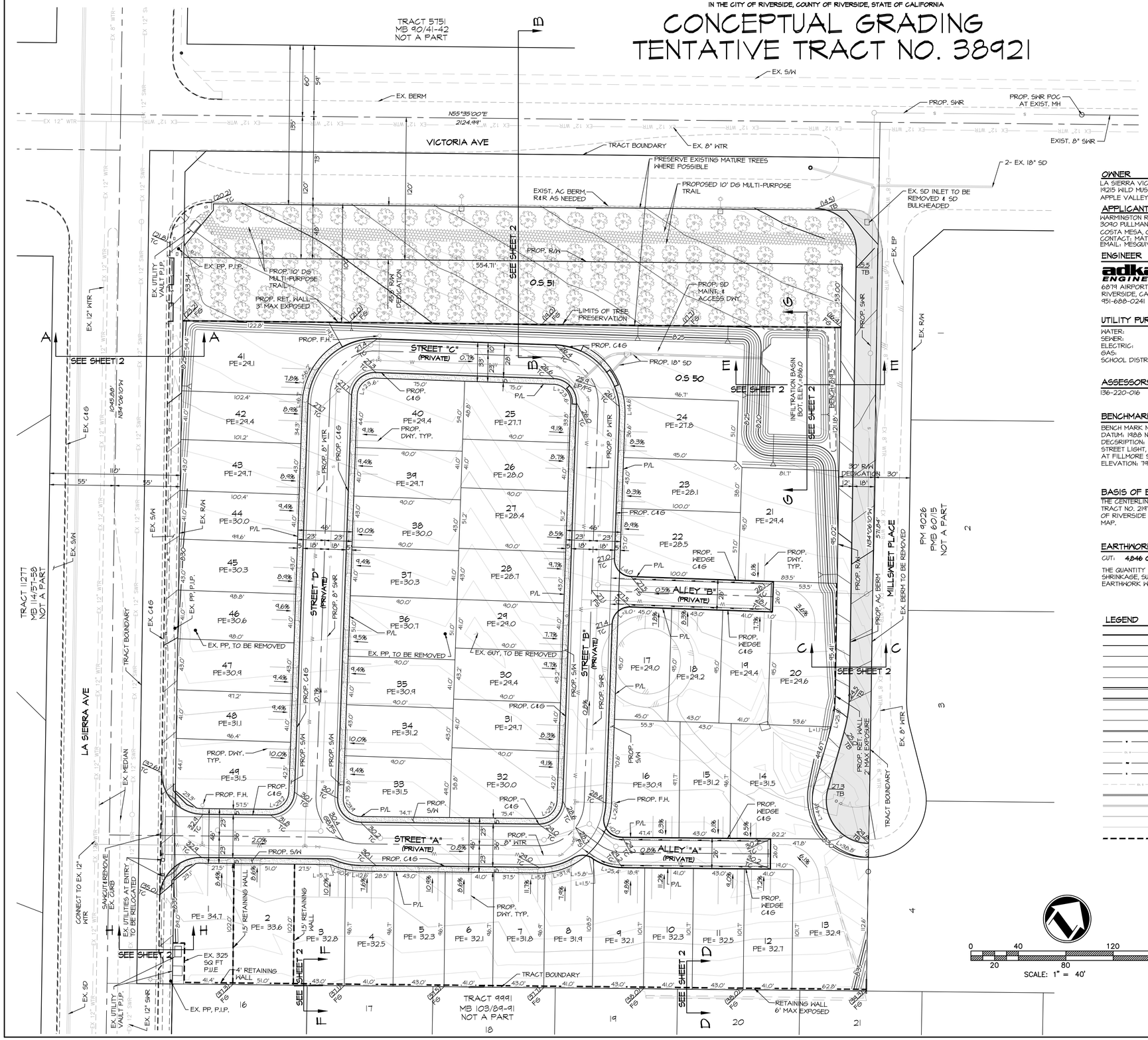
PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599

Appendix 2: Construction Plans

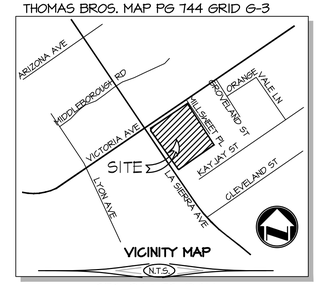
Grading and Drainage Plans

IN THE CITY OF RIVERSIDE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

CONCEPTUAL GRADING
TENTATIVE TRACT NO. 38921



THOMAS BROS. MAP PG 744 GRID G-3



SEC. 24 T.3S. R.6W

OWNER
LA SIERRA VICTORIA DEVELOPMENT LLC
19215 WILD MUSTANG COURT
APPLE VALLEY, CA 92307

APPLICANT
WARMINGTON RESIDENTIAL
3090 PULLMAN ST
COSTA MESA, CA 92626
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EMAIL: MESQUIVEL@WARMINGTONGROUP.COM

ENGINEER
adkan ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA. 92504
951-688-0241

UTILITY PURVEYORS
WATER:	RIVERSIDE PUBLIC UTILITIES
SEWER:	RIVERSIDE PUBLIC WORKS
ELECTRIC:	*RIVERSIDE PUBLIC UTILITIES*
GAS:	SO. CAL. GAS COMPANY
SCHOOL DISTRICT:	RIVERSIDE UNIFIED SCHOOL DISTRICT

ASSESSORS PARCEL NUMBER
136-220-016

BENCHMARK
BENCH MARK NO. D3-E3
DATUM: 1988 NAVD
DECSRIPTION: P.K. NAIL AND CITY ENGINEER TAG IN CONCRETE BASE OF A STREET LIGHT, 2 FEET NORTHWESTERLY OF THE NORTHERLY CURB RETURN AT FILLMORE STREET AND ARIZONA AVENUE FORMERLY D3-D RESET.
ELEVATION: 1143.147

BASIS OF BEARING
THE CENTERLINE OF VICTORIA AVENUE BEING NORTH 55°35'00" EAST PER TRACT NO. 21974, FILED IN BOOK 175 MAPS, AT PAGES 46 AND 47, RECORDS OF RIVERSIDE COUNTY, WAS HELD AS THE BASIS OF BEARINGS FOR THIS MAP.

EARTHWORK QUANTITIES
CUT: **4846 CY** FILL: **30,491 CY** NET: **24346 CY (FILL)**

THE QUANTITY SHOWN ABOVE IS FOR DISCUSSION PURPOSES ONLY. SHRINKAGE, SUBSIDENCE AND SURFACE LOSS FACTORS ARE NOT INCLUDED. EARTHWORK WILL BE BALANCED ON SITE DURING FINAL ENGINEERING.

LEGEND
BOUNDARY	EX. EXISTING
RIGHT OF WAY	PROP. PROPOSED
CENTERLINE	S/W SIDEWALK
PROPERTY LINE	R/W RIGHT OF WAY
EASEMENT	R&R REPLACE AND REPAIR
PROP. CURB & GUTTER	P/L PROPERTY LINE
EX. CURB & GUTTER	C&G CURB & GUTTER
PROP. SIDEWALK	O.S. OPEN SPACE
EX. SIDEWALK	EVA EMERGENCY VEHICLE ACCESS
UNDERGROUND STORAGE	SWR SEWER
PROP. DOMESTIC WATER	WTR WATER
EX. DOMESTIC WATER	SD STORM DRAIN
PROP. RECYCLED WATER	CB CATCH BASIN
PROP. SEWER	TBR TO BE REMOVED
EX. SEWER	TYP. TYPICAL
PROP. STORM DRAIN	DWY DRIVEWAY
EX. STORM DRAIN	
EX. MAJOR CONTOUR	
EX. MINOR CONTOUR	
PROP. RETAINING WALL	

LEGAL DESCRIPTION
LOT 6 IN BLOCK 12 OF THE RESUBDIVISION OF LANDS OF J. F. MOULTON AND H. B. PRAED, AS SHOWN BY MAP ON FILE IN BOOK 1 PAGES 44 AND 50 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE

PROJECT NOTES
1. TOTAL GROSS AREA: 10.8 AC, 470,448 SQ.FT
2. NET PROJECT SIZE: 7.85 AC, 341,946 SQ.FT
3. NO. OF RESIDENTIAL LOTS: 44
4. NO. OF O.S. LOTS: 2
5. PROPOSED DENSITY: 4.5 DU/AC (GROSS), 6.24 DU/AC (NET)
6. DRIVEWAY SLOPE: 15% MAX
7. BLDG SETBACKS:
   FRONT-
   HOUSE = 10 FT
   GARAGE FACE = 18 FT
   SIDEYARD = 4' TYP., 10' STREET SIDE
   REAR YARD-15' MIN
8. THOMAS BROS. COORDINATES: 2006 RIV. CO. (PAGE 744, GRID G-3)
9. THIS MAP DOES INCLUDE ALL OF THE LAND DIVIDERS CONTIGUOUS PROPERTY.
10. THE PROJECT IS NOT SUBJECT TO OVERFLOW, INNUNDATION, OR FLOOD HAZARDS.
11. THIS PROJECT DOES NOT LIE WITHIN THE AIRPORT INFLUENCE AREA
12. ALL CONTOURS ARE SHOWN AT 1' INTERVALS

TOPOGRAPHY SOURCE
FIELD SURVEY PERFORMED BY ADKAN ENGINEERS 12/01/2023

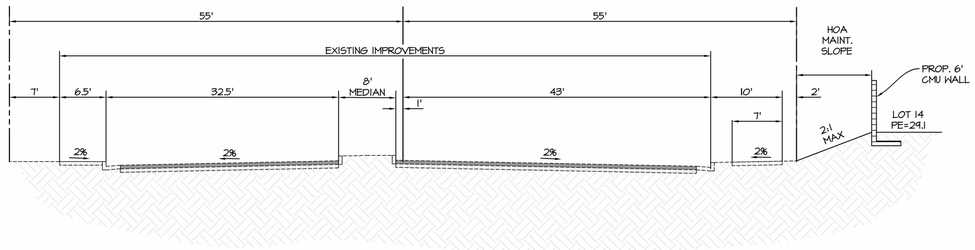
REVISIONS	
DELTA	DESCRIPTION

PAGE 1 OF 2
TENTATIVE TRACT NO. 38921
CONCEPTUAL GRADING DETAILS
PREPARATION DATE: FEBRUARY 2024

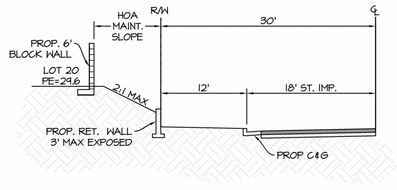
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

U:\PROJECTS\WARMINGTON\0514\ENGINEERING\CONCEPTUAL GRADING\0514 CG_OLD.DWG

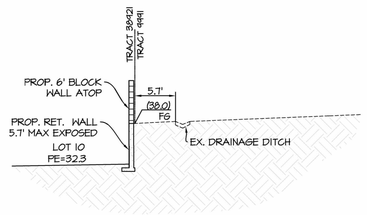
PLOT DATE: 2/23/2024 2:26 PM



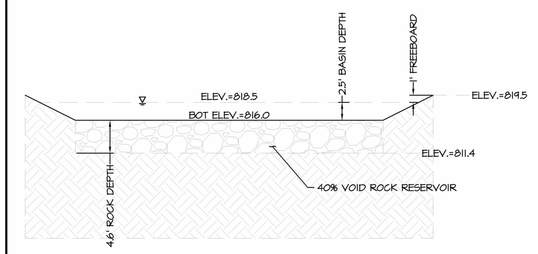
SCALE: 1"=10' SECTION A-A



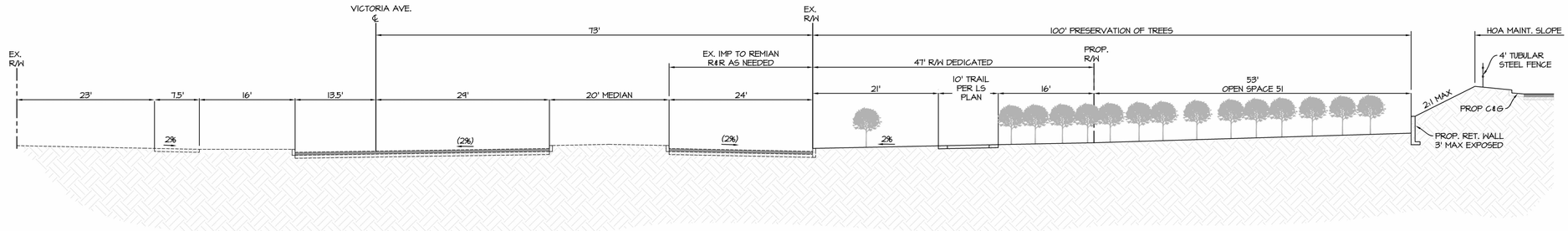
SCALE: 1"=10' SECTION C-C



SCALE: 1"=10' SECTION D-D



SCALE: 1"=10' TYPICAL BASIN SECTION

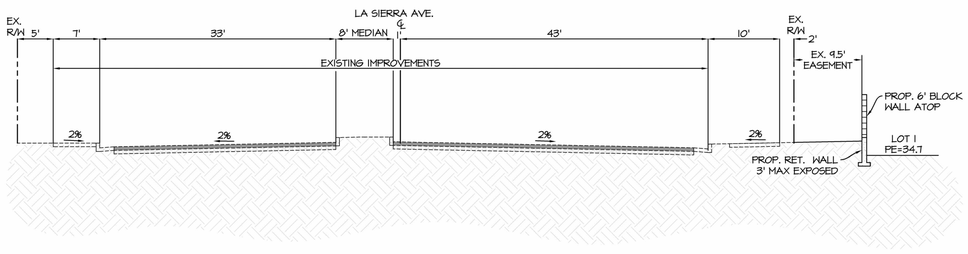


SCALE: 1"=10' SECTION B-B

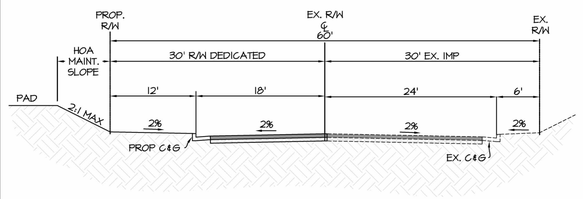
SCALE: 1"=10' SECTION E-E

SCALE: 1"=10' SECTION F-F

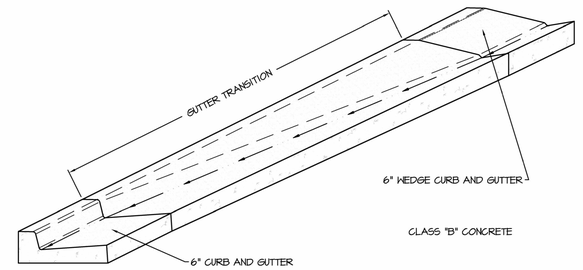
SCALE: 1"=10' SECTION G-G



SCALE: 1"=10' SECTION H-H



SCALE: 1"=10' MILLSWEET PLACE



N.T.S. CURB TRANSITION DETAIL

SCALE: 1"=10' TYPICAL ONSITE STREET (A,B,D) SECTION

SCALE: 1"=10' TYPICAL ONSITE STREET C SECTION

SCALE: 1"=10' TYPICAL ALLEY

N.T.S. WEDGE CURB DETAIL

PAGE 2 OF 2
TENTATIVE TRACT NO. 38921
CONCEPTUAL GRADING DETAILS
PREPARATION DATE: FEBRUARY 2024

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

PLOT DATE: 2/26/2024 9:56 AM

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

December 14, 2023
J.N. 23-341

WARMINGTON RESIDENTIAL
3090 Pullman Street
Costa Mesa, California 92626

Attention: Mr. Bret Ilich

Subject: **Feasibility/Due-Diligence Desktop Geotechnical Review, *Proposed 48 Lot Residential Project,* Assessor's Parcel Number 136-220-016, 7.9-Acre Site at SEC of Victoria and La Sierra Avenues, City of Riverside, Riverside County California**

Dear Mr. Ilich

In accordance with your request, **Petra Geosciences, Inc. (Petra)** is providing this desktop feasibility/due-diligence geotechnical review for proposed 48-lot development in the city of Riverside, California. This report presents our findings and professional opinions with respect to the geotechnical feasibility of the proposed development, geotechnical constraints that should be taken into consideration during development of the site, and potential mitigation measures to bring the site to compliance from a geotechnical engineering viewpoint.

> *It must be emphasized that that this desktop review report is intended as a feasibility-level geotechnical assessment only and is based solely on a review of the referenced geotechnical literature, a site reconnaissance and updated engineering analysis. As such, the contents of this report are not suitable for submittal to regulatory agencies, nor should the findings or conclusions provided herein be relied upon for earthwork, quantity calculation or procedure, or final structural engineering design. It should be further noted that this geotechnical evaluation does not necessarily address soil contamination or other environmental issues affecting the property.*

SITE GENERAL OVERVIEW

The project site is essentially square-shaped and approximately 8.8-acres in size, of which 7.9 acres are proposed for development. The site is situated southeasterly of Victoria Avenue, southwesterly of Millsweet Place and northeasterly of La Sierra Avenue. Existing residences are located to the southeast and the site is currently utilized as an orange grove with the exception of the eastern quadrant that appears to have been more recently developed as a park or recreation feature. Site access is at a driveway at the end of Millsweet Place, although a locked gate is present off Victoria Avenue.

DUE DILIGENCE ASSESSMENT

Geotechnical Literature Review and Site Reconnaissance

We have reviewed the existing geotechnical report, code update letter and supporting data for subject property by Soil Exploration Company, Inc. (SEC, 2014, 2019), as well as available published and unpublished geologic maps, data and reports, online aerial imagery and historic phots. We also performed a recent site reconnaissance to observe the surface conditions.

FINDINGS

Proposed Development

The current proposed development concept, Plan Option 3g by KTGY Architecture, will consist of 48 residential lots, a water quality basin and in-tract streets. A new site entrance will be constructed off La Sierra Avenue and Millsweet Place will be improved. The exiting orange grove along Victoria Avenue will remain as a 100-foot wide easement along with a trail. Other ancillary site improvements are expected to consist of underground utility lines (sewer, water, storm drain and dry utilities), perimeter masonry block screen walls, concrete sidewalks and landscaping. No grading plans are currently available; therefore, the preliminary grading quantities are currently unknown. Based on the low gradient of the site, significant fill slopes, cut slopes, nor retaining walls are currently anticipated.

Aerial Photograph Review

Based on aerial photographs reviewed, the subject site appears to have been utilized as an orange grove since at least 1931. Victoria and La Sierra Avenues were also present since that time and the surrounding properties were developed for residential use during the 1980's. The grove operations have continued from at least 1931 to the present time with the exception of the southeasterly quadrant of the site. During 2002, portions of the grove in this local area was cleared and some localized construction appeared to be taking place by 2004. By 2007 the park and/or recreation facilities included an asphalt-paved driveway and several sheds had been constructed. This area appears to no longer be in use, with the exception of parking for contractor vehicles/trailers.

Site Reconnaissance

A representative of Petra performed a site reconnaissance and photo documentation on December 4, 2023. Current access is via an asphalt driveway off Millsweet Place near the southeastern corner and a locked gate is also present at Victoria Avenue. Wire and/or chain link fencing surrounds the site. The majority of

the site is covered by an active orange grove with other miscellaneous mature trees located in other areas, with the exception of the southeasterly quadrant which has been partially improved with an asphalt driveway, a few sheds and miscellaneous playground-related equipment. These recreation facilities no longer appear to be in use; however, several contractor trailers and vehicles were currently parked within the site. A windmill structure is present near the center of the site along with overhead power poles for electricity. Overhead power lines are also located along the southwestern property line with La Sierra Avenue.

Underground irrigation lines are present throughout the property and although not observed, a water well may also be present. Two electric vaults were observed at the south corner and storm drain facilities are located at the north corner. The southeastern property edge appears to have undergone some minor grading, as evidenced by a noteworthy break in grade, and is clear of vegetation that may be related to an easement. In addition to the various trees, site vegetation consists of a variable growth of weeds, grasses and shrubs, and miscellaneous debris was randomly observed on the surface of the site. The site descends at relatively low grading to the northwest.

Literature Review

As noted, Petra has reviewed the preliminary geotechnical report and code update letter by Soil Exploration Company, Inc. for the subject property, as well as geologic and geotechnical maps and data it the nearby area. The most pertinent geotechnical findings made from reviewing the report are paraphrased herein with any commentary/discussion by Petra in parenthesis and italics.

SEC Geotechnical Investigation and Update Letter (2014, 2019)

- The field investigation included 4 hollow-stem auger borings to depths ranging from 15 to 25 feet and performing 3 infiltration tests at a depth of 2 feet. *(Petra: Due to limited access from the existing grove, the borings are primarily located in the middle portion of the site. The boring location map and logs are included as Appendix A herein for reference.)*

- In general, the site is underlain by alluvial soils consisting of silty sand, sandy silt and silty clay. The soils are loose near the surface and become dense to very dense and stiff below. Bedrock was encountered at depths of 15 to 20 feet. *(Petra: Based on the 4 borings logs, the alluvial soils are loose to at least 10 feet in depth and mainly consist of silty sand soil type. No consolidation or collapse tests were performed in the loose alluvium.)*

- Basic laboratory testing was performed for natural moisture content and dry density and sieve analysis. Based on observation of the soils, the expansion potential of near-surface soils is expected to be very low (*Petra: One sand equivalent test was performed in addition to two sieve tests. No tests were performed for soil expansion or corrosion potentials. Based on the lab data, site soils have appreciable fines content and soil expansion could also be in the low range.)*

- No groundwater was encountered in the borings. Historic groundwater is indicated to be at a depth of 10± feet and a well in the vicinity of the site indicated a depth to groundwater was 4.7 feet in 1974. (*Petra: One boring was advanced to the maximum explored depth of 25 feet in January of 2014 did not encounter groundwater.)*

- The site in an area of potential liquefaction, however considering the depth to bedrock at 15 and 20 feet, the potential for liquefaction at the site is low. The potential for seismically induced dynamic settlement would be mitigated by overexcavation and recompaction of near surface sandy soils. (*Petra: Based on current standards of practice, we have performed a supplemental liquefaction/dynamic settlement as described further below.)*

- The grading areas should be cleared of all vegetation, irrigation lines, roots, debris and deleterious materials which should be hauled offsite. Subsequent to site clearance and debris removal, the building areas should be overexcavated to a depth of at least 4 feet below ground or proposed grade, whichever is deeper, to expose underlying firm soils. Locally deeper overexcavation should not be precluded to expose competent soils. All foundations should be provided with at least 3 feet of compacted fill mat below the bottom of the footings. After overexcavation the exposed soils should be further scarified to a depth of at least 12 inches, watered and recompacted to at least 90 percent of the maximum dry density. (*Petra: Based on the data in the borings logs, the alluvial silty sand soils appear to be loose to about 10 feet below ground surface. Based on a lack of geotechnical engineering test data, we recommend a minimum removal or overexcavation depth of 6 to 7 feet below existing grades, as well as processing the exposed removal bottom in-place at least one foot in depth. Alternatively, additional exploratory borings and laboratory testing may be performed to confirm these preliminary recommendation depths.)*

- The use of shallow spread footings is feasible for proposed structures. The expansion potential of the onsite sandy soils is anticipated to be very low, however this should be verified subsequent to completion of site preparation. The soluble sulfate content of the foundation soils should also be determined subsequent to complete of grading. (*Petra: Based on the boring logs and reported lab data, site soils have appreciable fines content and soil expansion could also be in the low range. We also recommend corrosion screening laboratory testing for presence of sulfates, chlorides and corrosion to metallic elements.)*

- Three 8-inch diameter and two-feet deep test holes were excavated, and the soils were classified as silty sand. The field tests indicated an infiltration rate of 2.8, 4.5 and 17.9 inches per hour with no factor of safety applied. (*Petra: SEC test IT-1 is in the vicinity of the proposed water quality basin which had a test rate of 2.8 inches/hour at a depth of 2 feet below grade. Depending on the depth of the proposed basin, additional field infiltration testing may be warranted.)*

- The 2019 letter proved updated seismic parameters related to the 2016 CBC. (*Petra: We have provided updated seismic design parameters for the current 2022 CBC as included in Appendix B herein.)*

Local Area Geology and Soil Conditions

The subject property is situated on the medial portion of a broad alluvial fan descending at a moderate gradient northwesterly from the nearby El Sobrante mountain just to the south. The general area is underlain predominantly by young surficial alluvial deposits further underlain by dense older alluvial fan deposits.

Topsoil and Artificial Fill – A presumed topsoil horizon and/or localized surficial artificial fill mantels the site to an anticipated depth of approximately 1 or 2 feet across the surface of the property. These materials generally consist of dry and very loose silty sand with organic material.

Younger Alluvium – Recent or young alluvium appears to be present beneath the topsoil horizon and these alluvial soils mainly consist of dry to moist, loose to medium dense, silty sands and occasional sandy silt. These soils appear to be loose to a depth of approximately 10 feet.

Older Alluvium – Older alluvium appears to be present beneath the upper young alluvium at depths of approximately 10 to 15 feet below surface grades. These soils mainly consist of moist, firm to stiff, sandy silts and sandy clays.

Granitic Bedrock – Bedrock, mostly likely weathered granite, were encountered within 3 of the borings at depths of 15, 18.5 and 20 feet below surface grades. The upper 5 feet of the bedrock was readily excavated with the B-61 mobile hollow-stem auger drill utilized. Blow counts indicated medium dense to very dense conditions.

Groundwater

Groundwater levels in the nearby area have been reported to range from approximately 4.7 to 10± feet below surface grades in 1974 and on historic high groundwater maps respectively. Groundwater was not encountered within the borings advanced to a maximum depth of 25 feet below grade during January 2014 exploration. Free groundwater is not expected to be encountered during remedial grading at the present time.

Compressible Soils

Based on our field observations and the data on the SCE borings logs, the existing soils including all topsoils and the upper portions of low-density alluvial deposits, are deemed to be potentially compressible. As such, these materials are considered unsuitable for support of proposed fills, structures, pavement or other improvements and should be removed to expose the underlying competent alluvium or alluvial fan deposits. The removal soils may be subsequently placed as engineered (compacted) fill. The recommended remedial removal of natural alluvial soils us estimated to be at depths of approximately 6 to 7 feet below the existing ground surface along with processing the exposed removal bottom to a depth of one foot in-place. Localized areas of deeper excavation/removal of unsuitable soils could be necessary based on field observations during the course of grading and contingencies for such deeper should be planned considering past use within the site.

Strong Ground Motions

The site is located in a seismically active area of southern California and will likely be subjected to very strong seismic-related ground shaking during the anticipated life span of the project. Structures within the site should therefore be designed and constructed to resist the effects of strong ground motion in accordance with the provisions of the 2022 California Building Code (2022 CBC).

Updated Liquefaction/Dynamic Settlement Potential

General

Based on a review of the Riverside County Land Information System the site is mapped as having a moderate to high potential for liquefaction. Accordingly, Petra has performed an updated liquefaction analyses using the data provided in SEC, 2014 report to determine the liquefaction settlement potential in accordance with 2022 CBC requirements within the site.

Seismically Induced Settlement

Petra has reanalyzed the boring data with respect to potential for liquefaction and dry sand settlement within the site development. The analysis was performed following the guidelines contained in Special Publication 117A published by the California Geological Survey (1997, Revised 2008) and those in the 2022 California Building Code (2022 CBC). Considering the sandy nature of some of the onsite deposits, seismically induced settlement within the site is calculated to be on the order of 1 to 1 ½ inches across the site.

Based on our calculations, the differential settlement between various locations within the site is not expected to exceed 1 inch in 40 feet, which is considered well within tolerable limits for seismic differential settlement.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on our recent reconnaissance and review of existing preliminary SCE report and data, development of the subject project site is considered feasible from a geotechnical engineering standpoint. It is recommended that the following geotechnical issues be considered by the Client during this due diligence period.

Primary Geotechnical Issues

Our professional opinion, from a geotechnical engineering viewpoint, regarding various aspects of the site existing conditions and the proposed development is presented within this letter report. The following

presents the salient features of our due diligence assessment that we recommend being considered for future site development.

- Rough Grading Plan Review and/or Updated Geotechnical Design Report: The city of Riverside may request a geotechnical update report during project approvals as well as review and signing of the future rough grading plans. The geotechnical report should include updated recommendations for site remedial and rough grading, post-grading improvements and *preliminary* building foundation design based on the current 2022 California Building Code. Minor modified recommendations could be warranted based on proposed slopes and/or retaining wall designs.

- Demolition of Improvements, Clearing and Grubbing: All existing trees and vegetation, and existing site improvements, such as power lines, a windmill structure, foundations or buried irrigation lines will need to be cleared or demolished and removed from the site. Other buried utility lines could be present within or along the boundaries of the site. All other dumped debris and/or other deleterious materials found within the site will also require clearing and hauling offsite. Based on the past site usage, we further recommend that the grading contractor provide a dedicated crew to removing all trees roots, irrigation pipes and/or debris encountered during grading and fill operations.

- Removal of Unsuitable Soil Materials: The existing topsoil and upper portions of young alluvium will require removal and replacement as compacted fill. Based on Petra's review of the existing boring data, we recommend an the upper 6 to 7 feet of existing soils should be removed to competent alluvial soils and replaced as compacted fill, however this should also be confirmed during grading by in-situ density testing of the removal bottoms, exhibiting a minimum of 85 percent relative compaction. Deeper removals are always possible depending on the exposed natural soils, and contingencies should be considered as with any large grading operation.

- Suitability of Onsite Soils for Fill: Onsite soils are considered suitable for use in engineering fill provided they are free of organics/roots or other deleterious materials. The shallow subsurface sandy soils may be in a dry condition to a depth of several feet and pre-watering of the site is highly recommended prior to site grading. As noted above, based on the historical site usage, the grading contractor should provide a dedicated crew to removing all organics, tree roots, debris or other deleterious materials encountered during remedial grading and fill placement operations.

- Importing of Fill: Preliminary grading calculations should account for remedial alluvial removal and overexcavation depths, as well as for soil shrinkage when recompacted as fill. Based on the loose alluvial soils, shrinkage when replaced as compacted fill could be on the order of 15± percent, however that is a qualitative estimate and not based on any calculations. In the event imported soil material is needed to complete the project, all potential import source(s) should be evaluated at least one week prior to confirm that non-expansive, low corrosive soils that are free of deleterious materials or environmental contaminants will be imported.

- Liquefaction and Dynamic Settlement Potential: Based on Riverside County hazard maps, the site is located in a high zone for liquefaction potential most likely due to historic high groundwater depths many decades ago. Based on the report and analysis by SEC liquefaction settlement was considered low due the presence of hard bedrock at 15 to 20 feet below the surface.

  Based on our updated analysis, the potential for seismically induced settlement is on the order of 1 to 1½ inches under the unlikely scenario of high groundwater level of 5 feet below ground surface.

- Soil Expansion and Corrosion Potential and Building Foundation Design: Local area soils are expected to have a very low expansion potential; however, low expansive soils could potentially be encountered during site grading. Supplemental sampling and testing of site soils for expansion and corrosion is recommended during the next phase of geotechnical report submittals.

- Foundation Design: The seismic and foundation design recommendations for the residential buildings should be provided in accordance with the current 2022 California Building Code (2022 CBC). Conventional foundations are feasible, and Appendix B contains preliminary foundation design based on the assumed future very low expansion as-graded soil conditions. Modifications may be warranted depending on the soil types placed at finish pad grades follow site grading.

- Infiltration Design: SEC reported infiltration rates of 2.8, 4.5 and 17.9 inches/hour at a test depth of 2 foot below grade within the site. Depending on the proposed infiltration basin depths, additional testing may be needed.

- Preliminary Pavement Design: Based on the observed soil types, moderate R-values are expected which will allow for a City of Riverside minimum pavement design presumably 4 inches of asphalt over 6 inches of base material for the interior streets. Final pavement design should be performed at the completion of street rough grading with final R-value testing.

REPORT LIMITATIONS

This report is based on the existing observed surficial conditions and the geotechnical document review for the subject site. The conclusions and opinions contained in this report are based on the results of the described geotechnical evaluations, primarily the 4 borings performed near the center of the site, very limited laboratory testing and our professional judgment. This report has been prepared consistent with that level of care being provided by other professionals providing similar services at the same locale and in the same time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

This opportunity to be of service is sincerely appreciated. If you have any additional questions or concerns, please feel free contact this office.

Respectfully submitted,

PETRA GEOSCIENCES, INC.

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CEG 2477

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DJ/SJ/kb

Attachments: References
Appendix A – SEC Exploration Map and Boring Logs
Appendix B – Tentative Preliminary Foundation Design Recommendations and Seismic Parameters

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APPENDIX A

SEC EXPLORATION MAP AND BORING LOGS


VICTORIA AVENUE
WIRE FENCE
B-1
I-1
WIRE FENCE
I-2
B-2
MILLSPORT PLACE
WIRE FENCE
B-3
B-4
I-3
LA SIERRA AVENUE
N
WIRE FENCE
EXPLORATORY BORING & INFILTRATION TEST LOCATION MAP
PLATE 1
LEGEND
B-4 ● Approximate Location of Boring
I-3 ▲ Approximate Location of Infiltration Test
Soil Exploration Co., Inc.
Project No. 13167-01 January 24, 2014
Base Map: Provided by Client

GEOTECHNICAL BORING LOGS

Drill Hole No. B-1

Date: January 17, 2014
Drilling Company: WDI
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 13167-01
Type of Rig: B-61
Elevation: 816±

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1	Alluvium					SM	**SILTY SAND:** Light brown, fine to coarse grained, dry, medium dense
2							
3							
4		■	4/8/10	108.4	3.4		Dry, medium dense, micaceous % Passing No. 200 Sieve = 43 SE = 18
5							
6		X	3/4/4	-	-		Slightly moist, loose
7							
8							
9							
10							
11		X	3/6/4	-	-		Medium dense
12							
13							
14							
15							
16		X	7/9/11	-	-	ML	**SANDY SILT:** Light brown, slightly moist, stiff
17							
18							
19							
20							
21	Bedrock	X	15/37/50	-	-	SM	**SILTY SAND:** Light brown, fine to coarse grained, very dense
22							
23							Very dense
24							TOTAL DEPTH = 25 FEET NO GROUNDWATER
25		X	19/39/50				NO CAVING BORING BACKFILLED

GEOTECHNICAL BORING LOGS

Drill Hole No. B-2

Date: January 17, 2014
Drilling Company: WDI
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 13167-01
Type of Rig: B-61
Elevation: 818.5±

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1	Alluvium					SM	**SILTY SAND:** Light brown, fine to medium grained, slightly moist, loose, micaceous
2							
3							
4		X	2/2/2	-	-		Loose SE = 29
5							
6		■	3/4/4	113.3	13.1	ML	**SANDY SILT:** Light brown, moist, loose, micaceous % Passing No. 200 Sieve = 59
7							
8							
9							
10							
11		X	2/3/3	-	-		Loose
12							
13							
14						CL-ML	**SILTY CLAY:** Light brown, moist, stiff
15		X	7/9/13	-	-		
16							TOTAL DEPTH = 15 FEET NO GROUNDWATER NO CAVING BORING BACKFILLED
17							
18							
19							
20							
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: January 17, 2014
Drilling Company: WDI
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 13167-01
Type of Rig: B-61
Elevation: 822.5±

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1	Alluvium					SM	**SILTY SAND:** Light brown, fine to medium grained, dry, loose
2							
3							
4							
5							
6		X	3/4/4	-	-		
7							
8							
9							
10							
11		X	5/6/7	-	-	ML	**SANDY SILT:** Light brown, moist, stiff
12							
13							
14							
15							
16	Bedrock	X	7/9/13	-	-	SM	**SILTY SAND:** Light gray, weathered, medium dense
17							
18							
19							
20		X	9/17/22	-	-		
21							TOTAL DEPTH = 20 FEET NO GROUNDWATER NO CAVING BORING BACKFILLED
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-4

Date: January 17, 2014
Drilling Company: WDI
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 13167-01
Type of Rig: B-61
Elevation: 824±

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1	Alluvium					SM	**SILTY SAND:** Light brown, fine to medium grained, slightly moist, loose
2							
3							
4							
5							
6		X	3/4/5	-	-		Loose
7							
8							
9							
10							
11		X	5/5/5	-	-		Medium dense
12							
13							
14							
15							
16		X	5/8/11	-	-	ML	**SANDY SILT:** Light brown, slightly moist, stiff
17							
18							
19							
20	Bedrock	X	27/33/39	-	-	SM	**SILTY SAND:** Light brown, fine to coarse grained, very dense
21							TOTAL DEPTH = 20 FEET NO GROUNDWATER NO CAVING BORING BACKFILLED
22							
23							
24							
25							

APPENDIX B

TENTATIVE PRELIMINARY FOUNDATION DESIGN RECOMMENDATIONS AND SEISMIC PARAMETERS

Tentative Preliminary Foundation Design Recommendations

Foundation System

Based on the expectation that very low expansion potential soils will be present at finish pads grades following site grading, a conventional slab-on-ground foundation is recommended for the proposed residual buildings. This should be confirmed by additional testing at the completion of site grading.

Allowable Soil Bearing Capacities

Pad Footings

An allowable soil bearing capacity of 1,500 pounds per square foot may be utilized for design of isolated 24-inch-square footings founded at a minimum depth of 12 inches below the lowest adjacent final grade for pad footings that are not a part of the slab system and are used for support of such features as roof overhang, second-story decks, patio covers, etc. This value may be increased by 20 percent for each additional foot of depth and by 10 percent for each additional foot of width, to a maximum value of 2,500 pounds per square foot. The recommended allowable bearing value includes both dead and live loads, and may be increased by one-third for short duration wind and seismic forces.

Continuous Footings

An allowable soil bearing capacity of 1,500 pounds per square foot may be utilized for design of continuous footings founded at a minimum depth of 12 inches below the lowest adjacent final grade. This value may be increased by 20 percent for each additional foot of depth and by 10 percent for each additional foot of width, to a maximum value of 2,500 pounds per square foot. The recommended allowable bearing value includes both dead and live loads and may be increased by one-third for short duration wind and seismic forces.

For foundations to be located adjacent to property lines where complete removal and re-compaction of unsuitable surficial soil materials below the proposed foundations can be performed but the *horizontal* limits of remedial grading are restricted due to perimeter constraints, a maximum allowable bearing value of 1,200 pounds per square foot should be used. These conditions may affect foundations for retaining and landscape walls to be located along the tract boundaries if remedial grading cannot encroach into the adjacent properties. The need for special foundation design for these structures should be evaluated during grading based on the actual limits of remedial removals achieved by the grading contractor.

Estimated Footing Settlement

Based on the allowable bearing values provided above, total static settlement of the footings under the anticipated loads is expected to be less than ¾ inch. Differential settlement is expected to be less than ½ inch over a horizontal span of 30 feet. The majority of settlement is likely to take place as footing loads are applied or shortly thereafter.

Lateral Resistance

A passive earth pressure increasing at a rate of 250 pounds per square foot per foot of depth, to a maximum value of 2,500 pounds per square foot, may be used to determine lateral bearing resistance for footings. In addition, a coefficient of friction of 0.40 times the dead load forces may be used between concrete and the supporting soils to determine lateral sliding resistance.

Lateral bearing and lateral sliding resistance may be combined without reduction. In addition, an increase of one-third of the above values may be used when designing for short duration wind and seismic forces.

The above values are based on footings placed directly against compacted fill. In the case where footing sides are formed, all backfill placed against the footings should be compacted to at least 90 percent of maximum dry density.

For foundations to be located adjacent to tract boundaries where complete removal and recompaction of unsuitable surficial soil materials *below* the proposed foundations can be performed but the *horizontal* limits of remedial grading are restricted due to perimeter constraints, a passive pressure of 150 pounds per square foot, per foot of depth, to a maximum value of 1,500 pounds per square foot, should be used to determine the lateral bearing.

Guidelines for Footings and Slabs on-Grade Design and Construction

Soils within the site are anticipated to exhibit expansion potential that is within the Very Low range (Expansion Index from 0 to 20). As indicated in Section 1803.5.3 of 2022 California Building Code (2022 CBC), these soils are considered non-expansive and, as such, the design of slabs on-grade is considered to be exempt from the procedures outlined in Sections 1808.6.2 of the 2022 CBC and may be performed using any method deemed rational and appropriate by the project structural engineer. However, the following minimum recommendations are presented herein for conditions where the project design team may require geotechnical engineering guidelines for design and construction of footings and slabs on-grade the project site.

The design and construction guidelines that follow are based on the above soil conditions and may be considered for reducing the effects of variability in fabric, composition and, therefore, the detrimental behavior of the site soils such as excessive short- and long-term total and differential settlements. These guidelines have been developed on the basis of the previous experience of this firm on projects with similar soil conditions. Although construction performed in accordance with these guidelines has been found to reduce post-construction movement and/or distress, they generally do not positively eliminate all potential effects of variability in soils characteristics and future settlement.

It should also be noted that the suggestions for dimension and reinforcement provided herein are performance-based and intended only as preliminary guidelines to achieve adequate performance under the anticipated soil conditions. However, they should not be construed as replacement for structural engineering analyses, experience and judgment. The project structural engineer, architect and/or civil engineer should make appropriate adjustments to slab and footing dimensions, and reinforcement type, size and spacing to account for internal concrete forces (e.g., thermal, shrinkage and expansion), as well as external forces (e.g., applied loads) as deemed necessary. Consideration should also be given to minimum design criteria as dictated by local building code requirements.

Conventional Slabs on-Grade System

Given the very low expansion potential by onsite soils expected to be present at finish pad grades, we recommend that footings and floor slabs be designed and constructed in accordance with the following minimum criteria.

Footings

1. Exterior continuous footings supporting one- and two-story structures should be founded at a minimum depth of 12 inches below the lowest adjacent final grade, respectively. Interior continuous footings may be founded at a minimum depth of 10 inches below the top of the adjacent finish floor slabs.

2. In accordance with Table 1809.7 of 2022 CBC for light-frame construction, all continuous footings should have minimum widths of 12 inches for one- and two-story construction. We recommend all continuous footings should be reinforced with a minimum of two No. 4 bars, one top and one bottom.

3. A minimum 12-inch-wide grade beam founded at the same depth as adjacent footings should be provided across garage entrances or similar openings (such as large doors or bay windows). The grade beam should be reinforced with a similar manner as provided above.

4. Interior isolated pad footings, if required, should be a minimum of 24 inches square and founded at a minimum depth of 12 inches below the bottoms of the adjacent floor slabs. Pad footings should be reinforced with No. 4 bars spaced a maximum of 18 inches on centers, both ways, placed near the bottoms of the footings.

5. Exterior isolated pad footings intended for support of roof overhangs such as second-story decks, patio covers, and similar construction should be a minimum of 24 inches square and founded at a minimum depth of 18 inches below the lowest adjacent final grade. The pad footings should be reinforced with No. 4 bars spaced a maximum of 18 inches on centers, both ways, placed near the bottoms of the footings. Exterior isolated pad footings may need to be connected to adjacent pad and/or continuous footings via tie beams at the discretion of the project structural engineer.

6. The minimum footing dimensions and reinforcement recommended herein may be modified (increased or decreased subject to the constraints of Chapter 18 of the 2022 CBC) by the structural engineer responsible for foundation design based on his/her calculations, engineering experience and judgment.

Building Floor Slabs

1. Concrete floor slabs should be a minimum 4 inches thick and reinforced with No. 3 bars spaced a maximum of 24 inches on centers, both ways. Alternatively, the structural engineer may recommend the use of prefabricated welded wire mesh for slab reinforcement. For this condition, the welded wire mesh should be of sheet type (not rolled) and should consist of 6x6/W2.9xW2.9 (per the Wire Reinforcement Institute, WRI, designation) or stronger. All slab reinforcement should be supported on concrete chairs or brick to ensure the desired placement near mid-depth. Care should be exercised to prevent warping of the welded wire mesh between the chairs in order to ensure its placement at the desired mid-slab position.

2. Living area concrete floor slabs and areas to receive moisture sensitive floor covering should be underlain with a moisture vapor retarder consisting of a minimum 10-mil-thick polyethylene or polyolefin membrane that meets the minimum requirements of ASTM E96 and ASTM E1745 for vapor retarders (such as Husky Yellow Guard®, Stego® Wrap, or equivalent). All laps within the membrane should be sealed, and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface cannot be achieved by grading, consideration should be given to lowering the pad finished grade an additional inch and then placing a 1-inch-thick leveling course of sand across the pad surface prior to the placement of the membrane.

   At the present time, some slab designers, geotechnical professionals and concrete experts view the sand layer below the slab (blotting sand) as a place for entrapment of excess moisture that could adversely impact moisture-sensitive floor coverings. As a preventive measure, the potential for moisture intrusion into the concrete slab could be reduced if the concrete is placed directly on the vapor retarder. However, if this sand layer is omitted, appropriate curing methods must be implemented to ensure that the concrete slab cures uniformly. A qualified materials engineer with experience in slab design and construction should provide recommendations for alternative methods of curing and supervise the construction process to ensure uniform slab curing. Additional steps would also need to be taken to prevent puncturing of the vapor retarder during concrete placement.

3. Garage floor slabs should be a minimum 4 inches thick and reinforced in a similar manner as living area floor slabs. Garage slabs should also be poured separately from adjacent wall footings with a

positive separation maintained using ¾-inch-minimum felt expansion joint material. To control the propagation of shrinkage cracks, garage floor slabs should be quartered with weakened plane joints. Consideration should be given to placement of a moisture vapor retarder below the garage slab, similar to that provided in Item 2 above, should the garage slab be overlain with moisture sensitive floor covering.

4. Presaturation of the subgrade below floor slabs will not be required; however, prior to placing concrete, the subgrade below all dwelling and garage floor slab areas should be thoroughly moistened to achieve a moisture content that is at least equal to or slightly greater than optimum moisture content. This moisture content should penetrate to a minimum depth of 12 inches below the bottoms of the slabs.

5. The minimum dimensions and reinforcement recommended herein for building floor slabs may be modified (increased or decreased subject to the constraints of Chapter 18 of the 2022 CBC) by the structural engineer responsible for foundation design based on his/her calculations, engineering experience and judgment.

SOIL
EXPLORATION
COMPANY, INC.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

January 24, 2014

Project No. 13167-01

TO: Adkan Engineers
6879 Airport Dr.
Riverside, CA 92504

ATTENTION: Charissa Leach, P.E.

SUBJECT: Preliminary Geotechnical Investigation/Liquefaction Evaluation/Infiltration Tests Report, Proposed 8.8± Acre, 14 Lot Residential Subdivision, SEC of Victoria Avenue and La Sierra Avenue (APN 136-220-016), City of Riverside, California

Introduction

In accordance with your authorization, Soil Exploration Co., Inc. has conducted a preliminary soil investigation and liquefaction analysis for the subject site (see Figure 1, Site Location Map). The accompanying report presents a summary of our findings, conclusions, recommendations and limitations of our work for the site development.

Scope of Work

- Review soils, geologic, seismic, groundwater data, maps and nearby site reports in our files.
- Perform exploration of the site by means of three or four borings varying in depth from 15 to 25 feet below existing ground surface at readily accessible locations.
- Field engineer for logging, sampling of select soils, observation of excavation resistance, record SPT blow counts, and water seepage (if any).
- Perform basic laboratory testing of select soil samples, including moisture, density, sieve analysis and expansion index.
- Perform three shallow infiltration tests at readily accessible locations.
- Perform digitized search of known faults within a 50-mile radius of the site.
- Determine CBC (2010) seismic parameters.
- Consult with project design engineer.
- Prepare a report of our findings, conclusions and recommendations for site preparation, including overexcavation/removal depth, liquefaction evaluation, allowable bearing value, foundation recommendations, footings/slab-on-grade depth/thickness, excavation characteristics, lateral earth pressures for retaining walls design, general earthwork and grading specifications, Cal/OSHA classification of soils, California Building Code (2010) seismic design coefficients and infiltration rate in inches/hour.

Site Conditions

The square shaped, 8.8± acre, flat site is located on the southeast corner of Victoria Avenue and La Sierra Avenue in the City of Riverside, California. Victoria Avenue is a paved road with AC curbs and La Sierra Avenue is a paved road with curbs, gutters and sidewalks. The site is bordered by a wire fence. Access to the site is from southeast corner via a driveway leading from cleared area on Millsweet Place. Vegetation throughout the site consists of small to medium size orange trees.

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The approximate locations of some of the above features are shown on the Exploratory Boring and Infiltration Test Location Map (Plate 1).

Proposed Development

We understand that the 8.8± acre site is proposed for a 14 lot, single family residential development. The structures will be of wood frame construction with concrete floor slabs supported on prepared subgrade. Based on the flat topography of the site, modest cut and fill grading and no significant cut or fill slopes are proposed.

Field Work

Four exploratory borings were drilled at the site on January 17, 2014, to a maximum depth of 25 feet below existing ground surface utilizing a B-61 mobile drill rig equipped with 8-inch diameter hollow stem auger. Standard Penetration Test (SPT) blow counts were recorded at regular intervals and utilized in determining the compactness/consistency of the earth materials.

In general, these borings revealed that the site is underlain by alluvial soils consisting of silty sand, sandy silt and silty clay (USCS "SM", "ML" and "CL-ML"). The soils are loose near the surface and become dense to very dense and stiff below. Bedrock was encountered at depths of 15 to 20 feet in Borings B-1, B-3 and B-4. Based on USGS Geologic Map, the site is underlain with alluvial fan deposits (see Figure 2). Envicom Plate VA shows the site is underlain with thin Pleistocene alluvium (10 feet to 200 feet thick).

Laboratory Testing

Basic laboratory tests were performed for select soil samples. The tests consisted primarily of natural moisture contents, dry densities and sieve analysis. Laboratory test results are presented in Appendix C and with Geotechnical Boring Logs (Appendix B).

Groundwater/Liquefaction

No groundwater was encountered in our exploratory borings at the time this work was performed. Based on referenced Carson & Matti map, the minimum historic groundwater is indicated to be at a depth of 10± feet. Well No. 679 in the vicinity of the site indicates the minimum depth to groundwater in 1974 was 4.7 feet.

Liquefaction occurs when loose, poorly graded, cohesionless soils are subject to ground shaking during an earthquake of large magnitude. The liquefaction potential is relatively higher when groundwater depths are less than 30 feet below ground surface. Based on referenced Envicom Map (Plate VA) and TLMA 1600-scale map dated September 26, 1997, the site is in an area of potential liquefaction.

Considering the depth to bedrock at 15 to 20 feet, the potential for liquefaction at the site is low.

Seismicity/Faulting

A computer search of all known Quarternary major faults within 50 miles of the site is presented in Appendix D. The computer search was performed by EQFAULT (Version 3.00) software. Please note that it is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Conclusions

- Vegetable matter, trees, roots, existing structures, old foundations, underground structures, old fills, buried utilities/irrigation lines, etc. and deleterious materials would require removal from the proposed improvement areas.

- Overexcavation and recompaction of surficial soils in building areas should be anticipated to provide adequate and uniform support for the proposed structures.

- The earth materials encountered during our exploration can be excavated with normal grading equipment in good working condition.

- The onsite soils, exclusive of deleterious material, debris, roots, etc., may be used as compacted fill materials.

- Based on observation and soil classification, the expansion potential of the near-surface soils at the site is expected to be very low (EI<20).

- The use of shallow foundations is feasible for the proposed light weight, residential construction.

- Site is located approximately 8.5 and 8.6 miles from the Chino-Central Ave. (Elsinore) and Elsinore-Glen Ivy faults, respectively. The site is located in a region of generally high seismicity, as is all of Southern California. During its design life, the site is expected to experience moderate to strong ground motions from earthquakes on regional and/or nearby causative faults.

- There is a 10 percent probability in 50 years that ground acceleration at the site will exceed 0.425g (see Appendix D).

- Based on referenced Envicom Map (Plate VA) and County of Riverside TLMA Geotechnical/Liquefaction Map, dated September 26, 1997, the site is in an area of potential liquefaction. Based on the bedrock at shallow depth and dense to very dense earth materials, the liquefaction potential at the site is low.

- The potential for seismically induced dynamic settlement of the near surface sandy soils during earthquake would be mitigated by overexcavation and recompaction as recommended below in the report.

- Based on Envicom Safety Element Map (Plate VB), the site is not in 100-year flood plain. However flood potential should be evaluated and considered in planning and design by civil engineering consultant.

- Groundwater was not encountered during subsurface investigation. However our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We therefore recommend that local landscape irrigation and landscape irrigation from surrounding areas be kept to the minimum necessary to maintain plant vigor and that any leaking pipes/sprinklers, etc. should be promptly repaired. We have no way of predicting depth to the groundwater or perched water, which may fluctuate with seasonal changes and from one year to the next.