SOIL
EXPLORATION
COMPANY, INC.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

March 6, 2019

Project No. 16151-01

TO: Richard Ashby
3751 Nimble Circle
Huntington Beach, CA 92649

SUBJECT: Engineering Geologic Report/Response to City Review Comments, Proposed 70 Lot Single Family Residence Development, Tract 36911, City of Menifee, California

REFERENCE: Soil Exploration Co., Inc., "Preliminary Soil Investigation and Infiltration Tests Report, Proposed 75 Lot Single Family Residential Development, Tract 36911, City of Menifee, California", Dated June 13, 2017 (Project No. 16151-01).

Introduction

Per your authorization and in response to the City of Menifee review comments, an Engineering Geologic Report prepared by RGS Engineering Geology is attached. The City review comments are also attached to this report for easy reference.

Legible map (Plate 1) and Figure 4 with North arrow and scale in response to Comment 4 are included in pocket and attached.

The response to related geotechnical comments 6, 7, 8 and 9 is as follows:

Comment 6

Oversized materials can be placed as decorative rock at designated locations, exported from the site or placed in windrows per detail in our General Earthwork and Grading Specifications (Appendix E) of the referenced report. The detail is attached herein for easy reference.

Comment 7

The criteria for suitability of onsite soils for support of the fill should be based on at least 85 percent compaction, relative to maximum dry density, as determined by ASTM D1557-12 Test Method.

Comment 8

As indicated in the comment, per ACI guideline, concrete floor slabs may be placed directly over a moisture barrier. The moisture barrier should be at least 15 mil or thicker. Based on California Green Code, if adapted by the City, a 4-inch thick base of ½-inch or larger clean aggregate shall be used below the Visqueen.

Comment 9

R-value test will be performed on select/representative subgrade soil sample subsequent to rough grading and traffic index provided by the County. A traffic index of 5 is typical for interior cul-de-sac streets in Riverside County.

Closure

We sincerely hope that the above will suffice to expedite your City of Menifee review process. Should you have any questions or concerns regarding this response, please do not hesitate to call this office.

Very truly yours,
Soil Exploration Co., Inc.

REGISTERED PROFESSIONAL ENGINEER
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Sid A. Siddiqui, M.S., PE, GE 775
Principal Geotechnical Engineer

Distribution: [1] Addressee
[1] Adkan Engineers, Attn: Bryan Ingersoll (bingersoll@adkan.com)

Attachments: General Earthwork and Grading Specifications from Referenced Report
, RGS Engineering Geology Report and City Review Comments

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installations of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

2.0 EARTHWORK OBSERVATIONS AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observations so that he may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soil, poor moisture conditions, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the unsatisfactory conditions are rectified. Maximum dry density tests used to determine the degree of compaction will be performed in accordance with ASTM D1557-09 test method.

3.0 PREPARATION OF AREAS TO BE FILLED

3.1 Clearing and Grubbing

All brush, vegetation, and debris shall be removed or piled and otherwise disposed of.

3.2 Processing

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 Overexcavation

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such depth that surface processing cannot adequately improve the condition, shall be overexcavated down to firm ground, approved by the consultant.

3.4 Moisture Conditioning

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed, as required to attain a uniform moisture content near optimum.

3.5 Recompaction

Overexcavation and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm materials, and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5:1 (horizontal : vertical) shall be benched or otherwise overexcavated when considered necessary by the consultant.

3.7 Approval

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be approved by the consultant prior to fill placement.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of organic matter and other deleterious substances, and shall be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize

Oversize materials defined as rock, or other irreducible material with maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

4.3 Import

If importing fill material is required for grading; import material shall meet the requirements of Section 4.1.

5.0 FILL PLACEMENT and COMPACTION

5.1 Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at a uniform moisture content at or near optimum.

5.3 Compaction of Fill

After each layer has been evenly spread, moisture-conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 Fill Slopes

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5.5 Compaction Testing

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

6.0 SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of filling over the subdrain.

7.0 EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

8.0 TRENCH BACKFILLS

Trench excavations for utility pipes shall be backfilled under engineering supervision.

After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

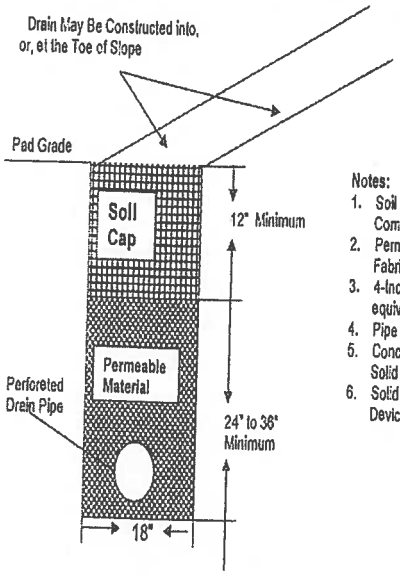
The onsite materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

The controlled backfill shall be compacted to at least 90 percent of the maximum dry density as determined by the ASTM D1557-09 test method.

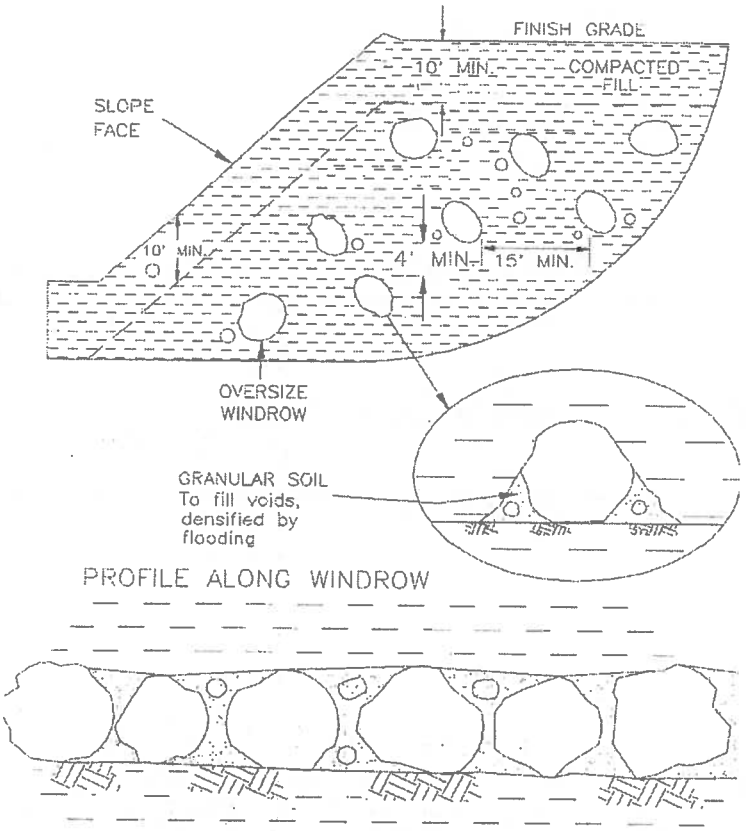
Field density tests and inspection of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.

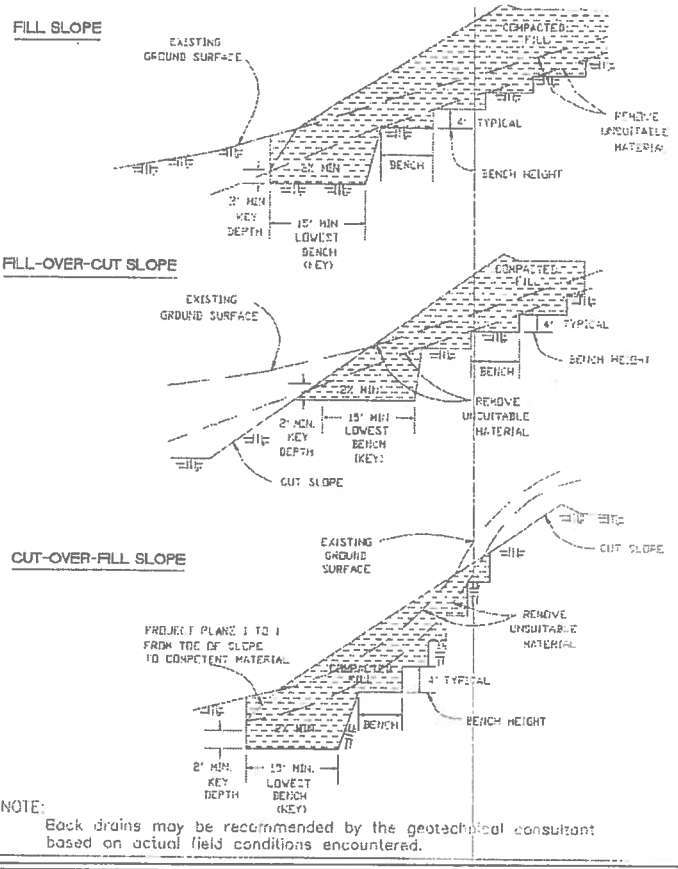
9.0 DETAILS

Toe of Slope Drain Detail

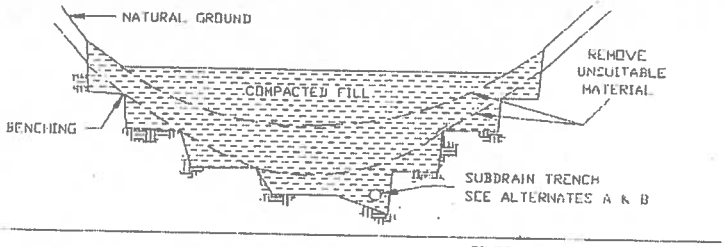


Notes:
1. Soil Cap Compacted to 90 Percent Relative Compaction.
2. Permeable Material May Be Gravel Wrapped in Filter Fabric (Mirafi 140N or equivalent).
3. 4-Inch Diameter Perforated Pipe (SDR 35 or equivalent) with Perforation Down.
4. Pipe to Maintain a Minimum of 1 Percent Fall.
5. Concrete Cutoff Wall to be Provided at Transition to Solid Outlet Pipe.
6. Solid Outlet Pipe to Drain to Approved Drainage Device

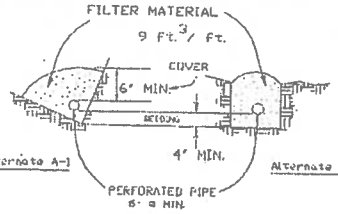




NOTE:
Back drains may be recommended by the geotechnical consultant based on actual field conditions encountered.



SUBDRAIN ALTERNATE A: Perforated Pipe Surrounded With Filter Material

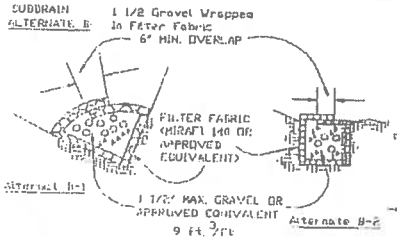


FILTER MATERIAL

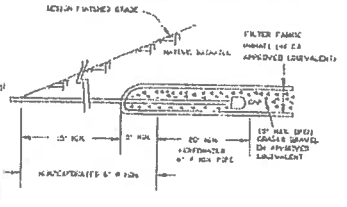
Filter material shall be Class 2 permeable material per State of California Standard Specifications, or approved alternate. Class 2 grading as follows:

SIEVE SIZE	PERCENT PASSING
1"	100
3/4"	90 - 100
3/8"	40 - 100
No. 4	25 - 40
No. 8	18 - 33
No. 30	5 - 15
No. 50	0 - 7
No. 200	0 - 3

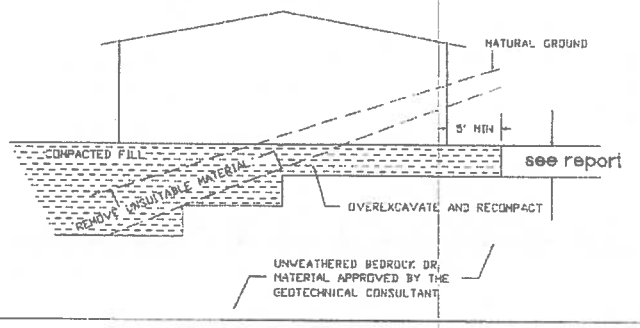
SUBDRAIN ALTERNATE B: 1 1/2 Gravel Wrapped In Filter Fabric



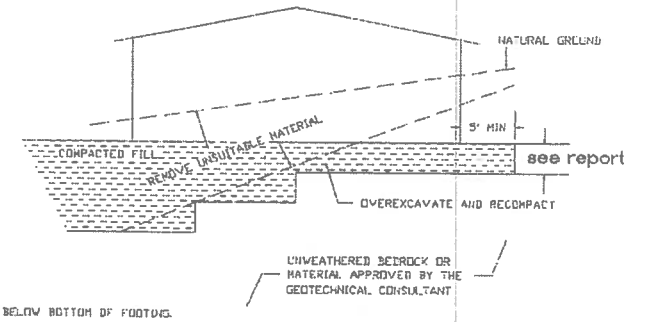
DETAIL OF CANYON SUBDRAIN TERMINAL



CUT-FILL LOT



CUT LOT



* BELOW BOTTOM OF FOOTING.

NOTE:
DEEPER OVEREXCAVATION AND RECOMPACTION SHALL BE PERFORMED IF DETERMINED TO BE NECESSARY BY THE GEOTECHNICAL CONSULTANT

R G S Engineering Geology

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(951) 315-3517

February 27, 2019

Gene Luu, PE
Soil Exploration Company, Inc.
7535 Jurupa Avenue
Riverside, California 92504

SUBJECT: **LIMITED ENGINEERING GEOLOGIC REPORT & RRESPONSE TO CITY COMMENTS,** Proposed 70-Lot Tract 36911, Menifee, California
SEC Project No. 16151-01, RGS Project No. 1740-01

Mr. Luu:

In accordance with your authorization, we have completed a Limited Engineering Geologic study of the subject property. The purpose of our investigation was to evaluate the engineering geologic aspects of the site relative to the proposed development and provide geologic recommendations for site design and construction in response to the City of Menifee review letter dated October 22, 2018. Our work is limited to the geologic conditions of the site and is intended to accompany a soil investigation by your firm to provide the required geotechnical documents for agency review and approval.

Our geological findings, conclusions, and recommendations are presented herein. Should you have any questions, or require additional information, please do not hesitate to contact our office.

Sincerely,
RGS Engineering Geology

Christopher Krall, CEG 1816
Engineering Geologist

Distribution: (1) Electronic Copy

ACCOMPANYING MAPS, ILLUSTRATIONS, AND APPENDICES

Figure 1 – Site Location Map
Figure 2 – Regional Geologic Map
Figure 3 – Site Geologic Map

APPENDIX A – References
APPENDIX B – City Review Letter

INTRODUCTION

SCOPE OF WORK

For this study, RGS conducted the following scope of work:

- Review related geologic and soils information available in our files.
- Site reconnaissance and geologic mapping of the immediate vicinity.
- Analysis and discussion of applicable geologic hazards to include faulting, seismicity, ground rupture, rockfall, liquefaction, and seismically induced settlement.
- Review and address the geologic aspects of items noted by the City of Menifee soil report review.
- Preparation of this report presenting our geologic findings, conclusions, and recommendations for site development.

Site Conditions

The subject site is located along the west side of Valley Boulevard at the intersection of Chambers Avenue in the western portion of Menifee, California (Figure 1). The site currently in a natural, vacant and undeveloped condition. Access is provided along many dirt roads and trails apparently used by off-road vehicle activity.

The easterly property boundary is marked by Valley Boulevard which exists as a half-constructed road (eastern half). The western half will be constructed as part of the subject Tract 36911. South of Chambers Avenue there is no curb, gutter, or sidewalk on the west side of Valley Boulevard. North of Chambers Avenue an asphalt berm is present. The north and northwest boundaries are delineated by pervious earthwork and grading associated with adjacent housing development. The south and southwest property lines are poorly marked with adjacent land remaining open and natural.

Topography varies from hillside terrain across the southern section, to relatively flat plain to the north. The site high elevation of approximately 1560 occurs near the southwest corner and the low elevation of approximately 1485 occurs near the northeast corner. This corresponds to total relief across the site on the order of 75 feet. Hillside gradients are moderately steep in the southern portion, approaching 2:1 (horizontal:vertical) locally. The northern portion is relatively flat sloping less than 3 percent toward the east.

Drainage is directed along small, poorly incised canyons in the southern section, and as sheet flow in the northern portion, toward the west where it is intercepted by Valley Boulevard and directed north and east. A drainage culvert has been constructed just north of Chambers Avenue directing run-off easterly into the regional storm drain system.

Site vegetation is limited to low-growing seasonal weeds, grasses, and shrubs native to this semi-arid environment of southern California.

Proposed Development

For the purpose of this report, we have been provided an updated copy of the Tentative Tract Map (No. 36911), 80-scale, prepared by Adkan Engineers of Riverside California dated February, 2019. The map notes the project owners as Recreational Land Investments, Inc. of Huntington Beach, California. In summary the site is 26.95 acres in size and zoned R-1 residential. The property is proposed for development of a housing tract including 70 lots of minimum 7200 square feet each with associated streets, utilities, and three WQMP stormwater detention basin.

Cut and fill grading will be conducted to achieve the proposed pad grades for homes and streets. Earthwork quantities are estimated as 138,692 cubic yards of cut and 108,506 cubic yards of fill with 30,186 cubic yards of export. These values do not appear to consider an allowance for shrinkage during the removal and re-compaction of unsuitable alluvial material.

Maximum cut is approximately 26 feet in the southwest corner near lots 32/33 and maximum fill is approximately 13 feet in the southeast corner near lots 45 and 52. Cut and fill slopes are proposed with a maximum inclination of 2:1 (horizontal:vertical) to a maximum height of 26 feet and 24 feet, respectively. Relatively small (less than 6 feet high) retaining walls are proposed locally to achieve design grade.

Following site earthwork, the proposed residential buildings will be supported on continuous spread footings with concrete slab-on-grade construction and wooden framing. Underground utilities to include sewer, water, storm drain, electric, gas, telephone/cable are also proposed. Streets will be constructed using asphaltic concrete over aggregate base with concrete curb and gutters.

Regional Geologic Setting

The subject site is situated within a natural geomorphic province in southern California known as the Peninsular Ranges which are one of California's eleven geomorphic provinces, each of which display distinct geologic and topographic features. The Peninsular Ranges are bordered to the east by the Salton Trough and to the north by the Transverse Ranges (San Bernardino, San Gabriel, and Santa Monica Mountains). The Peninsular Range province extends southerly to the Baja peninsula and westerly to the Pacific Ocean.

Elongated northwesterly-trending valleys and mountains structurally controlled by regional tectonic forces with elevated erosional surfaces generally characterize this province. The eastern portion of the province has been extensively uplifted by faulting and represents the highest and most rugged terrain including Mount San Jacinto at well over 10,000 feet elevation. From the east, the province gradually descends to the west toward the Pacific Ocean.

The Peninsular Ranges are traversed by numerous northwest trending faults creating and subdividing the province into many sub-parallel, northwest trending ranges and valleys. The northwesterly trending mountains and valleys are flanked by regional faults, which remain active today, including the San Andreas, San Jacinto, and Elsinore Fault zones. The regional geology is depicted on our Regional Geologic Map, Figure 2.

Local Geologic Setting

Locally, the site is mainly situated along an alluvial saddle separating Perris Valley to the north and Menifee Valley to the south. This area is underlain by very old alluvial fan material emanating from the crystalline bedrock hills protruding through the alluvium to the west and east (Figure 2). The older alluvial material here is comprised mostly of sand grains with minor clay particles and is described by Morton (2003) as mostly well-dissected, well indurated, reddish brown alluvial fan deposits. These materials are underlain by crystalline bedrock of the regional bedrock complex consisting of quartzite and quartz-rich metasandstone at this location.

SITE INVESTIGATION

Our geologic investigation of the site began with review of regional geologic literature and maps pertaining to the site including the project soil investigation conducted by Soil Exploration Company (SEC, 2017). This was followed by site reconnaissance and geologic mapping of the site and immediate vicinity and preparation of this report discussing the geologic site conditions.

SUMMARY OF FINDINGS

Earth Materials

Our review of geologic literature and field mapping indicates the site is underlain by very old alluvial fan deposits of early to mid-Pleistocene age. These materials were evaluated by SEC (2017) during their soil investigation which included 11 exploratory trenches and 1 boring. On-site subsurface exploration encountered two distinct earth units, alluvium, and bedrock, which are described below.

Alluvium – This material was encountered within each exploratory excavation and is reported to cover the entire site at the ground surface. Our site geologic mapping suggests that quartzite bedrock is exposed at the higher site elevations with a mantle of topsoil/older alluvium (Figure 3). The unit is described within the exploratory trenches as silty sand and silty sand with gravel (Unified Soil Classification – SM) that is light brown in color, fine to coarse grained, dry, medium dense, with a trace of gravel. Occasional cobbles 11"-19" in dimension were encountered and rootlets with associated pores were noted to depths of 5 feet in areas.

The alluvium deposits noted range in thickness from more than 13 feet in the northern portion of the site to less than 2 feet in the higher southern areas where it is likely topsoil over bedrock. Based on the descriptions given by SEC (2017) this material coincides with the early to mid-Pleistocene aged very old alluvial fan deposits (Qvof) mapped by Morton (2003).

Bedrock – Underlying the very old alluvial fan deposits across the entire site is crystalline bedrock of the regional basement complex. This material is described in the SEC (2017) report as quartz that is grayish to yellowish brown, fine to medium grained, angular, and very dense. This material coincides with the Mesozoic aged quartzite and quartzite-rich metasandstone (Mqz) mapped by Morton (2003) and cropping out at along the hillsides just west of the site.

Bedrock structure was evaluated based on local roadcuts and limited site exposure along the higher elevations. The quartzite is moderately to well fractured with a random fracture/joint pattern that predominately dips in excess of 45 to 50 degrees. The material is very dense, hard, and only slightly to moderately weathered near the ground surface.

Groundwater

No groundwater or seepage was observed during our field mapping, nor were signs of past water seepage (such as phreatophytes, rock staining, or moss) noted on-site. Groundwater was not encountered within on-site exploratory excavation to a depth of 16 feet (SEC, 2017). Groundwater is noted to occur at a depth of approximately 117 to 138 feet within local wells within 1 miles of the site (SEC, 2017).

In general, the very old alluvial fan deposits and underlying crystalline bedrock are not considered to represent significant groundwater aquifers and shallow groundwater is not anticipated to impact the proposed development or construction activities. However, groundwater seepage can occur within fractures and joints within the bedrock material and manifest along the basal contact of the older alluvial fan and underlying bedrock. This potential for this condition occurs during the winter and spring months following significant periods of heavy or prolonged rainfall and should be considered during site planning, design, and construction.

Considering this information, groundwater is not considered a significant hazard to the site area. Perched or seasonal seepage water, however, may be present and must be considered during all site planning and design.

Slope Stability

Cut Slopes: Cut slope construction will expose dense, hard, moderately fractured quartzite bedrock with a thin (less than 24-inch) mantle of topsoil. Cut sloe stability is largely dependent on the structural components of the bedrock which generally dip greater than 45 degrees based on local roadcut exposures. Considering the anticipated bedrock structure, we anticipate that cut slopes constructed at a 2:1 (horizontal:vertical) slope ratio, to a maximum height of approximately 30-ft, will be surficially and grossly stable provided they are constructed in accordance with the recommendations presented in the project geotechnical documents and under the super vision of the RGS. If cut slopes are planned higher than 30 feet or steeper than 2:1, RGS must conduct specific quantitative slope stability analysis based on site specific data for soil/rock strength and the proposed grades. All cut slope construction should be monitored by RGS and specific recommendations for cut slope construction should be made by our geologist based on the exposed bedrock conditions.

Fill Slopes: Properly compacted fill slopes constructed of on-site material and approved by the project soil engineer are expected to be stable at a maximum slope ratio of 2:1 to a height of up to 30 feet. If fill slopes are planned higher than 30 feet or steeper than 2:1, SEC must conduct specific quantitative slope stability analysis based on site specific data for soil/rock strength and the proposed grades.

The importance of proper fill compaction to the face of slope cannot be overemphasized. In order to achieve proper compaction to the slope face, one or more of the four following methods should be employed by the contractor following implementation of typical slope construction guidelines; 1) track walk the slopes at grade; 2) grid roll the slopes; 3) use a combination of sheep foot roller and track walking; and/or 4) overfill the slope 3 to 5-ft laterally and cut back or trim to grade.

Care should be taken to avoid spillage of loose materials down the face of any slope during grading. Loose fill on the face of the slope will require complete removal prior to compaction, shaping and track walking.

Proper seeding and planting of the slopes should follow as soon as practical to inhibit erosion and deterioration of the slope surfaces. Proper moisture control will enhance the long-term stability of the finish slope surface.

FAULTING AND SEISMICITY

Faulting

The site is not located within any California Fault Rupture Hazard Zone (Bryant and Hart, 2007) designated for known active faults, nor are any active faults known to traverse the site. More importantly the site lacks geomorphic features indicative of faulting such as offset drainage courses, topographic scarps, or sag ponds. Based on our review of regional geologic mapping, and our site specific geologic reconnaissance, the potential for fault rupture to impact the site is very low.

The nearest known active fault is the Glen Ivy North segment of the Elsinore Fault Zone which traverses northwest to southeast approximately 7.5 miles southwest of the site. The Elsinore Fault zone is comprised of many sub-parallel segments stretching for a total length of approximately 180 kilometers, not including splays of the Whittier and Chino faults along the north end and the Laguna Salada faults to the south. This fault system is one of the largest in southern California and is capable of large earthquakes on the order of 6.5 to 7.5 magnitude (Mw). The last major rupture was recorded on May 15, 1910 (magnitude 6) with no surface rupture noted. The fault has been assigned a slip rate of roughly 4.0 mm/yr with a recurrence interval of approximately 250 years (http://scedc.caltech.edu/significant/elsinore.html#glenivy).

Seismicity

The primary geologic hazard that exists at the site is that of ground shaking. The strength of earthquake-induced ground shaking is commonly measured as maximum or peak ground acceleration. Acceleration is defined as the time rate of change of velocity of a referenced point during an earthquake, commonly expressed in percentage of gravity (g). Its value at a particular site is a function of many factors, including, but not limited to, earthquake magnitude, distance to causative earthquake, various seismic-source parameters, site location relative to direction of energy propagation, and geologic conditions at the site.

Considering the location of the site relative to the regional faults, the site is likely to experience strong ground shaking during the design life of the proposed development. The contrast in shear wave velocities between the underlying bedrock and overlying older alluvium can amplify the ground motions. This condition should be considered during future seismic hazard design by following applicable seismic design standards per the California Building Code.

SECONDARY SEISMIC HAZARDS

Landslide Hazard

There are no landslides known to exist in the study area and the bedrock materials comprising the local hillsides west of the site are generally not susceptible to landslide failure. Considering the site location within relatively stable crystalline bedrock, the potential for landslide hazard to impact the site is very low.

Liquefaction

Soil liquefaction is the loss of soil strength due to increased pore water pressures caused by a significant ground shaking (seismic) event. Liquefaction typically consists of the re-arrangement of the soil particles into a denser condition resulting, in this case, in localized areas of settlement, sand boils, and flow failures. Areas underlain by loose to medium dense cohesion less soils, where groundwater is within 30 to 40 feet of the surface, are particularly susceptible when subject to ground accelerations such as those due to earthquake motion. The liquefaction potential is generally considered greatest in saturated loose, poorly graded fine sands with a mean grain size (D_{50}) in the range of 0.075 to 0.2mm.

Our review indicates that the property is underlain by very old alluvial deposits of early to mid-Pleistocene age and quartzite bedrock. Groundwater occurs at a depth of more than 100 feet below the ground surface locally. These geologic conditions are not susceptible to liquefaction hazard due to the consolidated condition of the earth material and depth to free water.

In summary, it is our opinion considering the location of the site and the underlying earth materials that the potential for liquefaction hazard to impact the proposed development is low.

Ground Rupture

Ground rupture usually occurs along pre-existing surface fault traces. As previously discussed, no active faults are known to traverse, or trend toward the site. Therefore, the potential for ground rupture during a seismic event is considered low.

Earthquake Induced Settlement

Considering the relatively dense condition of the earth material that underlies the site, and the recommendations for remedial processing of unsuitable soil material (SEC, 2017), the potential for settlement induced by seismic activity is considered low. Static settlement is expected to be mitigated by the site preparation recommendations of the soil report.

Rockfall

There are no rock outcrops located along hillsides on, or adjacent to the site, that could become dislodged during a seismic event and impact the proposed development. Rockfall hazard is not expected to impact the proposed development.

CONCLUSIONS

- The site is considered feasible for development from an engineering geologic standpoint provided the findings of this report are considered during site design and construction.
- The subject site is underlain by very old alluvial fan deposits and quartzite bedrock. Alluvial material is mainly comprised of fine to coarse grained sand (SM) but does include occasional cobbles to 19 inches in dimension. Deeper excavations to achieve design grade could generate moderate quantities of oversize materials (greater than 6-inches) that require special consideration for handling on-site or off-site disposal.
- Groundwater is estimated to occur approximately 117 to 138 feet below the site. Groundwater or seepage can occur along bedrock fractures and along the basal contact of the older alluvium and bedrock during periods of heavy or prolonged rainfall. This condition is not expected to impact the proposed development or construction activities, but must be considered during site planning, design, and construction.
- No active faults are known to traverse through or toward the site. Known active faults or seismic sources in the area include the Glen Ivy North fault of the Elsinore zone located approximately 7.5 miles to the southwest.
- The potential for secondary seismic hazards including liquefaction, ground rupture, rockfall and earthquake-induced settlement are considered low.
- Cut and fill slopes constructed to a maximum slope ratio of 2:1 and no higher than 30 feet will be grossly and surficially stable provided they are properly constructed under the supervision of RGS and SEC.

RECOMMENDATIONS

Plan Review

RGS should review development plans at 40-scale relative to the geologic site conditions identified when they are available. Additional field studies and recommendations specific to the planned development should be provided at that time.

Site Preparation and Processing of Unsuitable Material

The referenced soil investigation (SEC, 2017) indicates that material unsuited for the support of the proposed fills and structures are present on site and recommends that all structures should be provided with a compacted fill mat, extending 5 feet beyond the structure lines in plan and to a depth of at least 4 feet below the existing grade.

It is our opinion that all unsuitable older alluvial material be over excavated and recompacted to a minimum of 4 feet below the existing ground surface or below proposed grade in cut areas, whichever is greater. Where fill is to be placed, over excavation of the older alluvial material should be of sufficient depth to remove all poorly consolidated material with an in-place density of less than 85% of the maximum dry density determined by the ASTM 1557 test method. Care must be exercised to also remove all porous soil that may be susceptible to hydro-collapse when wetted or put under the normal load of proposed fill. The porosity and suitability of any and all native older alluvial materials should be evaluated by RGS by inspection and approval during grading.

Bedrock material is considered suitable for the support of structural fill and buildings. Where bedrock is exposed by cut at pad grade, over excavation and re-compaction of the bedrock material to a depth of 4 feet is recommended to assure uniform support of the building.

Canyon Clean-Outs and Sub-Drains

Where unsuitable alluvial material is removed along natural canyons or drainage courses, sub-drains should be considered to assure drainage of seepage from underlying bedrock is adequately dissipated. The specific need and design of the sub-drains should be determined by RGS based on the field conditions exposed during grading.

In general, however, subdrains should consist of 4-inch perforated pipe surrounded by 9 cubic feet of ¾ inch gravel wrapped in filter fabric. The drains can be installed within a trench excavation or v-ditch into the bedrock material. In either case the canyon bottom must be shaped or sloped toward the subdrain to assure proper drainage by gravity flow.

The subdrain must maintain positive slope for gravity flow and should outlet into a permanent storm drain or other approved facility. Where the sub-drain needs to cross artificial fill material a concrete cut off wall should be provided, and solid pipe used to traverse the fill material.

Seismic Design Parameters

Seismic design parameters should conform to the 2016 California Building Code, Section 1613A. Considering the physical characteristics of the older alluvial deposits, an estimated site class of 'D' can be considered for structural design of improvements in the lower elevations of the site and site class "C" for areas underlain by quartzite bedrock in accordance with Minimum

Design Loads for Buildings and Other Structures (ASCE 7-10, Chapter 20, Table 20.3-1, Site Classification).

Excavation Characteristics

The very old alluvial deposits are well indurated and cemented locally. Field exploration encountered practical refusal in many trenches at various depths. The underlaying quartzite bedrock is also very hard and difficulty with excavation is likely where the material is massive or poorly fractured.

All site excavation should be conducted by heavy-duty earth moving equipment in proper working condition. Excavation characteristics for specific planned improvements should be determined when available. In general, however, excavations of greater than 10 feet within bedrock material may encountered significant resistance and the need for bedrock 'breaking' or blasting cannot be ruled out.

Surface Drainage

Surface drainage should be directed away from site improvements in a controlled manner. All drainage should be directed toward streets or natural drainage patterns. Where landscaping and planters are proposed adjacent to foundations, subsurface drains should be provided to prevent standing water or saturation of soil by landscape irrigation water.

Grading/Foundation Plan Review

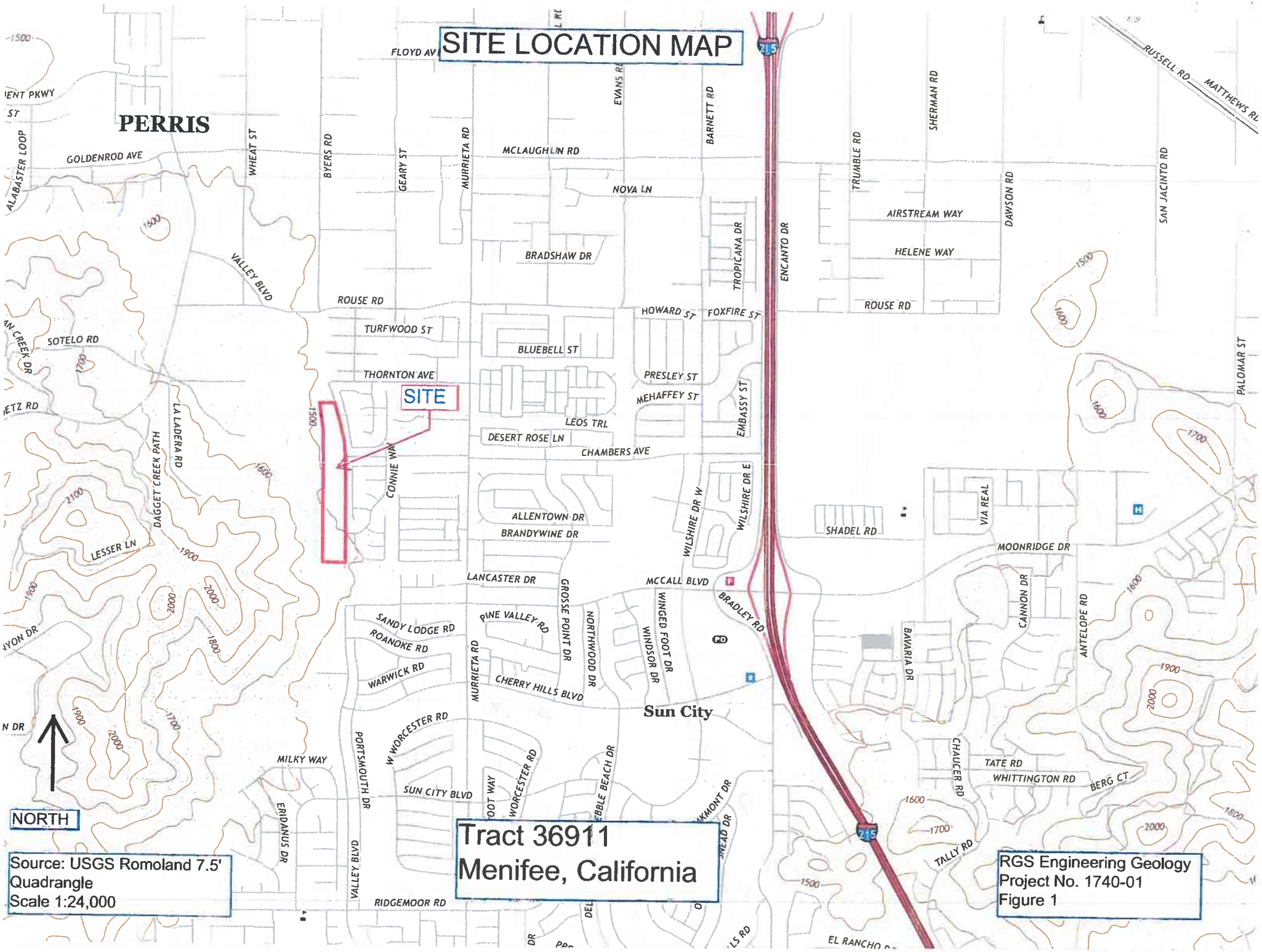
The final grading/foundation plans (40-scale or better) should be reviewed by RGS and the project geotechnical consultant when available to assure that the recommendations of this report are consistent with the proposed grading. Additional field and laboratory services may be required at that time depending on the earthwork proposed.

CLOSURE

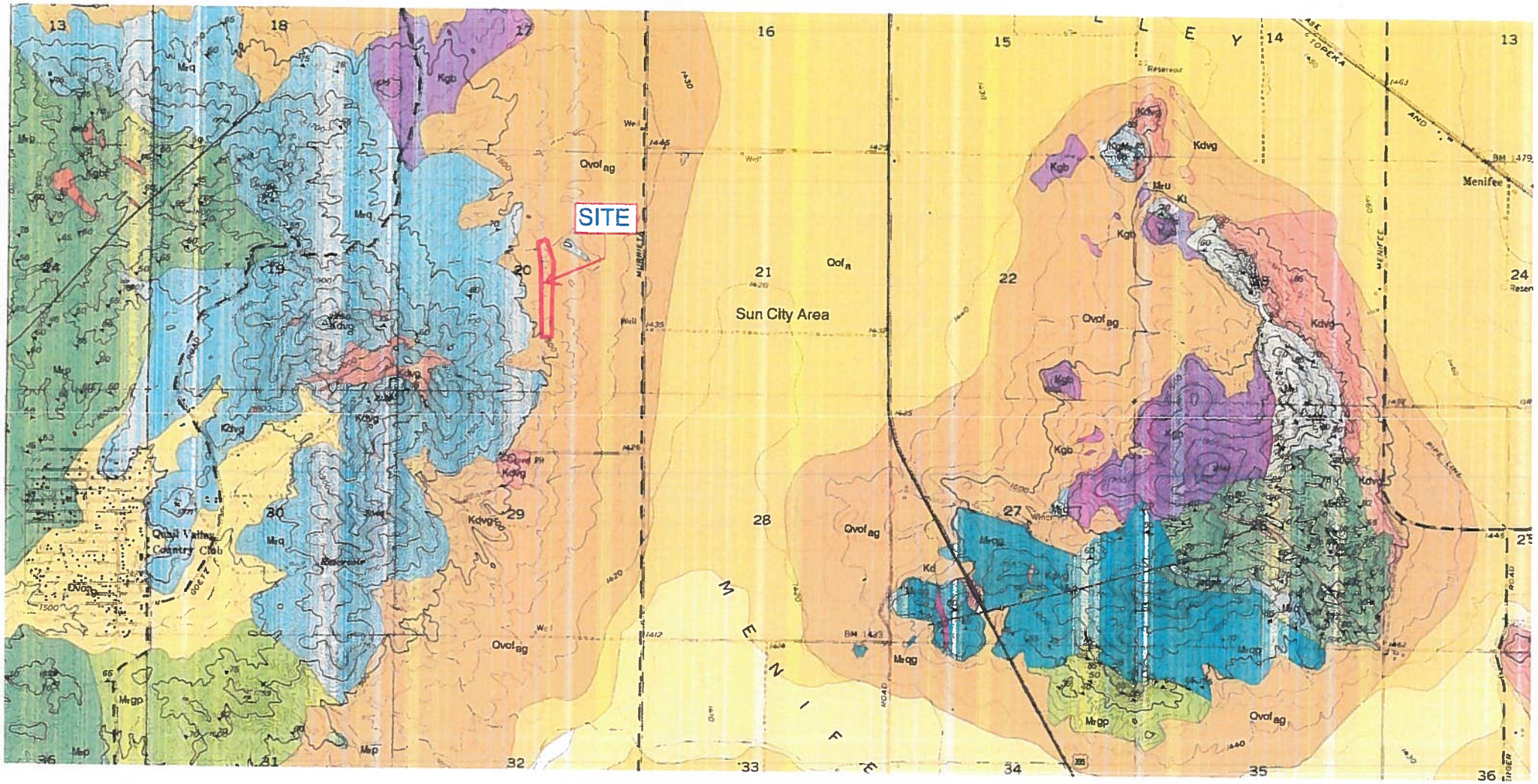
Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this and other localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The samples taken and used for testing, and the observations made are believed to be representative of the entire project; however, soil and geologic conditions can vary significantly between test locations. As in most projects, conditions revealed during construction may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the project geotechnical engineer and/or geologist and designs adjusted as required or alternate designs recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representatives, to ensure the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps taken to see that the contractor and subcontractors carry out such recommendations in the field. This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions herein to be unsafe. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.


SITE LOCATION MAP
PERRIS
SITE
Sun City
NORTH
Source: USGS Romoland 7.5' Quadrangle
Scale 1:24,000
Tract 36911
Menifee, California
RGS Engineering Geology
Project No. 1740-01
Figure 1
FLOYD AV
GOLDENROD AVE
WHEAT ST
BYERS RD
GEARY ST
MURRIETA RD
MCLAUGHLIN RD
EVANS RD
BARNETT RD
NOVA LN
BRADSHAW DR
TROPICANA DR
ENCANTO DR
TRUMBLE RD
SHERMAN RD
RUSSELL RD
MATTHEWS RD
AIRSTREAM WAY
HELENE WAY
DAWSON RD
SAN JACINTO RD
ROUSE RD
HOWARD ST
FOXFIRE ST
TURFWOOD ST
BLUEBELL ST
THORNTON AVE
PRESLEY ST
MEHAFFEY ST
EMBASSY ST
LEOS TRL
DESERT ROSE LN
CHAMBERS AVE
CONNIE WAY
VALLEY BLVD
SOTELO RD
LA LADERA RD
DAGGET CREEK PATH
LESSER LN
ALLENTOWN DR
BRANDYWINE DR
WILSHIRE DR W
WILSHIRE DR E
SHADEL RD
VIA REAL
MOONRIDGE DR
PALOMAR ST
LANCASTER DR
GROSSE POINT DR
NORTHWOOD DR
MCCALL BLVD
BRADLEY RD
WINGED FOOT DR
WINDSOR DR
CANNON DR
ANTELOPE RD
BAVARIA DR
SANDY LODGE RD
ROANOKE RD
WARWICK RD
PINE VALLEY RD
CHERRY HILLS BLVD
MURRIETA RD
W WORCESTER RD
PORTSMOUTH DR
MILKY WAY
SUN CITY BLVD
WORCESTER RD
EBBLE BEACH DR
CHAUCER RD
TATE RD
WHITTINGTON RD
BERG CT
TALLY RD
RIDGEMOOR RD
VALLEY BLVD
ERIDANUS DR
EL RANCHO
215

REGIONAL GEOLOGIC MAP



Source: Morton, 2003
Scale 1:24,000

North

Tract 36911
Menifee, California

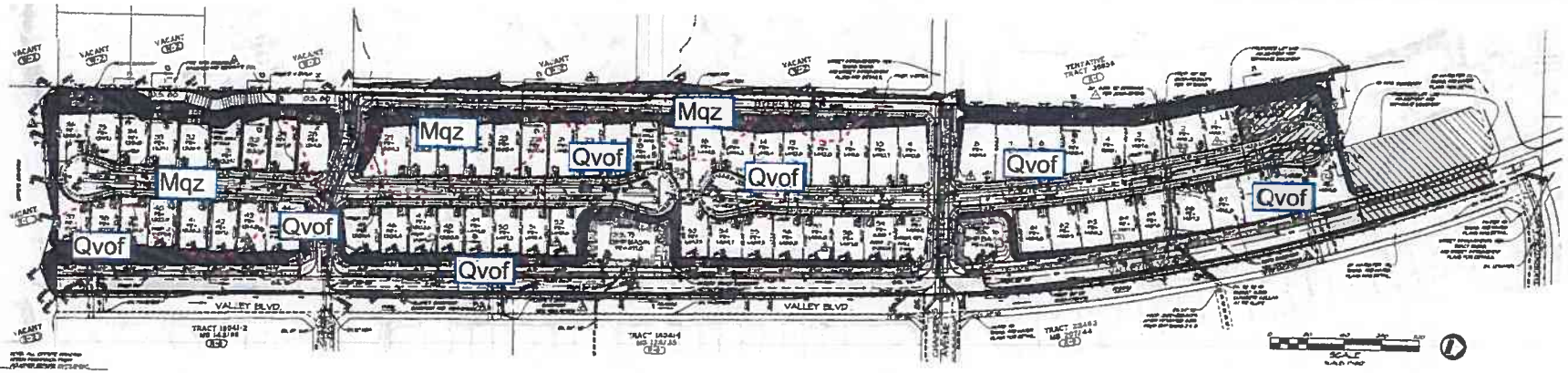
RGS Engineering Geology
Project No. 1740-01
Figure 2

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

TENTATIVE TRACT NO. 36911

SITE GEOLOGIC MAP

RGS



LEGEND

PROJECT NOTES

EARTHWORK QUANTITIES

ASSESSORS PARCEL NUMBERS

BASE ELEVATION DETAILS

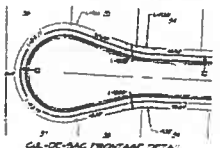
LOT SIZING TABLE

LOT MATRIX

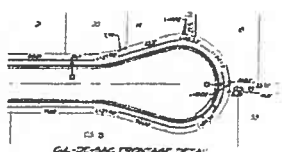
LOT MATRIX CONTINUED

VICINITY MAP

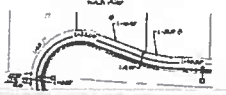
SEC.30 T5S. R3W.



GARDENBAG FRONTAGE DETAIL



GARDENBAG FRONTAGE DETAIL

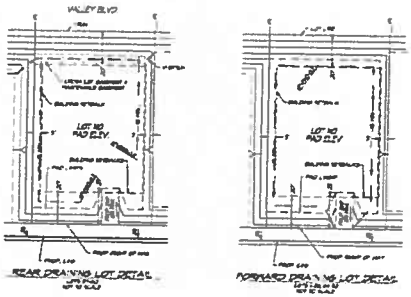


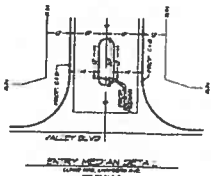
GEOLOGIC LEGEND

- Approximate Geologic Contact

Qvof - Very Old Alluvial Fan deposits

Mqz - Bedrock - Quartzite





LEGAL DESCRIPTION

OWNER

RECREATIONAL LAND INVESTMENTS, INC.

APPLICANT

RECREATIONAL LAND INVESTMENTS, INC.

ENGINEER

BENCHMARK

BASIS OF BEARINGS

EASEMENT NOTES

TENTATIVE TRACT SUMMARY

OPEN SPACE LOTS

UTILITY PURVEYORS

APPENDIX A

REFERENCES

REFERENCES

California Building Code, 2016, Volume 2, California Building Standards Commission and International Conference of Building Officials.

California Division of Mines and Geology, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, CDMG Special Publication 117A

Hart, E.W. and Bryant, William A., 2007, "Fault-Rupture Hazard Zones in California", California Division of Mines and Geology Special Publication 42;

Morton, Douglas, M, and Cox, Brett, 2001, Geologic Map of the Romoland 7.5' Quadrangle, Riverside County, California, United States Geological Survey, Open File Report, 03-102.

Soil Exploration Company, Inc., 2017, Preliminary Soil Investigation and Infiltration Test Report, Proposed 75-Lot Residential Development, Tract 36911, City of Menifee, California, Project No. 16151-01, June 13, 2017.

Southern California Earthquake Center, http://scedc.caltech.edu/

APPENDIX B

City of Menifee Review Letter

NV5

City of Menifee
29714 Haun Road
Menifee, California 92586

October 22, 2018
Project No.: 226815-00022.73

Attention: Mr. Haile Ford
hford@cityofmenifee.us

Subject: Review of Geotechnical Report

Project: Tract 36911, City of Menifee, California

References: 1) "*Preliminary Soil Investigation and Infiltration Test Report, Proposed 75 Lot Single Family Residential Development, Tract 36911, City of Menifee, California*", prepared by Soils Exploration Company, Inc., Project No. 16151-01, dated June 13, 2017.

2) "*Tentative Tract No. 36911, In the City of Menifee, County of Riverside, State of California*", plan sheet prepared by Adkan Engineers, dated August 2015.

3) "*Technical Guidelines for Review of Geotechnical and Geologic Reports; County of Riverside*", prepared by the Transportation and Land management Agency, Building and Safety Department, Transportation Department, 2000 edition.

Dear Mr. Ford:

As requested, NV5, Inc. (NV5) has conducted a geotechnical review of the above-referenced geotechnical report for the proposed development at Tentative Tract Map No. 36911, located in the City of Menifee, California. The purpose of the review was to provide an opinion on whether the geotechnical aspects of the project have been identified and appropriately addressed in the referenced report. NV5's geotechnical review is based on geotechnical information presented in the referenced report, our experience with the geotechnical conditions in the general site area and the referenced County of Riverside, Technical Guidelines for Review of Geotechnical and Geologic Reports. NV5 has not performed an independent geotechnical investigation at the project site and therefore does not offer or imply any guarantee or warranty as to future site performance. The opinions presented below are limited. Other consultants could arrive at different conclusions. This report presents a summary of the review.

Review Summary

Based on our review, the referenced geotechnical report for the proposed Tentative Map does not meet the minimum criteria for a geotechnical and geological investigation report as outlined in the referenced County of Riverside Technical Guidelines for Review of Geotechnical and Geologic Reports (COR Technical Guidelines) and as required by the City of Menifee Planning Department. Therefore, the report is not approved. Additional geotechnical information is requested. NV5 has developed the following comments which should be addressed by the project geotechnical consultant. The items in the outlined text boxes are direct excerpts from the report.

Comment 1- As indicated above, the report does not meet the minimum criteria for a geotechnical report and geological investigation report as outlined in the referenced County of Riverside Technical Guidelines for Review of Geotechnical and Geologic Reports (COR Technical Guidelines) and as required by the City

of Menifee Planning Department. The consultant should review the COR Technical Guidelines and resubmit a report that presents the minimum criteria in accordance with the requirements outlined therein (we specifically refer to Section I beginning on page 27). As indicated on page 27 of the COR Technical Guidelines, geotechnical and geological investigation reports are required for all tract subdivisions.

Comment 2 - The report provided for our review is signed and stamped by a registered professional engineer (PE). According to the COR Technical Guidelines, the report also needs to be reviewed, signed and stamped by a professional geologist (PG) or certified engineering geologist (CEG).

Comment 3 - The site description presented on page 1 of the referenced report states the following:

> **Site Conditions**
>
> The subject rectangular shaped, topographically undulating, 22± acre site is located on the west side of Valley Boulevard, south of Thornton Avenue, in the City of Menifee, Riverside County, California. Valley Boulevard is a paved road with no curbs, gutters or sidewalks. Vegetation at the site consists of dense growth of bushes and weeds

From a review of Google Maps' it appears that Valley Boulevard has concrete curb and gutter on the east side, and a asphaltic concrete curb on most of the west side.

- The report should describe any obvious previous grading, existing improvements and development on adjacent properties, if any.
- The site description should provide approximate site elevations (highest and lowest) and should include a description of overall topographic relief (gently sloping, steeply sloping, etc.) even if it measured with simple hand tools.
- The report should include a description of onsite drainage, such as the direction of flow, and character, such as sheet flow and/or concentrated flow within in drainage courses or other drainage features.

Comment 4 - As indicated in Comment 1, the geotechnical site conditions should be evaluated and presented in accordance with the COR Technical Guidelines and therefore should include at a minimum, discussions regarding site geology, geologic setting, geologic structure geologic materials, and should include a site specific geologic map and cross sections depicting the subsurface geology and the locations of the exploratory excavations. These are essential to the understanding of the report and site geology.

The referenced project report that was submitted for our review did not have a site specific geologic map. Figure 2 of that report was a copy of a portion of the USGS geologic map and did not have a scale or a north arrow. Figure 4, Fault Activity Map of California, did not have a scale or a north arrow. Plate 1, Exploratory Trench, Boring and Infiltration Test Location Map, did not have a legend, and the locations of the exploratory trenches were barley legible.

On page 2 under the section titled, "Field Work", the report includes the following description of the geologic materials encountered on site:

> The exploratory excavations revealed the site soils primarily consist of silty sand and silty sand with gravel with cobbles to 12 inches in size (USCS "SM"). Quartz bedrock was encountered at shallow depths varying from 1.5 to 3 feet in Trench T7, T8 and T9.

From the trench logs and the description above, the geologic conditions underlying the site cannot be surmised. The maps and cross sections produced for the project report should be legible and include

pertinent mappable features, map scales legends and north arrows. Again, the consultant is requested to review the COR Technical Guidelines and present the site geology in accordance with those requirements.

Comment 5 - On page 2 under the section titled, "Proposed Development", the report indicates that the maximum heights of cut/fill slopes will not exceed 25 feet, and references the Tentative Tract 36911 map prepared by Adkan Engineers. NV5's review of the referenced tract map indicates that cut slopes in excess of 25 feet are planned, with some slopes higher than 30 feet. The referenced project geotechnical report does not address the stability of cut or fill slopes. As per the COR Technical Guidelines (beginning on page 34), the stability of all proposed cut and fill slopes higher than 10 feet in vertical height should be analyzed. All slope stability analyses should include static, seismic and surficial stability.

Comment 6 - On page 3 under the section titled, "Conclusions", the report discusses on site soils and their suitability for use as engineered compacted fills:

> Onsite earth materials, cleansed of any deleterious materials and oversize cobbles and boulders (over 6 inches), should be suitable for engineered/compacted fills

NV5's review of the exploratory trench logs indicates that ten of the eleven trenches excavated at the site encountered refusal at relatively shallow depths (refusal at 5 feet or less), and that the materials encountered in nearly all trenches, contained oversized cobbles and boulders. The proposed project includes excavations that are significantly deeper than the exploratory trenches that were excavated for the project report. The deeper excavations that will be made during grading of the site will likely produce significant quantities of oversized materials that are not suitable for use in compacted fills (materials greater than 6 inches as defined by the project report). The project geotechnical report should address the likelihood of grading producing oversized materials and should include recommendations regarding the manner in which oversized materials should be handled. If oversized materials are to be placed onsite, the report should provide specific recommendations regarding oversized material placement, and the location of areas planned for oversized fill material need to be indicated on the project grading plan.

Comment 7 - On page 4 under the section titled, "Recommendations", the report discusses that structures should be provided with a compacted fill mat. The section discusses bottoms of the over-excavations for fill mat and states that:

> The excavated bottom should be cleaned from any roots, cobbles/boulders and deleterious materials, etc. As a result, deeper excavations should not be precluded and this should be determined by observations or testing of excavated bottoms during grading.

The report should describe the type of evaluation (both qualitative and qualitative) that will be used by the consultant during grading to verify the suitability of soil and/or rock to be left in place below proposed fills. It is requested that the consultant refer to page 39 and 40 of the COR Technical Guidelines on the identification and assessment of unsuitable soils and for criteria establishing suitability of soils to be left in place at the bottom of fills.

Comment 8 – On page 4 under the subsection "Conventional Residential Slabs-On-Grade", the report states the following:

> Residential slabs-on-grade should be at least 4 inches thick and should be reinforced with at least No. 3 bars at 18-inches on-center both ways, properly centered in mid-thickness of slabs (structural recommendations govern). Slabs-on-grade should be underlain with 10-mil Visqueen moisture barrier. The moisture barrier should be overlain by two-inch layer of clean rolled sand to aid in concrete curing and underlain by two inches of rolled clean sand.

It is noted that current American Concrete Institute (ACI) guidelines no longer recommend the use of clean sand overlying a moisture barrier. ACI currently recommends concrete slabs lie directly over a moisture barrier when a floor receives a vapor sensitive floor covering. Consideration may also be given to recommending a thicker vapor barrier (such as 15 mil or thicker).

Comment 9 - On page 6, the report states:

> Tentative Pavement Thickness Estimate (Interior Street)
>
> Based on classification, we estimate the "R" value of onsite near-surface sandy soils to be on the order of 40 or better. Considering this, typical pavement thickness estimate for interior street improvements are as follows:

Location	Traffic Index (TI)	"R" Value	Minimum Pavement Thickness*
Interior Streets	5.0	40	3" AC over 6" AB Class II*

> * Please note City minimum pavement thickness requirements may govern

- Although no R-value tests were done, a structural pavement section was provided using an assumed R-value. It is our opinion that for a project of this size at least one R-value should have been performed for estimation purposes.
- The consultant should provide a basis for the estimated traffic index.

NV5 appreciates the opportunity to be of service to you on this project. If you have any questions regarding this report, please do not hesitate to contact our office.

Respectfully submitted,
NV5 West, Inc.

Gene Custenborder, CEG 1319
Senior Project Geologist

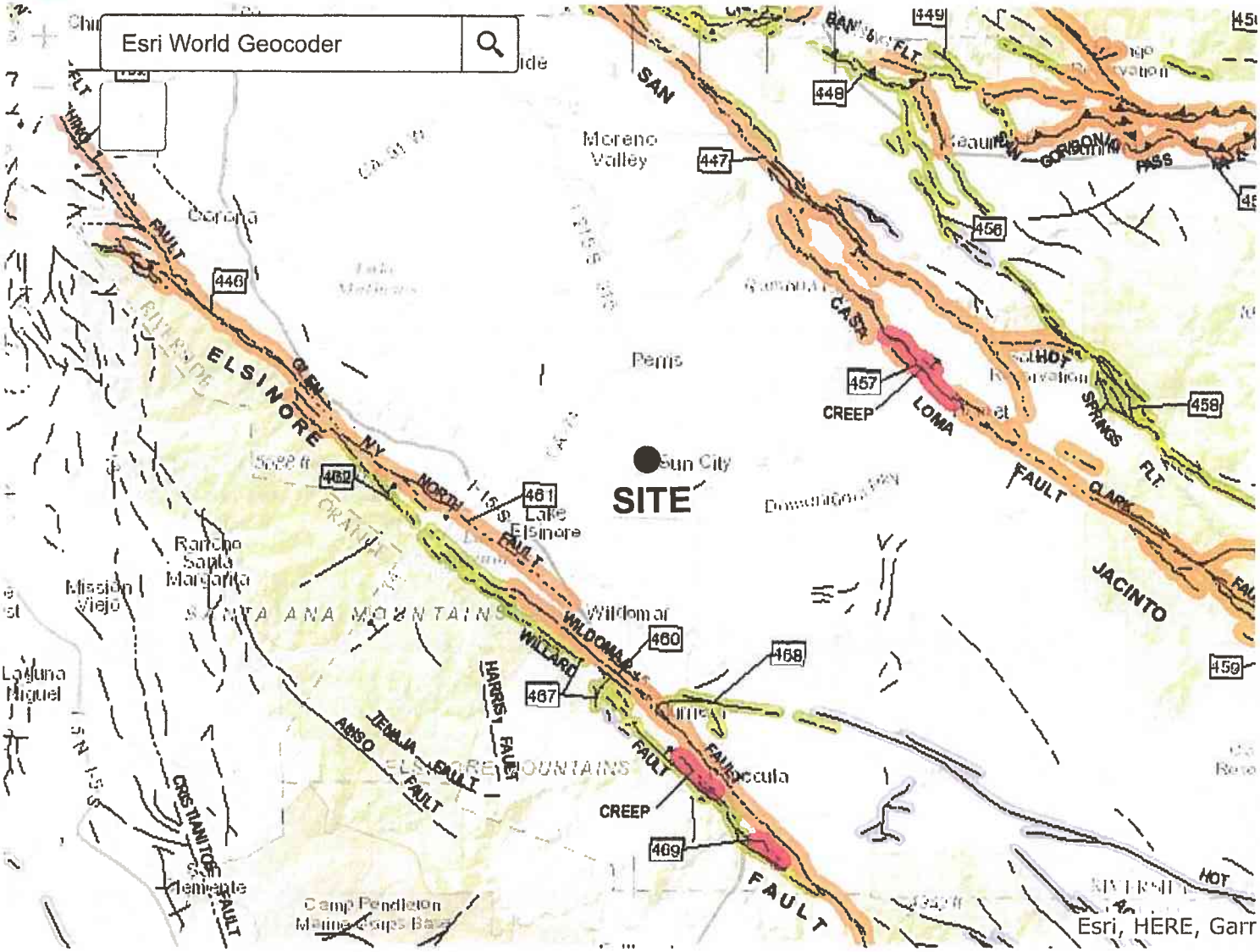
Carl Henderson, PhD, GE 2886
CQA Group Director (San Diego)

GC/CH/ma

Distribution: (1) via email

REGISTERED PROFESSIONAL ENGINEER
CARL FRANCISCO HENDERSON
No. 2886
GEOTECHNICAL
STATE OF CALIFORNIA

Fault Activity Map of California (2010)



N

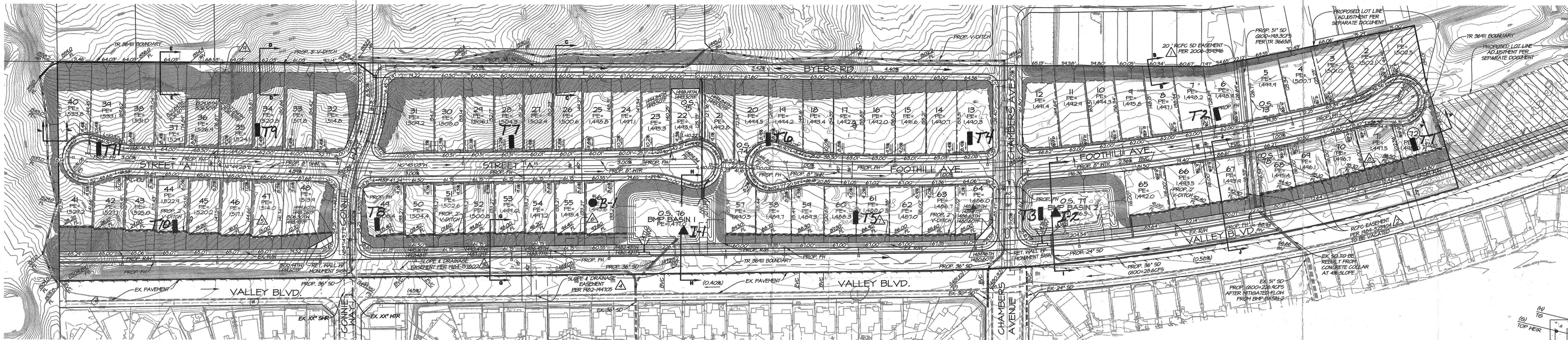
10mi

Figure 4

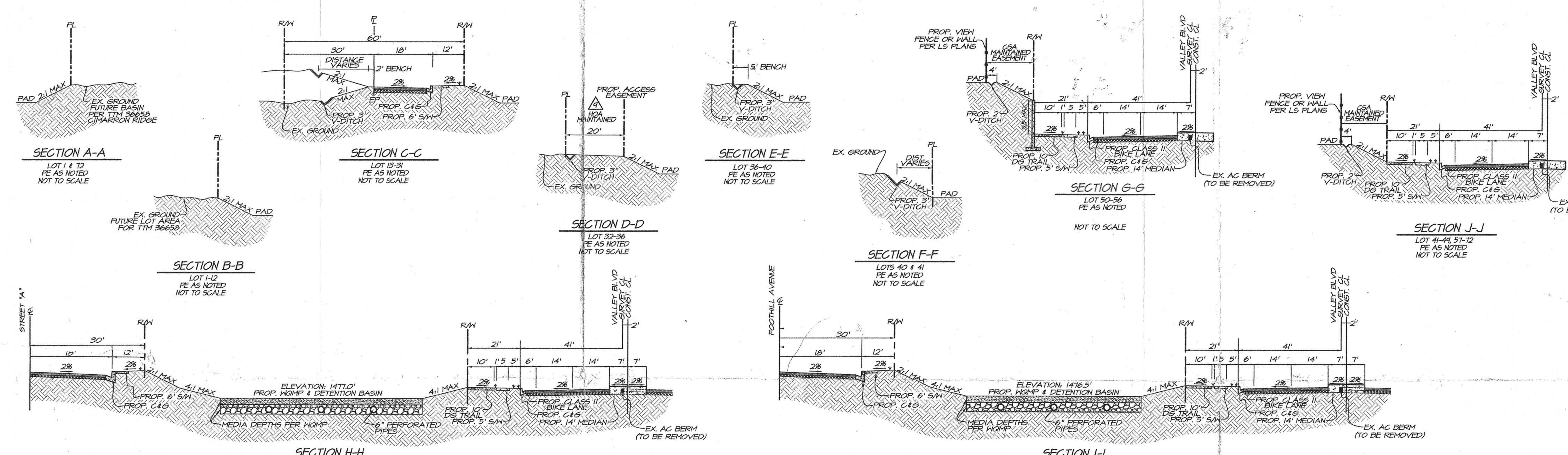
IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT NO. 36911

SCALE
SCALE: 1"=80'



EXPLORATORY TRENCH, BORING & INFILTRATION TEST LOCATION MAP PLATE 1	
LEGEND	
T11 ■ Approximate Location of Trench	
B-1 ● Approximate Location of Boring	
I-2 ▲ Approximate Location of Infiltration Test	
Soil Exploration Co., Inc.	
Project No. 16151-01	June 13, 2017



SECTION A-A
LOT 1 & 72
PE AS NOTED
NOT TO SCALE

SECTION B-B
LOT 1-12
PE AS NOTED
NOT TO SCALE

SECTION C-C
LOT 13-31
PE AS NOTED
NOT TO SCALE

SECTION D-D
LOT 32-36
PE AS NOTED
NOT TO SCALE

SECTION E-E
LOT 36-40
PE AS NOTED
NOT TO SCALE

SECTION F-F
LOTS 40 & 41
PE AS NOTED
NOT TO SCALE

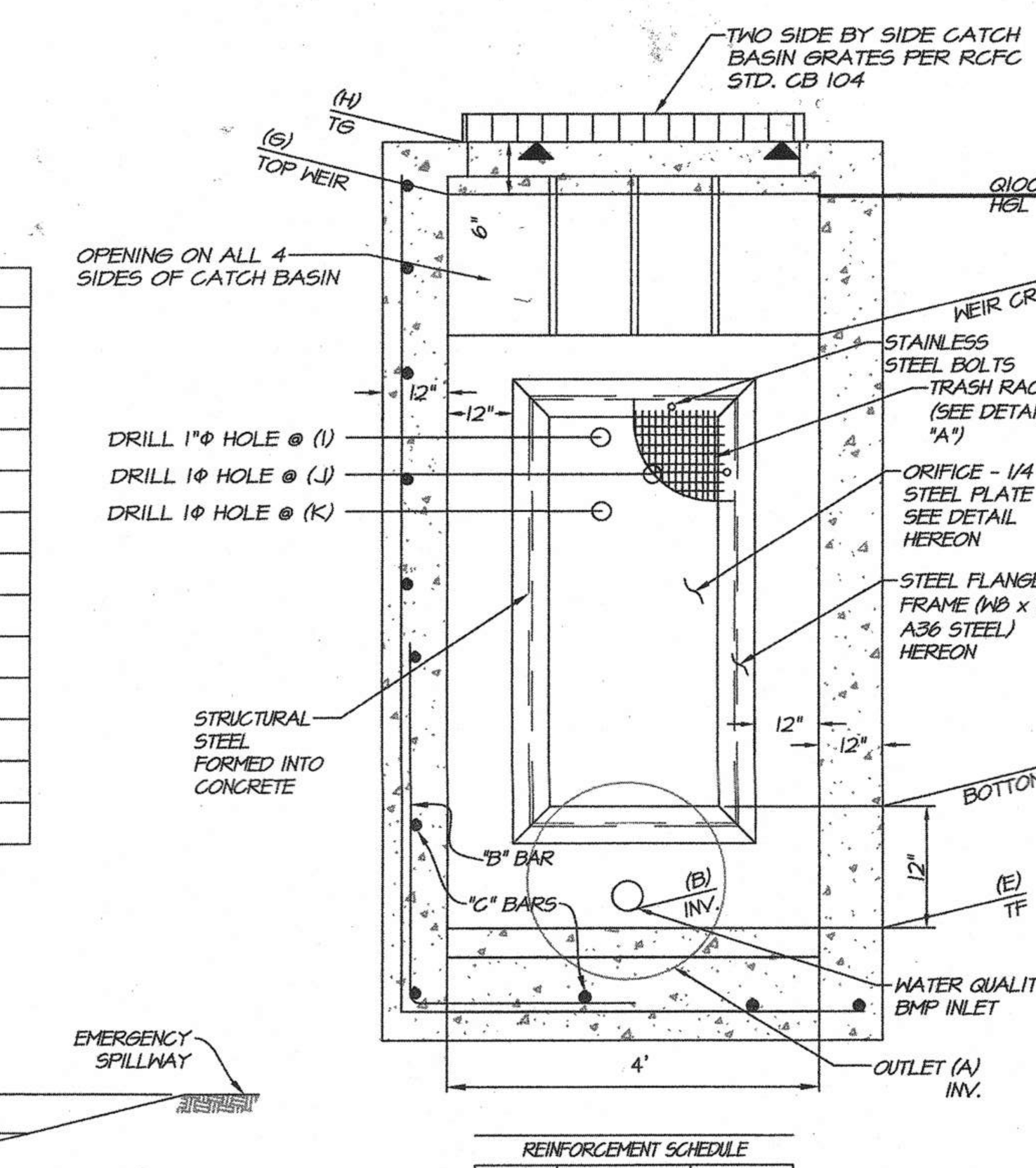
SECTION G-G
LOT 50-56
PE AS NOTED
NOT TO SCALE

SECTION J-J
LOT 41-49, 57-72
PE AS NOTED
NOT TO SCALE

SECTION H-H
BASIN NO. 1
NOT TO SCALE

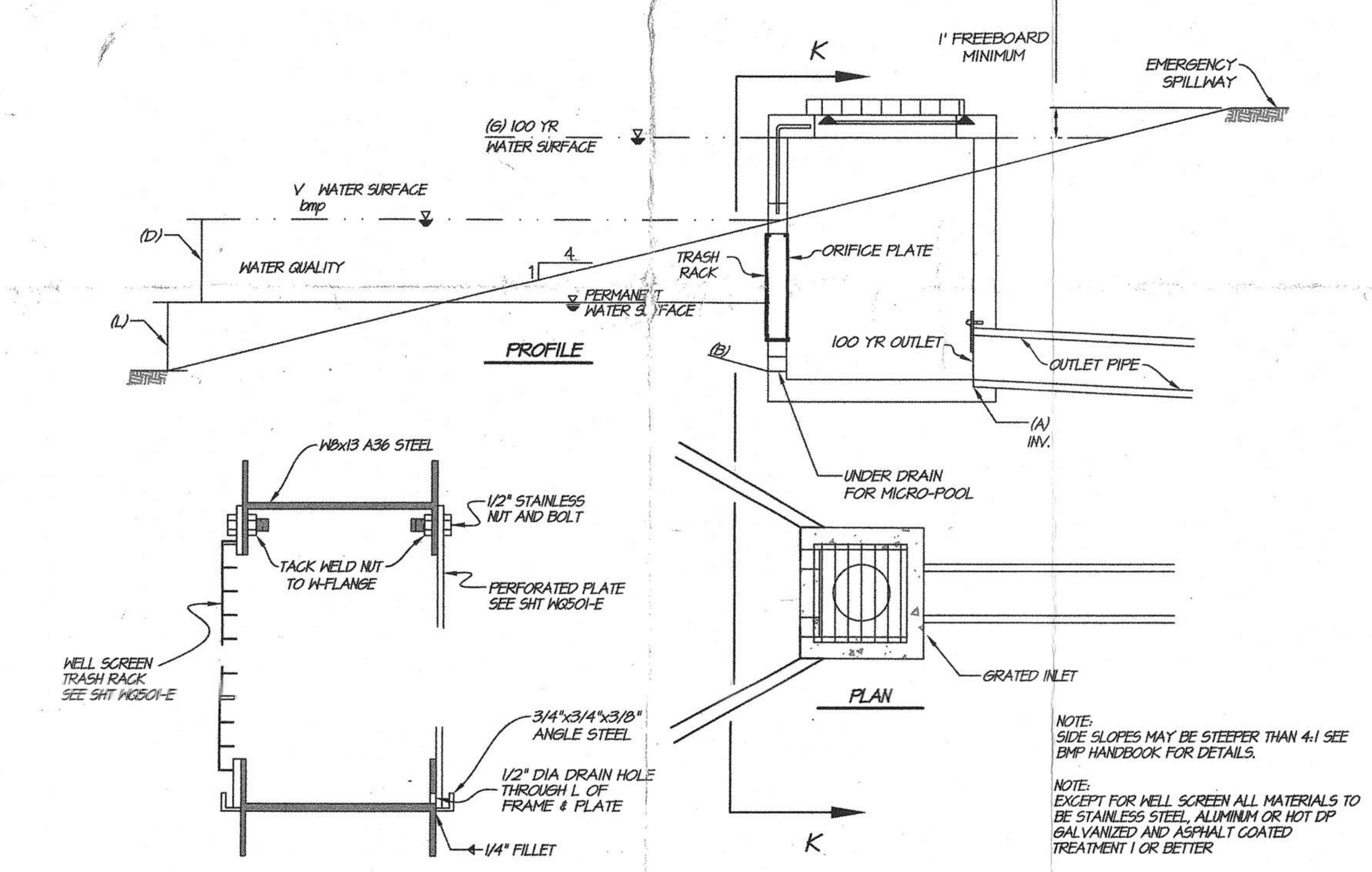
SECTION I-I
BASIN NO. 2
NOT TO SCALE

BASIN ELEVATION DETAILS		
	BASIN 1	BASIN 2
(A)	1473.00 INV.	1473.30 INV.
(B)	1474.00 INV.	1474.30 INV.
(C)	1476.85 BOT	1476.50 BOT
(D)	0.85'	1.35'
(E)	1475.85 TF	1475.50 TF
(F)	1479.35	1478.92
(G)	1480.10	14790.50
(H)	1480.60	1480.00
(I)	1478.65	N/A
(J)	1478.60	1478.50
(K)	1478.50	1478.00
(L)	1.65'	1.65'



REINFORCEMENT SCHEDULE		
T WALL	A&B BARS	C BARS
12"	#5 @ 12"	#4 @ 12"

SECTION K-K
STD. DWG. NO. WQ501-C
EDB BASIN OUTLET
NOT TO SCALE



PROFILE

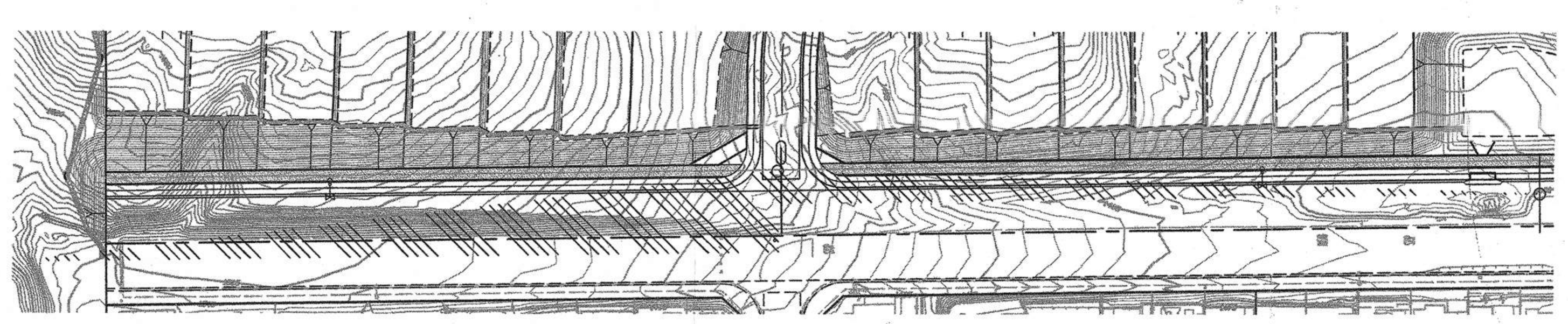
PLAN

NOTE:
SIDE SLOPES MAY BE STEEPER THAN 4:1 SEE BMP HANDBOOK FOR DETAILS.

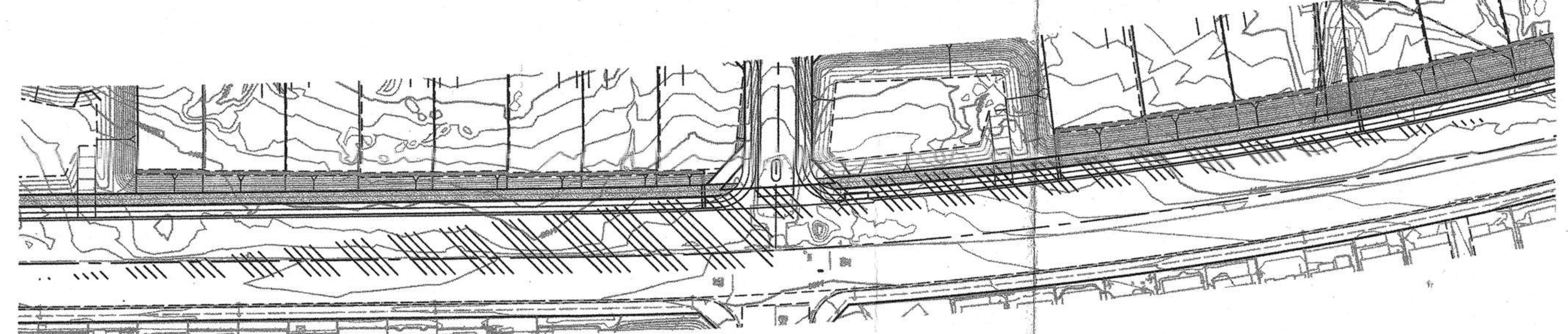
NOTE:
EXCEPT FOR WELL SCREEN ALL MATERIALS TO BE STAINLESS STEEL, ALUMINUM OR HOT DIP GALVANIZED AND ASPHALT COATED TREATMENT I OR BETTER

EDB TRASH RACK FRAME
STD DWG. NO. WQ501-D
NOT TO SCALE

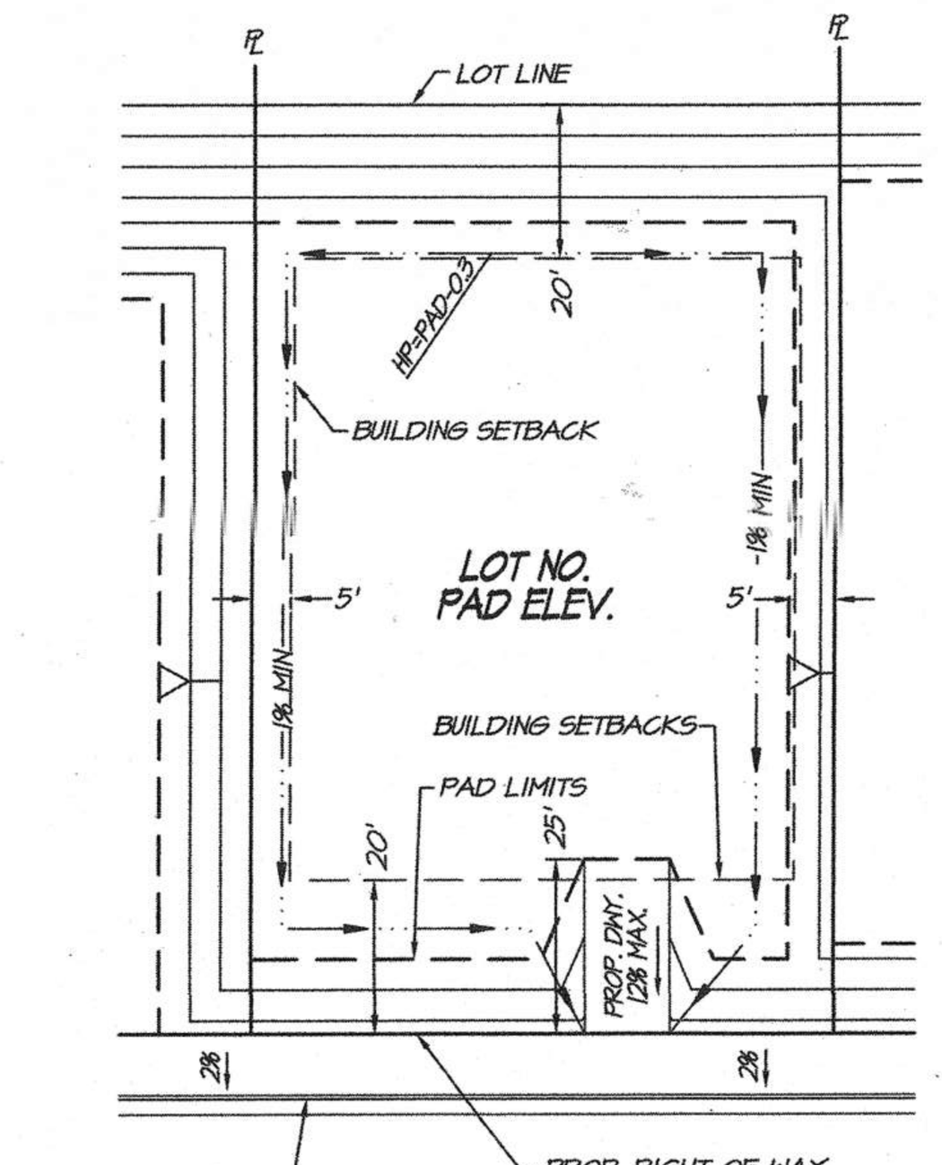
EDB BASIN OUTLET
STD. DWG. NO. WQ501-A
PLAN AND PROFILE
NOT TO SCALE



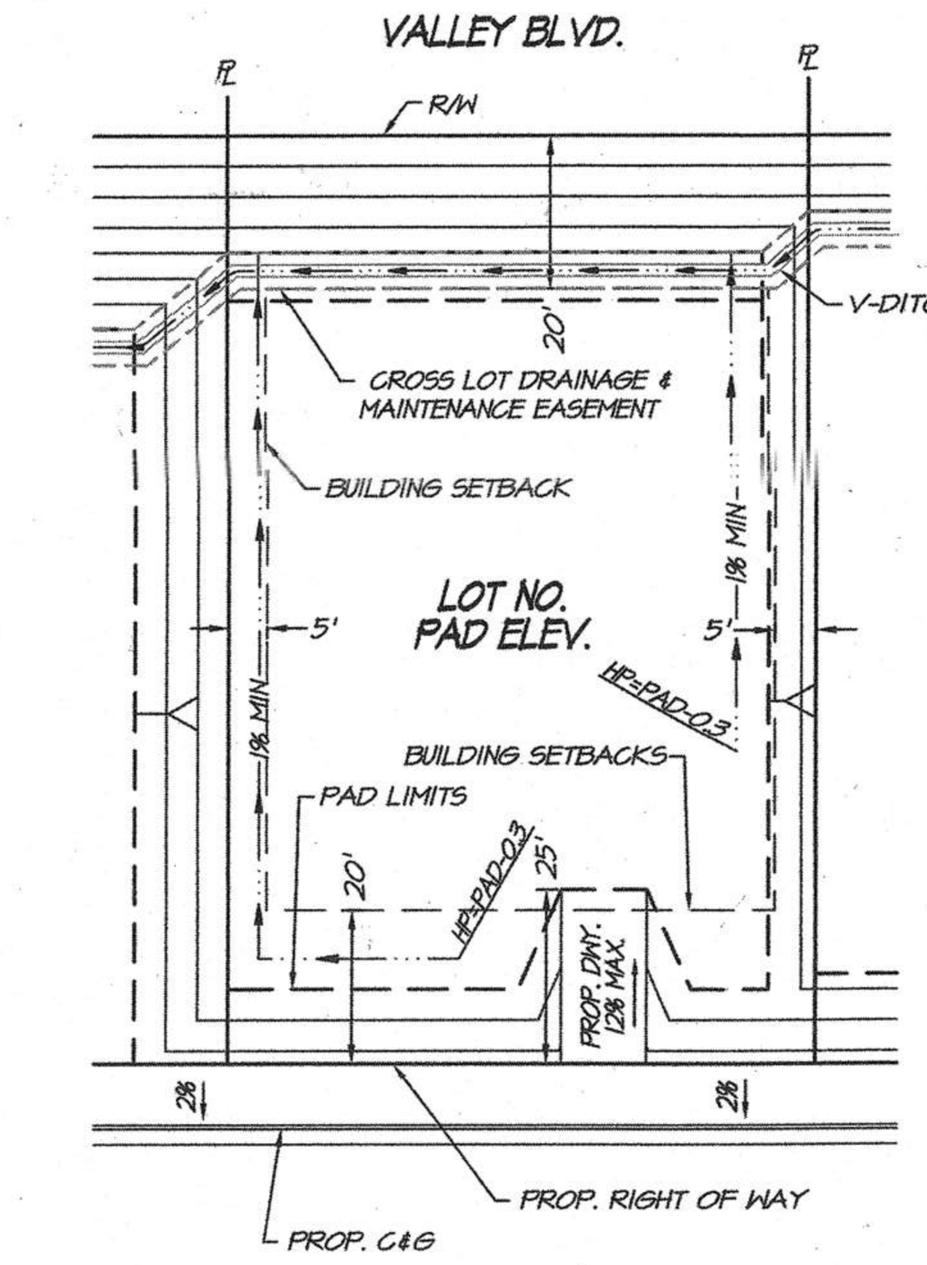
LINE OF SIGHT DISTANCE - VALLEY BLVD & CONNIE WY
INTERSECTION SITE DISTANCE BASED ON COUNTY OF RIVERSIDE STD. NO. 821
VALLEY BLVD DESIGN SPEED 60 M.P.H. - CORNER SIGHT DISTANCE 660'
SCALE: 1"=100'



LINE OF SIGHT DISTANCE - VALLEY BLVD & CHAMBERS AVE
INTERSECTION SITE DISTANCE BASED ON COUNTY OF RIVERSIDE STD. NO. 821
VALLEY BLVD DESIGN SPEED 60 M.P.H. - CORNER SIGHT DISTANCE 660'
SCALE: 1"=100'



FORWARD DRAINING LOT DETAIL
NOT TO SCALE



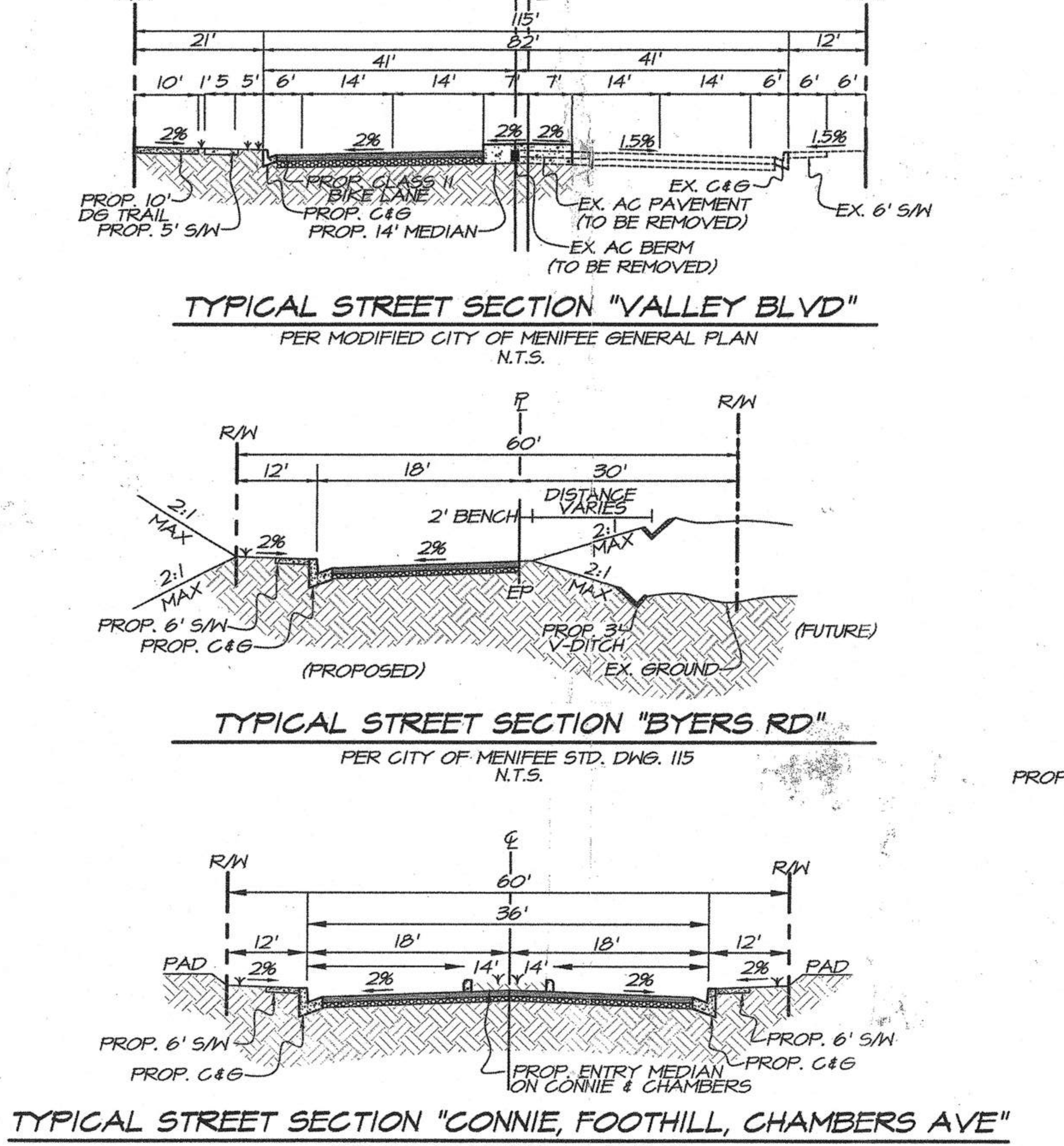
REAR DRAINING LOT DETAIL
LOTS 41-72
NOT TO SCALE

LOT SIZING TABLE
LOT AND PAD SIZES

LOT #	LOT SIZE (NET)	PAD SIZE
1	7,695	7,201
2	8,211	7,434
3	8,451	7,359
4	8,873	7,725
5	11,777	7,571
6	8,215	6,742
7	8,379	6,685
8	8,682	6,729
9	9,240	7,001
10	9,738	7,216
11	10,176	7,483
12	12,474	8,766
13	11,073	8,597
14	9,718	7,719
15	9,804	7,663
16	9,824	7,324
17	9,777	7,061
18	9,643	6,627
19	9,735	6,618
20	10,224	7,624
21	9,475	6,448
22	7,884	6,017
23	8,738	6,382
24	8,869	6,526
25	8,927	6,557
26	8,985	6,519
27	9,043	6,403
28	9,171	6,387
29	9,236	6,270
30	9,294	6,326
31	15,476	8,370
32	15,676	7,484
33	11,074	6,576
34	11,145	6,529
35	12,273	6,100
36	12,048	6,044
37	11,134	6,490
38	11,007	6,528
39	10,756	6,426

LOT MATRIX (CONTINUED)

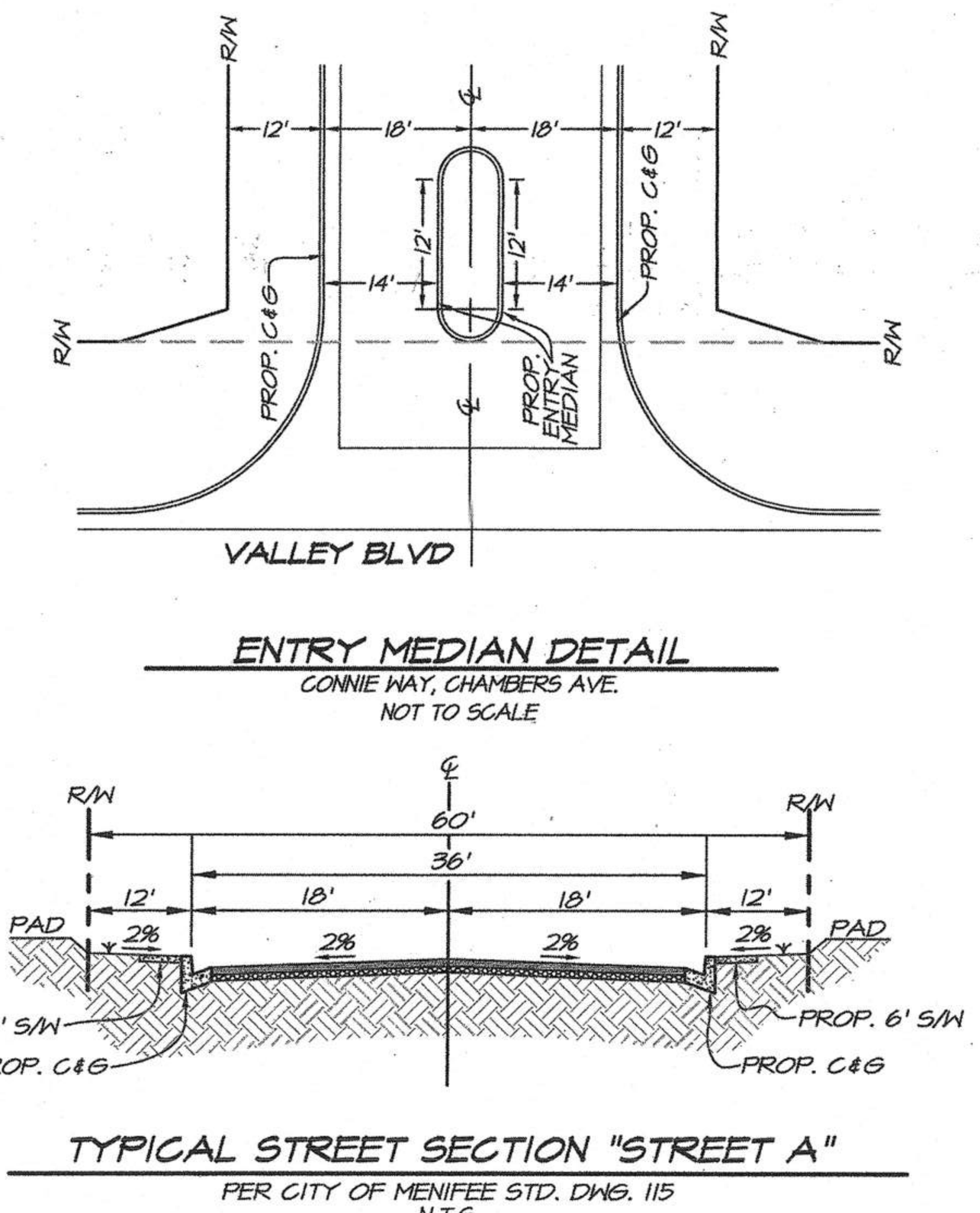
LOT #	LOT SIZE (NET)	PAD SIZE
40	11,118	6,768
41	10,158	6,652
42	9,710	6,105
43	10,067	6,663
44	9,879	6,704
45	9,688	6,620
46	9,498	6,593
47	9,308	6,641
48	13,967	8,569
49	11,109	7,800
50	8,196	6,047
51	8,229	6,058
52	8,229	6,005
53	8,229	6,016
54	8,229	6,048
55	8,229	6,116
56	8,069	6,127
57	8,827	7,510
58	8,150	6,504
59	8,050	6,744
60	7,985	6,627
61	7,843	6,684
62	7,718	6,633
63	7,807	6,753
64	8,724	7,034
65	9,578	7,361
66	9,369	7,198
67	9,784	7,277
68	11,059	6,204
69	8,303	6,134
70	8,579	6,263
71	8,634	6,237
72	10,186	6,159
O.S. 73	2,788	SD DEDICATION
O.S. 74	490	ACCESS - CSA/HOA
O.S. 75	1,266	SD DEDICATION
O.S. 76	29,117	BASIN - CSA/HOA
O.S. 77	24,756	BASIN - CSA/HOA
O.S. 78	2,564	SD DEDICATION



TYPICAL STREET SECTION "VALLEY BLVD"
PER MODIFIED CITY OF MENIFEE GENERAL PLAN
N.T.S.

TYPICAL STREET SECTION "BYERS RD"
PER CITY OF MENIFEE STD. DWG. 115
N.T.S.

TYPICAL STREET SECTION "CONNIE, FOOTHILL, CHAMBERS AVE"
PER CITY OF MENIFEE STD. DWG. 115
N.T.S.



ENTRY MEDIAN DETAIL
CONNIE WAY, CHAMBERS AVE.
NOT TO SCALE

TYPICAL STREET SECTION "STREET A"
PER CITY OF MENIFEE STD. DWG. 115
N.T.S.

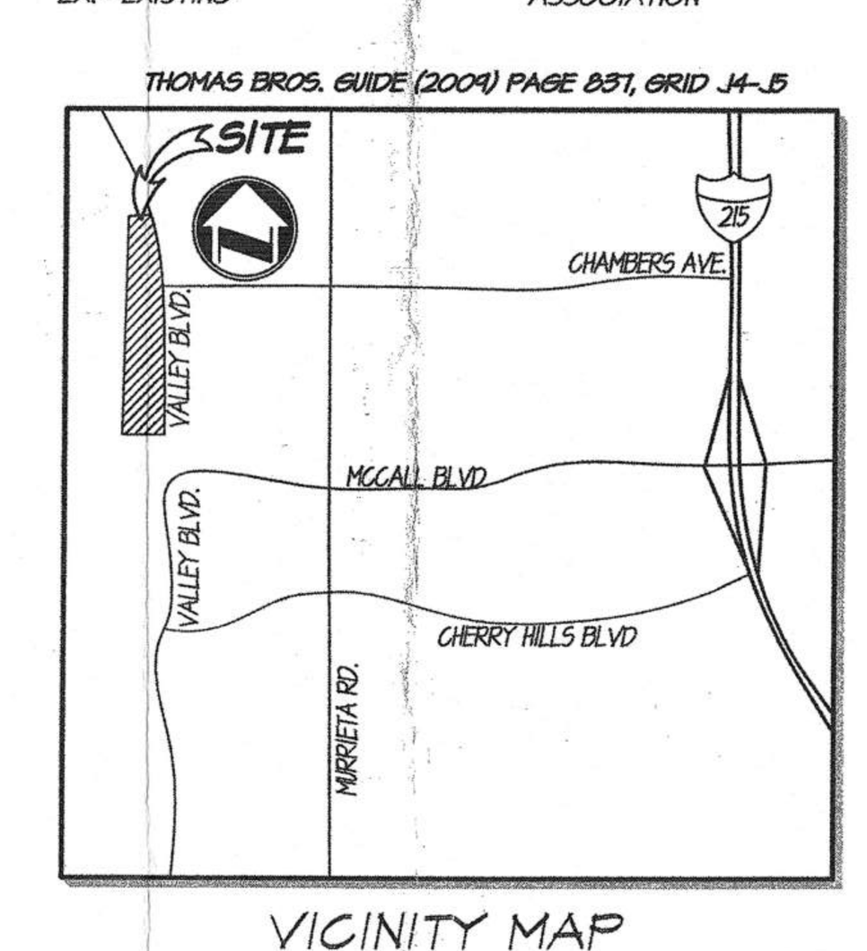
REVISIONS	
DELTA	DESCRIPTION

LEGEND

- PROP DOMESTIC WATER
- PROPOSED RECLAIMED WATER
- PROPOSED SEWER
- TRACT BOUNDARY
- A.D.A ACCESS RAMP
- AREA TO BE SWAPPED
- NEW AREA TO BE OBTAINED
- RESTRICTED USE AREA
- STREETLIGHT

SD = STORM DRAIN
TC = TOP OF CURB
FS = FINISH SURFACE
SWR = SEWER
TF= TOP OF FOOTING
TW= TOP OF WALL
CL = CENTER LINE
FG = FINISHED GROUND
WTR= WATER
E/P = EDGE OF PAVEMENT
P/L = PROPERTY LINE
R/W = RIGHT OF WAY
O.S.= OPEN SPACE
EX.= EXISTING
PROP.= PROPOSED
EVC=END OF VERTICAL CURVE
BVC = BEGINNING OF VERTICAL CURVE
A.R. = A.D.A ACCESS RAMP
SW = SIDEWALK
( ) = EXISTING ELEVATION
C&G = CURB AND GUTTER
S.F. = SQUARE FEET
FS = FINISH SURFACE
FH = FIRE HYDRANT
HOA = HOME OWNERS ASSOCIATION

THOMAS BROS. GUIDE (2009) PAGE 837, GRID J4-J5



VICINITY MAP
N.T.S.
SEC.20 T.5S. R.3W

OWNER
RECREATIONAL LAND INVESTMENTS, INC.
5642 RESEARCH DRIVE, UNIT A
HUNTINGTON BEACH, CA 92649
(714) 895-5349 (OFFICE)
(714) 313-0202

APPLICANT
RECREATIONAL LAND INVESTMENTS, INC.
5642 RESEARCH DRIVE, UNIT A
HUNTINGTON BEACH, CA 92649
(714) 895-5349 (OFFICE)
(714) 313-0202

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

BENCHMARK
BENCH MARK NO. 600-30-68
DATUM: N.G.V.D. 29
BRASS DISK IN CONCRETE POST 0.9 MILES NORTH ALONG MURRIETA ROAD FROM CATHOLIC CHURCH IN SUN CITY, 175' EAST OF INTERSECTION OF MURRIETA ROAD AND ROUSE ROAD, 25' NORTH OF ROUSE ROAD AS EXISTING, 5' WEST OF POWER POLE #X9651-E, 2' EAST OF MARKER POST.
ELEV: 1442.015 1970 ADJ.

BASIS OF BEARINGS
THE WEST LINE OF THE SOUTHEAST 1/4 OF SECTION 20, TOWNSHIP 2 SOUTH, RANGE 3 WEST WITH A BEARING OF N00°10'09"E WAS HELD AS THE BASIS OF BEARING FOR THIS MAP AS SHOWN ON PARCEL MAP BOOK 152, PAGES 60-61, LOCATED IN THE COUNTY OF RIVERSIDE RECORDERS OFFICE.

TENTATIVE TRACT SUMMARY

TOTAL AREA GROSS:	21.66 ACRES
EXISTING ZONING:	R-1
PROPOSED ZONING:	R-1
PROPOSED LAND USE:	RESIDENTIAL
MINIMUM LOT SIZE:	7,200 SQ. FT.
MAXIMUM LOT SIZE:	15,807 SQ. FT.
AVERAGE LOT SIZE:	10,650 SQ. FT.
DENSITY PER GROSS ACREAGE:	6 DU/AC
NO. OF LOTS:	72

UTILITY PURVEYORS

WATER:	EASTERN MUNICIPAL WATER DISTRICT
SEWER:	EASTERN MUNICIPAL WATER DISTRICT
GAS:	SOUTHERN CALIFORNIA GAS COMPANY
ELECTRICITY:	SOUTHERN CALIFORNIA EDISON
TELEPHONE:	VERIZON
SCHOOL:	MENIFEE UNION & PERRIS UNION HIGH
CATV:	TIME WARNER CABLE

LEGAL DESCRIPTION

IN THE UNINCORPORATED TERRITORY OF RIVERSIDE COUNTY, STATE OF CALIFORNIA, A PORTION OF SECTION 20, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, BEING A PORTION OF PARCEL 3 OF PARCEL MAP No. 11167, AS SHOWN ON MAP FILED IN BOOK 50 OF PARCEL MAPS, PAGES 98 AND 99, AND A PORTION OF PARCEL 2, A PORTION OF LOT "A" AND LOT "D" OF PARCEL MAP No. 22482, AS SHOWN ON MAP FILED IN BOOK 152 OF PARCEL MAPS, PAGES 60 AND 61, ALL IN RECORDS OF SAID COUNTY, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE CENTER 1/4 CORNER OF SAID SECTION 20, BEING THE SOUTHEAST CORNER OF SAID PARCEL 3 OF PARCEL MAP No. 11167;

THENCE SOUTH 00°10'01" WEST, ALONG THE WEST LINE OF SAID PARCEL MAP No. 22482, A DISTANCE OF 1942.45 FEET;

THENCE NORTH 89°19'19" EAST, ALONG THE SOUTH LINE OF SAID PARCEL 2, A DISTANCE OF 449.63 FEET TO THE CENTERLINE OF VALLEY BOULEVARD AS SHOWN ON SAID PARCEL MAP No. 22482;

THENCE NORTH 00°44'59" WEST, ALONG SAID CENTERLINE OF VALLEY BOULEVARD, A DISTANCE OF 1752.29 FEET TO THE BEGINNING OF A NON TANGENT CURVE CONCAVE SOUTHWEST AND HAVING A RADIUS OF 4000.00 FEET, A LINE RADIAL TO SAID CURVE AT SAID POINT BEARS NORTH 84°15'01" EAST, SAID CURVE BEING THE SAID CENTERLINE OF VALLEY BOULEVARD;

THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE, AN ARC DISTANCE OF 1418.56 FEET THROUGH A CENTRAL ANGLE OF 20°19'10", TO POINT "A" PREVIOUSLY DESCRIBED IN PARCEL "A", HEREIN;

THENCE RADIAL TO SAID CURVE, SOUTH 68°55'51" WEST, A DISTANCE OF 55.00 FEET;

THENCE NORTH 64°09'28" WEST, A DISTANCE OF 34.23 FEET;

THENCE SOUTH 68°03'15" WEST, A DISTANCE OF 82.81 FEET;

THENCE SOUTH 23°34'58" WEST, A DISTANCE OF 21.02 FEET;

THENCE SOUTH 20°53'19" WEST, A DISTANCE OF 20.83 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWEST AND HAVING A RADIUS OF 3824.00 FEET;

THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, AN ARC DISTANCE OF 418.72 FEET THROUGH A CENTRAL ANGLE OF 7°10'22";

THENCE DEPARTING SAID CURVE SOUTH 76°17'03" WEST, A DISTANCE OF 60.00 FEET;

THENCE SOUTH 76°37'57" WEST, A DISTANCE OF 122.96 FEET;

THENCE SOUTH 11°21'21" EAST, A DISTANCE OF 217.49 FEET TO A POINT ON THE EAST LINE OF SAID PARCEL 3;

THENCE SOUTH 00°10'01" WEST, ALONG THE SAID EAST LINE OF PARCEL 3, A DISTANCE OF 413.49 FEET TO THE POINT OF BEGINNING.

EARTHWORK QUANTITIES
CUT: 138,692 CY FILL: 108,506 CY NET: 30,186 CY EXPORT
THE QUANTITY SHOWN ABOVE IS FOR DISCUSSION PURPOSES ONLY.

ASSESSORS PARCEL NUMBERS
335-080-056, 335-080-066, 335-080-067

EASEMENT NOTES
EXISTING EASEMENTS:

1. EXISTING EASEMENT 2006-354346 TO RCFCD TO BE VACATED IN FAVOR OF DEDICATED LETTER LOTS 73, 78, AND RIGHT OF WAY DEDICATION ON FOOTHILL AVE.
2. EXISTING EASEMENT 1984-323904 TO RCFCD TO BE VACATED.
3. EXISTING ROADWAY DEDICATION 1984-157802 TO COUNTY OF RIVERSIDE FOR SLOPE AND DRAINAGE PURPOSES TO BE VACATED.
4. EXISTING ROADWAY DEDICATION 1982-144705 TO COUNTY OF RIVERSIDE FOR SLOPE AND DRAINAGE PURPOSES TO BE VACATED.

PROPOSED EASEMENTS:

5. PROPOSED HOA/CFD MAINTENANCE EASEMENT
6. PROPOSED HOA/CFD MAINTENANCE EASEMENT
7. PROPOSED HOA/CFD MAINTENANCE EASEMENT
8. PROPOSED HOA/CFD MAINTENANCE EASEMENT
9. PROPOSED 20' ACCESS EASEMENT

OPEN SPACE LOTS
FOR OPEN SPACE LOT SQUARE FOOTAGE, SEE LOT MATRIX HEREON.

O.S. 73 - OPEN SPACE FOR STORM DRAIN ACCESS AND MAINTENANCE
O.S. 74 - 10' PEDESTRIAN ACCESS LOT CONNECTING STREET 'A' AND FOOTHILL AVE.
O.S. 75 - OPEN SPACE FOR STORM DRAIN ACCESS AND MAINTENANCE
O.S. 76 - WQMP AND DETENTION BASIN 1
O.S. 77 - WQMP AND DETENTION BASIN 2
O.S. 78 - OPEN SPACE FOR STORM DRAIN ACCESS AND MAINTENANCE

PROJECT NOTES
1. ALL IMPROVEMENTS SHALL BE PER SCHEDULE "A" SUBDIVISION ORDINANCE 460.
2. THOMAS BROS. GUIDE (2009) PAGE 837 J4-J5
3. ALL CUT SLOPES WILL BE 2:1 RATIO AND FILL SLOPES 2:1, UNLESS OTHERWISE NOTED.
4. SETBACKS OF SLOPES TO PROPERTY LINES SHALL CONFORM TO CBC 2013
5. BUILDING SETBACKS OF PROPOSED RESIDENTIAL UNITS WILL CONFORM TO THE SETBACK REQUIREMENTS OF CITY OF MENIFEE ZONING CODE.
6. LOT DIMENSIONS SHOWN HEREON INCLUDE DIMENSIONS TO STREET R/W.
7. ALL WATER QUALITY FOR THIS TRACT IS BEING MITIGATED BY ON-SITE BMP BASINS
8. ALL SEWERS ARE SLOPED AT A MINIMUM OF 0.5%
9. THIS TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER.
10. PROPERTY NOT LOCATED IN A FLOOD ZONE, OR SUBJECT TO OVERFLOW OR INUNDATION.
11. PROPERTY HAS VERY LOW LIQUEFACTION POTENTIAL.
12. THERE ARE NO KNOWN WELLS LOCATED ON THE PROJECT SITE.
13. O.S. NO. 74 WILL BE UTILIZED FOR PEDESTRIAN INGRESS AND EGRESS.

TENTATIVE TRACT NO. 36911
PREPARATION DATE : AUGUST 2015

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

Plot Date: 5/15/2017

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