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Appendix D:

Geology, Seismicity, and Soils Supporting Information

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D.1 - Geotechnical Study Report

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GEOTECHNICAL STUDY REPORT

ZINFANDEL SUBDIVISION
1583 AND 1657 EL CENTRO AVENUE
NAPA, CALIFORNIA

Project Number:

7121.01.04.2

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INTRODUCTION

This report presents the results of our geotechnical study for the Zinfandel Subdivision to be constructed at 1583 and 1657 El Centro Avenue in Napa, California. The parcels extend over relatively flat terrain and contain vineyards and two residences. A narrow creek channel runs generally southwest along most of the southern border of the property. The southeastern corner of the site extends to the south side of the stream. The site location is shown on Plate 1, Appendix A.

We understand it is proposed to construct a 55-lot residential subdivision on the two properties. We anticipate that one- and two-story, wood-frame structures with attached garages will be constructed on the individual lots. The subdivision will include removal of one existing residence and its outbuildings. Public streets and utilities will be constructed as part of the project. Structurally supported wood floors or concrete slab floors will be used in the living areas. Slab floors will be used in the garages.

Foundation loads are expected to be typical for the light to moderately heavy type of construction planned. We anticipate that site grading will be the minimum amount needed to construct level building pads and paved areas with positive drainage, and could include cuts and fills on the order of 1 to 2 feet.

Utility plans are not available, but we have assumed for this study that the project utilities will extend no deeper than 10 feet below the existing ground surface. If project utilities extend deeper, supplemental exploration may be required to evaluate the soil conditions within and below the utility excavations.

SCOPE

The purpose of our study, as outlined in our Professional Service Agreement dated October 11, 2017, was to generate geotechnical information for the design and construction of the project. Our scope of services included reviewing selected published geologic data pertinent to the site; evaluating the subsurface conditions with borings and laboratory tests; analyzing the field and laboratory data; and presenting this report with the following geotechnical information:

1. A brief description of the soil and groundwater conditions observed during our study;

2. A discussion of seismic hazards that may affect the proposed development;

3. Seismic design criteria per guidelines in the 2016 California Building Code; and

4. Conclusions and recommendations regarding:

    a. Primary geotechnical engineering concerns and mitigating measures, as applicable;

    b. Site preparation and grading including remedial grading of weak, porous, compressible and expansive surface soil;

    c. Foundation types, design criteria, and estimated settlement behavior;

    d. Lateral loads for retaining wall design;

    e. Support of concrete slabs-on-grade;

f. Preliminary pavement thickness based on our experience with similar soil and projects and the results of an R-value test on the anticipated subgrade soil;

g. Utility trench backfill;

h. Geotechnical engineering drainage improvements; and

i. Supplemental geotechnical engineering services.

STUDY

Site Exploration

We reviewed our previous geotechnical studies in the vicinity and selected geologic references pertinent to the site. The geologic literature reviewed is listed in Appendix B. On October 30 and December 19, 2017, we performed a geotechnical reconnaissance of the site and explored the subsurface conditions by drilling twelve borings to depths ranging from about 11 to 18½ feet. Borings B-1 through B-8 were drilled with a truck-mounted drill rig equipped with 6-inch diameter, solid stem augers. Borings B-9 through B-12 were drilled with a limited-access, track-mounted drill rig equipped with 4-inch solid stem augers. Approximate locations for each of the borings are shown on the Exploration Plan, Plate 2. The boring locations were determined approximately by pacing their distance from features shown on the Exploration Plan and should be considered accurate only to the degree implied by the method used. Our field engineer located and logged the borings and obtained samples of the materials encountered for visual examination, classification and laboratory testing.

Relatively undisturbed samples were obtained from the borings at selected intervals by driving a 2.43-inch inside diameter, split spoon sampler, containing 6-inch long brass liners, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches. The blows required to drive each 6-inch increment were recorded and the blows required to drive the last 12 inches, or portion thereof, were converted to equivalent Standard Penetration Test (SPT) blow counts for correlation with empirical data. Disturbed samples were also obtained at selected depths by driving a 1.375-inch inside diameter (2-inch outside diameter) SPT sampler, without liners or rings, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches, the blows to drive each 6-inch increment were recorded, and the blows required to drive the final 12 inches, or portion thereof, are provided on the boring logs. Disturbed “bulk” samples of the near surface soil were also obtained from the borings and placed in buckets.

The logs of the borings showing the materials encountered, groundwater conditions, converted blow counts and sample depths are presented on Plates 3 through 14. The soil is described in accordance with the Unified Soil Classification System, outlined on Plate 15.

The boring logs show our interpretation of the subsurface soil and groundwater conditions on the date and at the locations indicated. Subsurface conditions may vary at other locations and times. Our interpretation is based on visual inspection of soil samples, laboratory test results, and interpretation of drilling and sampling resistance. The location of the soil boundaries should be considered approximate. The transition between soil types may be gradual.

Laboratory Testing

The samples obtained from the borings were transported to our office and re-examined to verify soil classifications, evaluate characteristics, and assign tests pertinent to our analysis. Selected samples were laboratory tested to determine their water content, dry density, classification (Atterberg Limits, percent of silt and clay), shear strength, expansion potential (Expansion Index - EI) and R-value. The test results are presented on the boring logs and on Plates 16 through 22.

SITE CONDITIONS

General

Napa County is located within the California Coast Range geomorphic province. This province is a geologically complex and seismically active region characterized by sub-parallel northwest-trending faults, mountain ranges and valleys. The oldest bedrock units are the Jurassic-Cretaceous Franciscan Complex and Great Valley sequence sediments originally deposited in a marine environment. Subsequently, younger rocks such as the Tertiary-age Sonoma Volcanics group, the Plio-Pleistocene-age Clear Lake Volcanics and sedimentary rocks such as the Guinda, Domengine, Petaluma, Wilson Grove, Cache, Huichica and Glen Ellen formations were deposited throughout the province. Extensive folding and thrust faulting during late Cretaceous through early Tertiary geologic time created complex geologic conditions that underlie the highly varied topography of today. In valleys, the bedrock is covered by thick alluvial soil. The site is located on the northern side of the City of Napa.

Geology

Published geologic maps (Clahan et al., 2004) indicate the property is underlain by undivided alluvium of latest Pleistocene age. The alluvium includes fan, stream terrace, basin, and channel deposits composed of poorly to moderately sorted sand, silt, clay and gravel.

Surface

The parcels extend primarily over relatively flat, valley terrain extending southward from El Centro Avenue. A narrow creek channel runs generally southwest along most of the southern border of the property. The southeastern corner of the site extends to the south side of the stream. A small pedestrian bridge spans the creek in this area. Two residences, including some outbuildings, are located along El Centro Avenue. The remainder of the site is covered in vineyards. In general, the ground surface within the vineyard area, which makes up most of the site, is soft and spongy. This is a condition generally associated with weak, porous surface soil. Natural drainage consists of sheet flow over the ground surface that concentrates in man-made surface drainage elements such as roadside ditches, and natural drainage elements such as the creek.

Subsurface

Our borings and laboratory tests indicate that the portion of the site we studied is blanketed by 1 to about 3 feet of weak, porous, compressible, clayey soil. Porous soil appears hard and strong when dry but becomes weak and compressible as its moisture content increases towards saturation. Our borings were performed in the vineyard access roads. It has been our experience that weak and porous soil within vineyards extend to the depth of previous ripping, which usually is about 3 feet. The near surface soil generally exhibits low to medium plasticity (LL = 29 to 37; PI = 11 to 17) and low to medium expansion potential (EI = 32 to 59). Locally the near surface soils exhibit higher plasticity and expansion potential than indicated by the laboratory test results. The near-surface soils are typically underlain by clay, clayey sand and clayey sand with gravel to the maximum depths explored (about 18½ feet). A detailed description of the subsurface conditions found in our borings is given on Plates 3 through 14, Appendix A. Based on Table 20.3-1 of American Society of Civil Engineers (ASCE) Standard 7-10, titled “Minimum Design Loads for Buildings and Other Structures” (2010), we have determined a Site Class of D should be used for the site.

Corrosion Potential

Mapping by the Natural Resources Conservation Service (2017) indicates that the corrosion potential of the near surface soil is high for uncoated steel and moderate for concrete. Performing corrosivity tests to verify these values was not part of our requested and/or proposed scope of work. Should the need arise, we would be pleased to provide a proposal to evaluate these characteristics.

Groundwater

Free groundwater was first detected in our borings at depths ranging from about 7 to 14 feet below the ground surface at the time of drilling. When borings B-2 and B-6 were backfilled after drilling was completed, the water level had risen to depths ranging from about 9 to 9½ feet. Groundwater was not detected in borings B-3 and B-5. Fluctuation in the groundwater level typically occurs because of a variation in rainfall intensity, duration and other factors such as flooding, irrigation, and well locations.

Flooding

Our review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Napa County, California, Unincorporated Areas (Community Panel No. 06055C0504E) dated September 26, 2008, indicates that the site is located within Zone “X”, an area outside of the 0.2 percent chance annual flood plain. Evaluation of flooding potential is typically the responsibility of the project civil engineer.

DISCUSSION AND CONCLUSIONS

Seismic Hazards

Faulting and Seismicity

We did not observe landforms within the area that would indicate the presence of active faults and the site is not within a current Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). Therefore, we believe the risk of fault rupture at the site is low. The site is within an area affected by strong seismic activity. Several northwest-trending Earthquake Fault Zones exist in close proximity to and within several miles of the site (Bortugno, 1982). The shortest distances from the site to the mapped surface expression of these faults are presented in the table below. Based on the nearby active faults, future seismic shaking should be anticipated at the site. It will be necessary to design and construct the proposed improvements in strict adherence with current standards for earthquake-resistant construction.

ACTIVE FAULT PROXIMITY		
Fault	**Direction**	**Distance-Miles**
San Andreas	SW	34½
Healdsburg-Rodgers Creek	SW	14
Concord-Green Valley	E	5½
Cordelia	E	8
West Napa	WSW	2

Liquefaction

Liquefaction is a rapid loss of shear strength experienced in saturated, predominantly granular soil below the groundwater level during strong earthquake ground shaking due to an increase in pore water pressure. The occurrence of this phenomenon is dependent on many complex factors including the intensity and duration of ground shaking, particle size distribution and density of the soil.

Granular soil was encountered at the site below the groundwater table. Therefore, we performed an analysis of the blow count data from our borings using the methods of Seed and Idriss (1982), Seed and others (1985), Youd and Idriss (2001), Idriss and Boulanger (2004) and Idriss and Boulanger (2008). These procedures normalize the blow counts to account for overburden pressure, rod length, hammer energy, and fines (percent of silt and clay) content. Once the blow counts are normalized and adjusted to a clean sand blow count, the cyclic resistance ratio (CRR) for each blow count is then determined using the same procedures referenced above. The CRR is compared to the cyclic stress ratio (CSR) induced by the earthquake. Calculating the CSR requires a peak ground acceleration and design earthquake magnitude.

Peak ground acceleration (PGA) was determined using the methods in the 2016 California Building Code (CBC) and the ASC) Standard 7-10 (2010). Using the U.S. Seismic Design Maps from the United States Geological Survey (USGS) website (http://earthquake.usgs.gov/designmaps/us/application.php), the site's latitude and longitude of 38.3350°N and 122.3147°W, respectively, and a site soil Class of D, the PGA for the site is 0.676g. Using this information, the CSR for a M_M 7.5 earthquake at the site ranges from 0.44 to 0.54. The Concord-Green Valley fault is most likely controlling the ground motions at the site. According to Petersen (1996), the Concord-Green Valley fault is capable of a M_M 6.9 earthquake. Therefore, the CRR values at the site must be scaled to account for the difference between M_M 6.9 and M_M 7.5. When the scaling factor for magnitude and confining stress corrections presented in Idriss and Boulanger (2004) are applied, the CRR values at the site do not exceed the CSR values for layers ranging in thickness from about 1½ to 5 feet between about 8 and 16 feet.

There are three potential consequences of liquefaction: bearing capacity failure, lateral spreading toward a free face (e.g. riverbank) and settlement. Bearing capacity failure is sudden and extreme settlement of foundations that typically occurs when the liquefied layer is relatively close (typically within two times the footing width, depending on the loads) to the bottom of the foundation. Because the liquefiable layer is 8 feet below the ground surface at its shallowest, we judge that the potential for bearing capacity failure is low.

Lateral spreading can occur where continuous layers of liquefiable soil extend to a free face, such as a creek bank. There is a creek that is about 8 feet deep that runs through the property. The potentially liquefiable layers at the site are discontinuous and the shallowest these soils were observed is at 8 feet, which is below the creek bottom. Therefore, we judge the potential for liquefaction-induced lateral spreading at the site is low.

The third potential consequence of liquefaction is settlement due to densification of the liquefied soil. Potential settlements based on the blow count data and cyclic stress ratio were calculated using the methods of Ishihara and Yoshimine (1992). For the layers encountered in our borings, we calculated total settlement ranging from ¼ to 1¼ inches. Given that liquefiable soils are not present in all of our borings, differential settlement could range from ¼ to 1¼ inches between adjacent borings. Based on the location of the borings, we estimate that liquefaction-induced differential settlement across each residence could be on the order of ½ inch.

Densification

Densification is the settlement of loose, granular soil above the groundwater level due to earthquake shaking. Typically, granular soil that would be susceptible to liquefaction, if saturated, are susceptible to densification if not saturated. As discussed in the "Liquefaction" section, the soil at the site have the potential for liquefaction. However, granular soils were not encountered above the groundwater table. Therefore, we judge that there is a low potential for densification to impact planned residences.

Geotechnical Issues

General

Based on our study, we judge the proposed residences and associated improvements can be built as planned, provided the recommendations presented in this report are incorporated into their design and construction. The primary geotechnical concerns during design and construction of the project are:

1. The presence of up to 3 feet of weak, porous, compressible surface soil that can locally be medium to highly expansive;

2. The detrimental effects of uncontrolled surface runoff on the long-term satisfactory performance of residences; and

3. The strong ground shaking predicted to impact the site during the life of the project.

Weak, Porous Surface Soil

Weak, porous surface soil, such as that found at the site, appears hard and strong when dry but will lose strength rapidly and settle under the load of fills, foundations, slabs, and pavements as its moisture content increases and approaches saturation. The moisture content of this soil can increase as the result of rainfall, periodic irrigation or when the natural upward migration of water vapor through the soil is impeded by, and condenses under fills, foundations, slabs, and pavements. The detrimental effects of such movements can be reduced by strengthening the soil during grading. This can be achieved by excavating the weak soil and replacing it as properly compacted fill. Alternatively, satisfactory foundation support could be obtained below the weak surface soil.

Expansive Soil

The near surface soil can be locally expansive. Expansive surface soil shrinks and swells as it loses and gains moisture throughout the yearly weather cycle. Near the surface, the resulting movements can heave and crack lightly loaded shallow foundations (spread footings) and slabs. The zone of significant moisture variation (active layer) is dependent on the expansion potential of the soil and the extent of the dry season. In the Napa area, the active layer is generally considered to range in thickness from about 2 to 3 feet. Stable foundation support needs to be obtained below the active layer or from post-tensioned slabs-on-grade.

Foundation, Slab and Pavement Support - After remedial grading, satisfactory foundation support for the residences can be obtained from post-tensioned slabs-on-grade bottomed on the engineered fill. Exterior slabs and pavements can also be satisfactorily supported on the engineered fill.

As an alternative to the extensive grading required to strengthen the weak, locally expansive, surface soil, satisfactory foundation support for the residences can be obtained from a system of grade beams supported on drilled piers that gain support below the weak surface materials and the active layer. With this alternative, it will not be necessary to remove and recompact the weak surface materials within living areas provided that:

1. Wood floors supported on joist above grade are used in living areas; and

2. The weak soil is removed and recompacted for a depth of at least 12 inches in garage, exterior concrete slab-on-grade and paved areas.

On-Site Soil Quality

We anticipate that, with the exception of organic matter and of rocks or lumps larger than 6 inches in diameter, the excavated material will be suitable for re-use as engineered fill within building, exterior slab and pavement areas.

Settlement

If the remedial grading and/or foundations are installed in accordance with the recommendations presented in this report, we estimate that post-construction non-earthquake-induced differential settlement across each residence will be about ½-inch. In addition, we estimate that earthquake-induced differential settlement across each residence will be about ½-inch.

Surface Drainage

The site may be impacted by surface runoff. Surface runoff typically sheet flows over the ground surface but can be concentrated by the planned site grading, landscaping, and drainage. The surface runoff can pond against structures and/or seep into the crawl space or slab rock. Therefore, strict control of surface runoff is necessary to provide long-term satisfactory performance of residential projects. It will be necessary to divert surface runoff around improvements and provide positive drainage away from structures. This can be achieved by constructing the building pads several inches above the surrounding area and conveying the runoff into man made drainage elements or natural swales that lead downgradient of the site.

RECOMMENDATIONS

Seismic Design

Seismic design parameters presented below are based on Section 1613 titled "Earthquake Loads" of the 2016 California Building Code (CBC). Based on Table 20.3-1 of ASCE Standard 7-10 (2010), we have determined a Site Class of D should be used for the site. Using a site latitude and longitude of 38.3350°N and 122.3147°W, respectively, and the U.S. Seismic Design Maps from the United States Geological Survey (USGS) website (http://earthquake.usgs.gov/designmaps/us/application.php), we recommend that the following seismic design criteria be used for structures at the site.

2016 CBC Seismic Criteria	
Spectral Response Parameter	**Acceleration (g)**
S_S (0.2 second period)	1.956
S_1 (1 second period)	0.701
S_{MS} (0.2 second period)	0.956
S_{M1} (1 second period)	1.051
S_{DS} (0.2 second period)	1.304
S_{D1} (1 second period)	0.701

Grading

Site Preparation

Areas to be developed should be cleared of vegetation and debris, including that left by the removal of obsolete structures. Trees and shrubs that will not be part of the proposed development should be removed and their primary root systems grubbed. Cleared and grubbed material should be removed from the site and disposed of in accordance with County Health Department guidelines. We did not observe septic tanks, leach lines or underground fuel tanks during our study. Any such appurtenances found during grading should be capped and sealed and/or excavated and removed from the site, respectively, in accordance with established guidelines and requirements of the County Health Department. Voids created during clearing should be backfilled with engineered fill as recommended herein.

Stripping

Areas to be graded should be stripped of the upper few inches of soil containing organic matter. Soil containing more than two percent by weight of organic matter should be considered organic. Actual stripping depth should be determined by a representative of the geotechnical engineer in the field at the time of stripping. The strippings should be removed from the site, or if suitable, stockpiled for re-use as topsoil in landscaping.

Excavations

Following initial site preparation, excavation should be performed as recommended herein. Excavations extending below the proposed finished grade should be backfilled with suitable materials compacted to the requirements given below.

Within building areas, where post-tensioned slabs are chosen for foundation support, the weak, porous, compressible, previously ripped soils should be excavated to within 6 inches of their entire depth (approximately 3 feet). This grading is not required where drilled pier and grade beam foundations are used. Within garage slab subgrade areas, where drilled pier foundations are used, and within exterior slab and pavement subgrade areas, the weak, porous, compressible soils should be removed to at least 12 inches below subgrade. The excavation of weak, porous, compressible, surface materials should extend at least 5 feet beyond the outside edge of the post-tensioned slabs and 3 feet beyond the edge of exterior slabs and pavements. The excavated materials should be stockpiled for later use as compacted fill, or removed from the site, as applicable.

At all times, temporary construction excavations should conform to the regulations of the State of California, Department of Industrial Relations, Division of Industrial Safety or other stricter governing regulations. The stability of temporary cut slopes, such as those constructed during the installation of underground utilities, should be the responsibility of the contractor. Depending on the time of year when grading is performed, and the surface conditions exposed, temporary cut slopes may need to be excavated to 1½:1, or flatter. The tops of the temporary cut slopes should be rounded back to 2:1 in weak soil zones.

Fill Quality

All fill materials should be free of perishable matter and rocks or lumps over 6 inches in diameter, and must be approved by the geotechnical engineer prior to use. We judge the on-site soil is generally suitable for use as engineered fill within building, garage slab, exterior slab and pavement areas. The suitability of the on-site soil for use as engineered fill should be verified during grading.

Import Fill

In general, import fill, if needed, should be select. Select fill should be free of organic matter, have a low expansion potential, and conform in general to the following requirements:

SIEVE SIZE	PERCENT PASSING (by dry weight)
6 inch	100
4 inch	90 – 100
No. 200	10 – 60

Liquid Limit – 40 Percent Maximum
Plasticity Index – 15 Percent Maximum

Material not conforming to these requirements may be suitable for use as import fill; however, it shall be the contractor's responsibility to demonstrate that the proposed material will perform in an equivalent manner. The geotechnical engineer should approve imported materials prior to use as compacted fill. The grading contractor is responsible for submitting, at least 72 hours (3 days) in advance of its intended use, samples of the proposed import materials for laboratory testing and approval by the soils engineer.

Fill Placement

The surface exposed by stripping and removal of weak, porous, compressible surface soil should be scarified to a depth of at least 6 inches, uniformly moisture-conditioned to at least 2 percent above optimum and compacted to at least 90 percent of the maximum dry density of the materials as determined by ASTM Test Method D-1557. Approved fill material should then be spread in thin lifts, uniformly moisture-conditioned to at least 2 percent above optimum and properly compacted. All structural fills, including those placed to establish site surface drainage, should be compacted to at least 90 percent relative compaction.

SUMMARY OF COMPACTION RECOMMENDATIONS

Area	Compaction Recommendation (ASTM D-1557)
Preparation for areas to receive fill	After preparation in accordance with this report, compact upper 6 inches to a minimum of 90 percent relative compaction.
General fill (native or import)	Compact to a minimum of 90 percent relative compaction.
Structural fill beneath buildings, extending outward to 5' beyond building perimeter	Compact to a minimum of 90 percent relative compaction.
Trenches	Compact to a minimum of 90 percent relative compaction. Compact the top 6 inches below vehicle pavement subgrade to a minimum of 95 percent relative compaction.
Pavements, extending outward to 3' beyond edge of pavement	Compact upper 6 inches of subgrade to a minimum of 95 percent relative compaction.
Concrete flatwork and exterior slabs, extending outward to 3' beyond edge of slab	Compact subgrade to a minimum of 90 percent relative compaction. Where subject to vehicle traffic, compact upper 6 inches of subgrade to at least 95 percent relative compaction.
Aggregate Base	Compact aggregate base to at least 95 percent relative compaction.

Wet Weather Grading

Generally, grading is performed more economically during the summer months when on-site soil are usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to excessive moisture in on-site soil. Special and relatively expensive construction procedures, including dewatering of excavations and importing granular soil, should be anticipated if grading must be completed during the winter and early spring or if localized areas of soft saturated soil are found during grading in the summer and fall.

Open excavations also tend to be more unstable during wet weather as groundwater seeps towards the exposed cut slope. Severe sloughing and occasional slope failures should be anticipated. The occurrence of these events will require extensive clean up and the installation of slope protection measures, thus delaying projects. The general contractor is responsible for the performance, maintenance and repair of temporary cut slopes.

Foundation Support

Post-tensioned slabs can be used if the weak and porous surface soils have been strengthened through remedial grading. As an alternative to remedial grading, drilled piers and grade beams can be used with raised wood floors. Specific recommendations for each alternative are given in the following sections of the report.

Post-Tension Slabs

A post tension (PT) slab should be a designed to accommodate edge moisture variation distances of 4.5 and 8.7 feet for edge and center lift conditions, respectively, a differential edge swell of 0.46 inch and a center swell of 0.63 inch. These parameters were developed using the Post-Tensioning Institute manual “Design and Construction of Post-Tensioned Slabs-On-Ground, Third Edition” (2004). When using these criteria, PT slabs should be designed in accordance with the procedures of the Third Edition only. A PT slab installed in accordance with the foregoing recommendations may be designed using allowable bearing pressures of 2,000, 3,000 and 4,000 pounds per square foot (psf) for dead loads, dead plus code live loads, and total loads, including wind and seismic, respectively. We recommend a minimum slab thickness of 10 inches and a 12-inch-wide (minimum) perimeter thickened edge. Concentrated loads in the slab interior should also be supported by thickened beams within the slab.

The PT slab should be underlain with a capillary moisture break consisting of at least 4 inches of clean, free-draining crushed rock or gravel (excluding pea gravel) at least ¼-inch and no larger than ¾-inch in size. The subgrade soil within and for a distance of 5 feet beyond the footprint of the buildings should be kept pre-swelled until the capillary moisture break is placed. The moisture content of the subgrade soil should be approved by the geotechnical engineer within 24 hours prior to placing the capillary moisture break. Where migration of moisture vapor through slabs would be detrimental, a moisture vapor barrier should be provided. RGH does not practice in the field of moisture vapor transmission evaluation or mitigation. Therefore, we recommend that a qualified person be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person should

provide recommendations for mitigation of the potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

Structural elements that are attached to the structure, but have their own foundation should not be used or should be founded on the PT slab. Exterior flatwork and concrete walkway subgrades should be underlain by at least 12 inches of engineered fill. In addition, concrete walkways should be:

1. Cast separate from the PT slab to allow differential settlement to occur without distressing the walkway;

2. Reinforced to reduce cracks; and

3. Grooved to induce cracking in a non-obtrusive manner.

The Post-Tensioning Institute states “Consideration should be given to ‘artificial’ effects, such as planter units adjacent to structural bearing areas. Tree roots can be a serious problem and cause volume reduction in limited areas, thus causing distress to the slab foundation. Trees that are planted closer to the foundation than half their ultimate height can be expected to cause significant differential movement.”

Drilled Piers

Drilled piers should be at least 12 inches in diameter and should extend at least 8 feet below finished ground surface. Where fill is placed to create a pad and the weak, compressible soil is not strengthened by grading, the piers should be deepened in direct proportion to the thickness of fill. Larger piers and deeper embedment may be needed to resist the lateral forces imposed by earthquakes per the 2016 California Building Code. Piers should be spaced no closer than 3 pier diameters, center to center.

Skin Friction - The portion of the piers extending below the weak and porous layer (3 feet plus fill, if placed) may be designed using an allowable skin friction of 500 psf for dead load plus long term live loads. This value can be increased by ⅓ for total loads, including downward vertical wind or seismic forces, however the skin friction below 8 feet should be neglected when evaluating seismic loading due to liquefaction. A skin friction value of 350 psf should be used to resist uplift forces, but should be neglected below 8 feet if being used to resist seismic forces. End bearing should be neglected because of the difficulty of cleaning out small diameter pier holes, and the uncertainty of mobilizing end bearing and skin friction simultaneously.

Lateral Forces - Lateral loads on piers will be resisted by passive pressure on the soil. An equivalent fluid pressure of 350 pcf acting on two pier diameters should be used. Confinement for passive pressure may be assumed from 3 feet below the lowest adjacent finished ground surface. When analyzing for seismic forces, passive pressure should not be applied below 8 feet from existing grade due to liquefaction.

The piers should be interconnected with grade beams to support building loads and to redistribute stresses imposed by wind or earthquakes and the expansive surface soil. The grade beams should be designed to span between the piers in accordance with structural requirements. The steel from the piers should extend sufficient distance into the grade beams to develop its full bond strength.

Uplift Forces - The piers and grade beams should be designed to resist uplift pressures imposed by expansive soil. The uplift pressure should be assumed to be 2,000 psf of grade beam surface contact. Alternatively, a 2-inch thick void form can be used below the grade beams.

Pier Drilling - We did encounter groundwater within potential pier depths during our study. If groundwater is encountered during drilling, it may be necessary to de-water the holes and/or place the concrete by the tremie method. If caving soil is encountered, it may be necessary to case the holes.

Concrete - Concrete mix design and placement should be done in accordance with the current ADSC and/or ACI specifications. Concrete should not be allowed to mushroom at the top of the piers or below the bottom of grade beams.

Slab-On-Grade

Provided grading is performed in accordance with the recommendations presented herein, exterior and garage slabs should be underlain by engineered fill. Slab-on-grade subgrade should be rolled to produce a dense, uniform surface. The future expansion potential of the subgrade soil should be reduced by thoroughly presoaking the slab subgrade prior to concrete placement. The moisture condition of the subgrade soil should be checked by the geotechnical engineer no more than 24 hours prior to placing the capillary moisture break. The slabs should be underlain with a capillary moisture break consisting of at least 4 inches of clean, free-draining crushed rock or gravel (excluding pea gravel) at least ¼-inch and no larger than ¾-inch in size. Interior slabs subject to vehicular traffic may be underlain by Class 2 aggregate base. The use of Class 2 aggregate base should be reviewed on a case by case basis. Class 2 aggregate base can be used for slab rock under exterior slabs.

Slabs should be designed by the project civil or structural engineer to support the anticipated loads, reduce cracking and provide protection against the infiltration of moisture vapor. Garage slabs should be separated from foundations and framing elements with low friction material.

A vapor barrier should be placed under all slabs-on-grade that are likely to receive an impermeable floor finish or be used for any purpose where the passage of water vapor through the floor is undesirable. RGH does not practice in the field of moisture vapor transmission evaluation or mitigation. Therefore, we recommend that a qualified person be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person should provide recommendations for mitigation of the potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

Utility Trenches

The shoring and safety of trench excavations is solely the responsibility of the contractor. Attention is drawn to the State of California Safety Orders dealing with "Excavations and Trenches."

Unless otherwise specified by the City of Napa, on-site, inorganic soil may be used as utility trench backfill. Where utility trenches support pavements, slabs and foundations, trench backfill should consist of aggregate baserock. The baserock should comply with the minimum requirements in Caltrans Standard Specifications, Section 26 for Class 2 Aggregate Base. Trench backfill should be moisture-conditioned as necessary, and placed in horizontal layers not exceeding 8 inches in thickness, before compaction. Each layer should be compacted to at least 90 percent relative compaction as determined by ASTM Test Method D-1557. The top 6 inches of trench backfill below vehicle pavement subgrades should be moisture-conditioned as necessary and compacted to at least 95 percent relative compaction. Jetting or ponding of trench backfill to aid in achieving the recommended degree of compaction should not be attempted.

Pavements

An R-Value of 5 was measured on a composite sample of the anticipated pavement subgrade soils. Based on the measured R-Value, we have computed pavement sections for Traffic Indices (TI) ranging from 5.0 to 7.0 in the table below. The project engineer, in consultation with City officials, should choose the pertinent (TI) for this project.

PAVEMENT SECTIONS			
TI	ASPHALT CONCRETE (feet)	CLASS 2 AGGREGATE BASE (feet)	AGGREGATE SUBBASE (feet)
7.0	0.35	1.25	0
6.0	0.25	1.15	0
5.0	0.20	0.90	0

Pavement thicknesses were computed using Caltrans CalFP v1.5 design software and are based on a pavement life of 20 years. These recommendations are intended to provide support for traffic represented by the indicated Traffic Indices. They are not intended to provide pavement sections for heavy concentrated construction storage or wheel loads such as forklifts, parked truck-trailers and concrete trucks.

In areas where heavy construction storage and wheel loads are anticipated, the pavements should be designed to support these loads. Support could be provided by increasing pavement sections or by providing reinforced concrete slabs. Alternatively, paving can be deferred until heavy construction storage and wheel loads are no longer present.

Prior to placement of aggregate base, the upper 6 inches of the pavement subgrade soil should be scarified, uniformly moisture-conditioned to near optimum, and compacted to at least 95 percent relative compaction to form a firm, non-yielding surface. Aggregate base materials should be spread in thin layers, uniformly moisture-conditioned, and compacted to at least 95 percent relative compaction to form a firm, non-yielding surface. The materials and methods used should conform to the requirements of the City of Napa and the current edition of the Caltrans Standard Specifications, except that compaction requirements should be based on ASTM Test Method D-1557. Aggregate used for the base course should comply with the minimum requirements specified in Caltrans Standard Specifications, Section 26 for Class 2 Aggregate Base.

Wet Weather Paving

In general, the pavements should be constructed during the dry season to avoid the saturation of the subgrade and base materials, which often occurs during the wet winter months. If pavements are constructed during the winter, a cost increase relative to drier weather construction should be anticipated. Unstable areas may have to be overexcavated to remove soft soil. The excavations will probably require backfilling with imported crushed (ballast) rock. The geotechnical engineer should be consulted for recommendations at the time of construction.

Geotechnical Drainage

Surface water should be diverted away from foundations and edges of pavements. Surface drainage gradients should slope away from building foundations in accordance with the requirements of the CBC or local governing agency. Where a gradient flatter than 2 percent for paved areas and 4 percent for unpaved areas is required to satisfy design constraints, area drains should be installed within the rear and side yard swales with spacing no greater than about 20 feet. Roofs should be provided with gutters and the downspouts should be connected to closed (glued Schedule 40 PVC or ABS with SDR of 35 or better) conduits discharging well away from foundations, onto paved areas or into the site's surface drainage system. Roof downspouts and surface drains must be maintained entirely separate from the perimeter foundation drains and slab underdrains recommended hereinafter.

Water seepage or the spread of extensive root systems into the soil subgrade of footings, slabs or pavements could cause differential movements and consequent distress in these structural elements. Landscaping should be planned with consideration for these potential problems.

Perimeter Foundation Drains

Where interior crawl spaces are lower than adjacent exterior grade, subdrains should be installed adjacent to perimeter foundations to prevent surface runoff from entering the crawl space. Foundation drains should consist of trenches that are at least 10 inches below the crawl space surface and are sloped to drain by gravity. Four-inch diameter perforated pipe sloped to drain to outlets by gravity should be placed in the bottom of the trenches. The top of subdrain pipes should be at least 12 inches lower than the adjacent crawl space. The perimeter subdrain trenches should be backfilled to within 6 inches of the surface with Class 2 permeable material.

The upper 6 inches should be backfilled with compacted soil to exclude surface water. An illustration of this system is shown on Plate 23. Where perimeter foundation drains are not used, water ponding in the crawl space should be anticipated.

Crawl Space Drains

Crawl spaces are inherently damp and humid. In addition, groundwater seepage is unpredictable and difficult to control and, regardless of the care used in installing perimeter foundation drains, can find its way into crawl spaces. The ground surface within the crawl space should be sloped to drain away from foundations and toward a 12-inch square drain trench that is excavated through the longitudinal axis of the crawl space. A 4-inch diameter perforated drain pipe (SDR 35 or better) should be embedded in Class 2 permeable materials near the bottom of the trench. The drain rock should extend to the surface of the crawl space (see Plate 23). Piped outlets should be provided to allow drainage of the collected water through foundations and discharge into the storm drain system. Additional protection against water seepage into crawl spaces can be obtained by compacting fill placed adjacent to perimeter walls to at least 90 percent relative compaction.

Slab Underdrains

Where living area slab subgrades are less than 6 inches above adjacent exterior grade and where migration of moisture through the slab would be detrimental, slab underdrains should be installed to dispose of surface and/or groundwater that may seep and collect in the slab rock. Slab underdrains should consist of 6-inch wide trenches that extend at least 6 inches below the bottom of the slab rock and slope to drain by gravity. The slab underdrain trenches should be spaced no further than 15 feet, both ways. Additional drain trenches should be installed, as necessary, to drain all isolated under slab areas. Four-inch diameter perforated pipe (SDR 35 or better) sloped to drain to outlets by gravity should be placed in the bottom of the trenches. Slab underdrain trenches should be backfilled to subgrade level with clean, free draining slab rock. An illustration of this system is shown on Plate 23. If slab underdrains are not used, it should be anticipated that water will enter the slab rock, permeate through the concrete slab and ruin floor coverings.

Maintenance

Periodic land maintenance will be required. Surface and subsurface drainage facilities should be checked frequently, and cleaned and maintained as necessary or at least annually. A dense growth of deep-rooted ground cover must be maintained on all slopes to reduce sloughing and erosion. Sloughing and erosion that occurs must be repaired promptly before it can enlarge.

Supplemental Services

Pre-Bid Meeting

It has been our experience that contractors bidding on the project often contact us to discuss the geotechnical aspects. Informal contacts between RGH and an individual contractor could result in incomplete or misinterpreted information being provided to the contractor. Therefore,

we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project owner or their designated representative. After consultation with RGH, the project owner or their representative should provide clarifications or additional information to all contractors bidding the job.

Plan and Specifications Review

Coordination between the design team and the geotechnical engineer is recommended to assure that the design is compatible with the soil, geologic and groundwater conditions encountered during our study. RGH Consultants (RGH) recommends that we be retained to review the project plans and specifications to determine if they are consistent with our recommendations. In the event we are not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

Construction Observation and Testing

Prior to construction, a meeting should be held at the site that includes, but is not limited to, the owner or owner's representative, the general contractor, the grading contractor, the foundation contractor, the underground contractor, any specialty contractors, the project civil engineer, other members of the project design team and RGH. This meeting should serve as a time to discuss and answer questions regarding the recommendations presented herein and to establish the coordination procedure between the contractors and RGH.

In addition, we should be retained to monitor all soil related work during construction, including:

- Site stripping, over-excavation, grading, and compaction of near surface soil;
- Placement of all engineered fill and trench backfill with verification field and laboratory testing;
- Observation of all foundation excavations, including pier drilling; and
- Observation of foundation and subdrain installations.

If, during construction, we observe subsurface conditions different from those encountered during the explorations, we should be allowed to amend our recommendations accordingly. If different conditions are observed by others, or appear to be present beneath excavations, RGH should be advised at once so that these conditions may be evaluated and our recommendations reviewed and updated, if warranted. The validity of recommendations made in this report is contingent upon our being notified and retained to review the changed conditions.

If more than 18 months have elapsed between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at, or adjacent to, the site, the recommendations made in this report may no longer be valid or appropriate. In such case, we recommend that we be retained to review this report and verify the applicability of the conclusions and recommendations or modify the same considering the time lapsed or changed conditions. The validity of recommendations made in this report is contingent upon such review.

These supplemental services are performed on an as-requested basis and are in addition to this geotechnical study. We cannot accept responsibility for items that we are not notified to observe or for changed conditions we are not allowed to review.

LIMITATIONS

This report has been prepared by RGH for the exclusive use of the Biale Family and their consultants as an aid in the design and construction of the proposed improvements described in this report.

The validity of the recommendations contained in this report depends upon an adequate testing and monitoring program during the construction phase. Unless the construction monitoring and testing program is provided by our firm, we will not be held responsible for compliance with design recommendations presented in this report and other addendum submitted as part of this report.

Our services consist of professional opinions and conclusions developed in accordance with generally accepted geotechnical engineering principles and practices. We provide no warranty, either expressed or implied. Our conclusions and recommendations are based on the information provided to us regarding the proposed construction, the results of our field exploration, laboratory testing program, and professional judgment. Verification of our conclusions and recommendations is subject to our review of the project plans and specifications, and our observation of construction.

The borings represent the subsurface conditions at the locations and on the date indicated. It is not warranted that they are representative of such conditions elsewhere or at other times. Site conditions and cultural features described in the text of this report are those existing at the time of our field exploration on October 30 and December 19, 2017, and may not necessarily be the same or comparable at other times.

The scope of our services did not include an environmental assessment or a study of the presence or absence of toxic mold and/or hazardous, toxic or corrosive materials in the soil, surface water, groundwater or air (on, below or around this site), nor did it include an evaluation or study for the presence or absence of wetlands. These studies should be conducted under separate cover, scope and fee and should be provided by a qualified expert in those fields.

APPENDIX A - PLATES

LIST OF PLATES

Plate 1	Site Location Map
Plate 2	Exploration Plan
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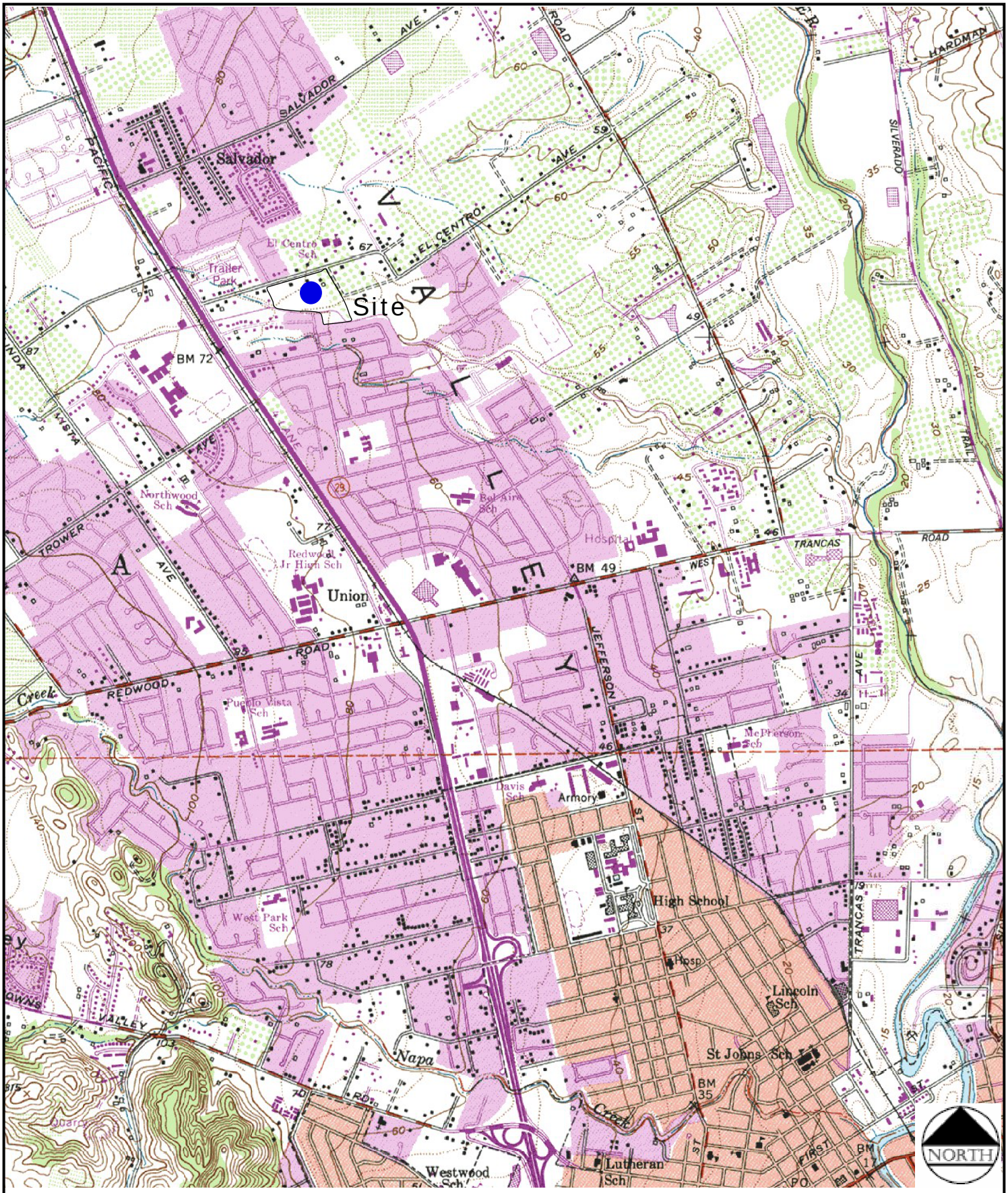
Plate 15	Soil Classification Chart and Key to Test Data
Plate 16	Classification Test Data
Plates 17 and 18	Particle Size Analysis Test Data
Plates 19 through 21	Strength Test Data
Plate 22	Resistance (R) Value Data
Plate 23	Typical Subdrain Details Illustration



Reference: Maptech Topoquad, Napa, California Quadrangle

Scale: 1" = 2000'

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Job No: 7121.01.04.2 | Date: JAN 2018

SITE LOCATION MAP
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
1

B-5
B-4
B-9
B-3
B-1
B-2
B-10
B-8
B-11
B-12
B-7
B-6

CLEMENTINA CIRCLE
ALDO COURT
EL CENTRO AVENUE
VIA LA PAZ
LASSEN STREET
UNWIN DRIVE
TOT LOT
BIO

EXPLANATION

B-3 Boring Location and Number

80 0 80 feet

Reference: Zinfandel Estate Subdivision Conceptual Layout by RSA+

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EXPLORATION PLAN
Zinfandel Subdivision
1583 & 1657 El Centro Avenue
Napa, California

PLATE 2

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **15 1/2 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **11 1/2 feet**	Sampling Method(s) **Modified California**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN SANDY CLAY (CL), very stiff, dry, with small gravels, mottled orange								
			17										
			10		becomes dark brown, stiff								
	5												
			13		LIGHT BROWN CLAY WITH SAND (CH), stiff, moist	105.2	21.4						Su = 2672 psf
	10		12		BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist ▽			17.9					
					LIGHT BROWN CLAY (CH), very stiff, moist, mottled orange								
	15		20		Boring terminated at 15 1/2 feet. Water encountered at 11 1/2 feet during drilling.								

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LOG OF BORING B-1
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **3**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **15 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **9 1/2 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				LIGHT BROWN CLAY (CL), very stiff, dry, with rootlets								
			28										
					LIGHT BROWN CLAY WITH SAND (CH), stiff, dry, with rootlets, mottled orange								
			15			110.8	18.3						Su = 11948 psf
	5				becomes very stiff, no rootlets								
			25			103.4	21.0						Su = 6290 psf
					LIGHT BROWN SANDY CLAY WITH GRAVEL (CL), stiff, dry, gravels under 1/2" diameter								
			12										
	10												
					DARK BROWN SAND WITH CLAY (SP-SC), medium dense, wet, with gravel, coarse sand			10.3					
			10										
					GRAY-BROWN CLAY WITH SAND (CH), very stiff, moist to wet								
	15		20		Boring terminated at 15 feet. Water encountered at 14 feet during drilling, rose to 9 1/2 feet at end of day.								

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LOG OF BORING B-2
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **4**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **12 1/2 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Water Encountered**	Sampling Method(s) **Modified California**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN SANDY CLAY (CL), very stiff, dry, mottled white								
			21					65.4	17	37	58		
			22										
	5				becomes stiff, mottled orange								
			15										
			26		GRAY-BROWN CLAY WITH SAND (CH), very stiff, dry, mottled orange								
	10				GRAY-BROWN SANDY CLAY (CL), stiff, moist, mottled orange								
			14		Boring terminated at 12 1/2 feet. No free water encountered.								
	15												

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LOG OF BORING B-3
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **5**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **14 1/2 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **13 feet**	Sampling Method(s) **Modified California**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN CLAY (CL), hard, dry								
			40										
					BROWN CLAY WITH SAND (CH), very stiff, dry, mottled orange								
	5		20										
			23										
					becomes moist								
	10		23										
					GRAY-BROWN SANDY CLAY (CL), medium stiff, moist to wet ▽								
			10										
	15				Boring terminated at 14 1/2 feet. Water encountered at 13 feet during drilling.								

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LOG OF BORING B-4
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **6**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **11 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Water Encountered**	Sampling Method(s) **Modified California**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN SANDY CLAY (CL), very stiff, dry								
			18					68.7	11	29	32		
			18		BROWN SANDY CLAY (CH), very stiff, dry								
	5		29		LIGHT BROWN CLAY (CH), very stiff, dry some gravels encountered								
	10		15		LIGHT BROWN CLAY (CH), stiff, moist								
					Boring terminated at 11 feet. No free water encountered during drilling.								
	15												

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LOG OF BORING B-5
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **7**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **15 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **9 1/2 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN CLAY WITH SAND (CL), very stiff, dry, mottled orange								
			24										
					becomes very stiff, with trace gravel								
			13										
	5				becomes very stiff, with fine gravel								
			20										
					BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, wet, larger gravels at 9 1/2 feet			27.5	30	51			
			16										
	10				DARK BROWN SAND WITH CLAY (SP-SC), medium dense, wet, with gravel			10.9					
			10										
	15		9		BROWN CLAY WITH SAND (CL), medium stiff, wet, mottled orange								
					Boring terminated at 15 feet. Water encountered at 9 1/2 feet during drilling, rose to 9 feet.								

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-6
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **8**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **14 1/2 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **8 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN CLAY WITH SAND (CL), stiff, dry, with rootlets								
			12										
			14		no rootlets								
	5				DARK BROWN CLAY (CH), very stiff, moist, mottled orange								
			19		▽								
					BROWN SAND WITH CLAY AND GRAVEL (SP-SC), medium dense, wet, coarse, subangular gravel								
	10		16					12.0					
			13										
			11		BROWN CLAY WITH GRAVEL (CL), stiff, wet								
	15				Boring terminated at 14 1/2 feet. Water encountered at 8 feet during drilling.								

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-7
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **9**

Date(s) Drilled **10/30/17**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6-inch**	Total Depth of Borehole **12 1/2 feet**
Drill Rig Type **Mobile B-53**	Drilling Contractor **Pearson Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **7 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop auto-trip hammer**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				LIGHT BROWN CLAY WITH SAND (CL), very stiff, dry								
			17										
			13		becomes stiff								
	5				BROWN CLAY (CH), very stiff, dry, with gravel and fine sand								
			17		▽								
					BROWN SAND WITH CLAY AND GRAVEL (SP-SC), medium dense, wet, coarse, subangular gravel								
	10		14										
					LIGHT BROWN SANDY CLAY WITH GRAVEL (CL), very stiff, wet, with coarse sand and fine gravel								
			20		Boring terminated at 12 1/2 feet. Water encountered at 7 feet during drilling.								
	15												

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-8
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **10**

Date(s) Drilled **12/19/17**	Logged By **JNK**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **4-inch**	Total Depth of Borehole **16 1/2 feet**
Drill Rig Type **Simco**	Drilling Contractor **Taber Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **13 1/2 feet**	Sampling Method(s) **Modified California, Not retained, SPT**	Hammer Data **140 lb., 30-inch drop rope and cathead**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				BROWN SANDY CLAY (CL), very stiff, moist, with few coarse sands, weak and porous								
			16		BROWN SANDY CLAY (CL), very stiff, moist, with few coarse sands								
			19		GRAY-BROWN SANDY CLAY (CH), very stiff, moist, with well-rounded coarse sand and fine gravel								
	5		17		mottled orange at 6 1/2 feet, large gravel from 6 1/2 to 7 1/2 feet								
	10		13										
			7		GRAY-BROWN CLAYEY SAND (SC), loose, wet, with gravel, fine to coarse sand								
	15		9		GRAY-BROWN SANDY CLAY (CH), stiff, moist								
					Boring terminated at 16 1/2 feet. Water encountered at 13 1/2 feet during drilling.								

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-9
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **11**

Date(s) Drilled **12/19/17**	Logged By **JNK**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **4-inch**	Total Depth of Borehole **18 1/2 feet**
Drill Rig Type **Simco**	Drilling Contractor **Taber Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **12 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop rope and cathead**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				DARK BROWN SANDY CLAY (CL), stiff, moist, weak and porous to 1 1/2 feet, few coarse sands and gravel								
			10		GRAY BROWN SANDY CLAY (CL), very stiff to hard, moist, with coarse sand and fine to coarse gravel; large gravel at 3 feet								
			31										
	5												
			34										
					MOTTLED GRAY AND ORANGE SANDY CLAY (CH), stiff, moist								
	10		9										
					GRAY-BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, wet, fine to coarse gravel			12.9					
			16										
	15		13										
					GRAY-BROWN CLAYEY GRAVEL (GC), dense, wet, fine to coarse gravel								
			44										
					Boring terminated at 18 1/2 feet. Water encountered at 12 feet during drilling.								

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-10
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **12**

Date(s) Drilled **12/19/17**	Logged By **JNK**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **4-inch**	Total Depth of Borehole **15 1/2 feet**
Drill Rig Type **Simco**	Drilling Contractor **Taber Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **9 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop rope and cathead**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
	0				DARK BROWN SANDY CLAY (CL), stiff, moist, weak and porous, with roots								
			15		GRAY MOTTLED ORANGE SANDY CLAY (CL), medium stiff to stiff, moist, with coarse sand and gravel								
	5		10										
			8										
					▽								
	10		4		GRAY-BROWN CLAYEY SAND (SC), loose, wet, fine-grained			47.9					
			16		MOTTLED GRAY AND ORANGE SANDY CLAY (CL), stiff, moist, with fine sand and few gravels								
	15		13		Boring terminated at 15 1/2 feet. Water encountered at 9 feet during drilling.								

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Job No: 7121.01.04.2 | Date: JAN 2018

LOG OF BORING B-11

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **13**

Date(s) Drilled **12/19/17**	Logged By **JNK**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **4-inch**	Total Depth of Borehole **13 feet**
Drill Rig Type **Simco**	Drilling Contractor **Taber Drilling**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **9 1/2 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb., 30-inch drop rope and cathead**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0			DARK BROWN SANDY CLAY (CL), stiff, moist, weak and porous, with few gravels								
		15	MOTTLED GRAY AND ORANGE SANDY CLAY (CL), stiff, to very stiff, moist, with abundant fine sand								
		28									
5		12									
			▽								
10			MOTTLED GRAY AND ORANGE CLAY WITH SAND (CL), medium stiff, wet, fine grained sand								
		17	MOTTLED GRAY AND ORANGE SANDY CLAY (CH), stiff, moist, with abundant fine gravels			74.4					
		20									
			Boring terminated at 13 feet. Water encountered at 9 1/2 feet during drilling.								
15											

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LOG OF BORING B-12
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE **14**

Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12	13	14

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
5 Graphic Log: Graphic depiction of the subsurface material encountered.
6 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
7 Dry Density (pcf): Dry density, in pcf.
8 Water Content (%): Water content, percent.
9 % <#200 Sieve: % <#200 Sieve
10 PI, %: Plasticity Index, expressed as a water content.
11 LL, %: Liquid Limit, expressed as a water content.
12 Expansion Index (EI): Expansion Index (EI)
13 UC, ksf: Unconfined compressive strength, in kips per square foot.
14 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)
Su: Shear Strength

MATERIAL GRAPHIC SYMBOLS

Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)
Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)
Clayey GRAVEL (GC)
Clayey SAND (SC)
Poorly graded SAND with Clay (SP-SC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Bulk Sample
2.5-inch-ID Modified California w/ brass liners
2-inch-OD unlined split spoon (SPT)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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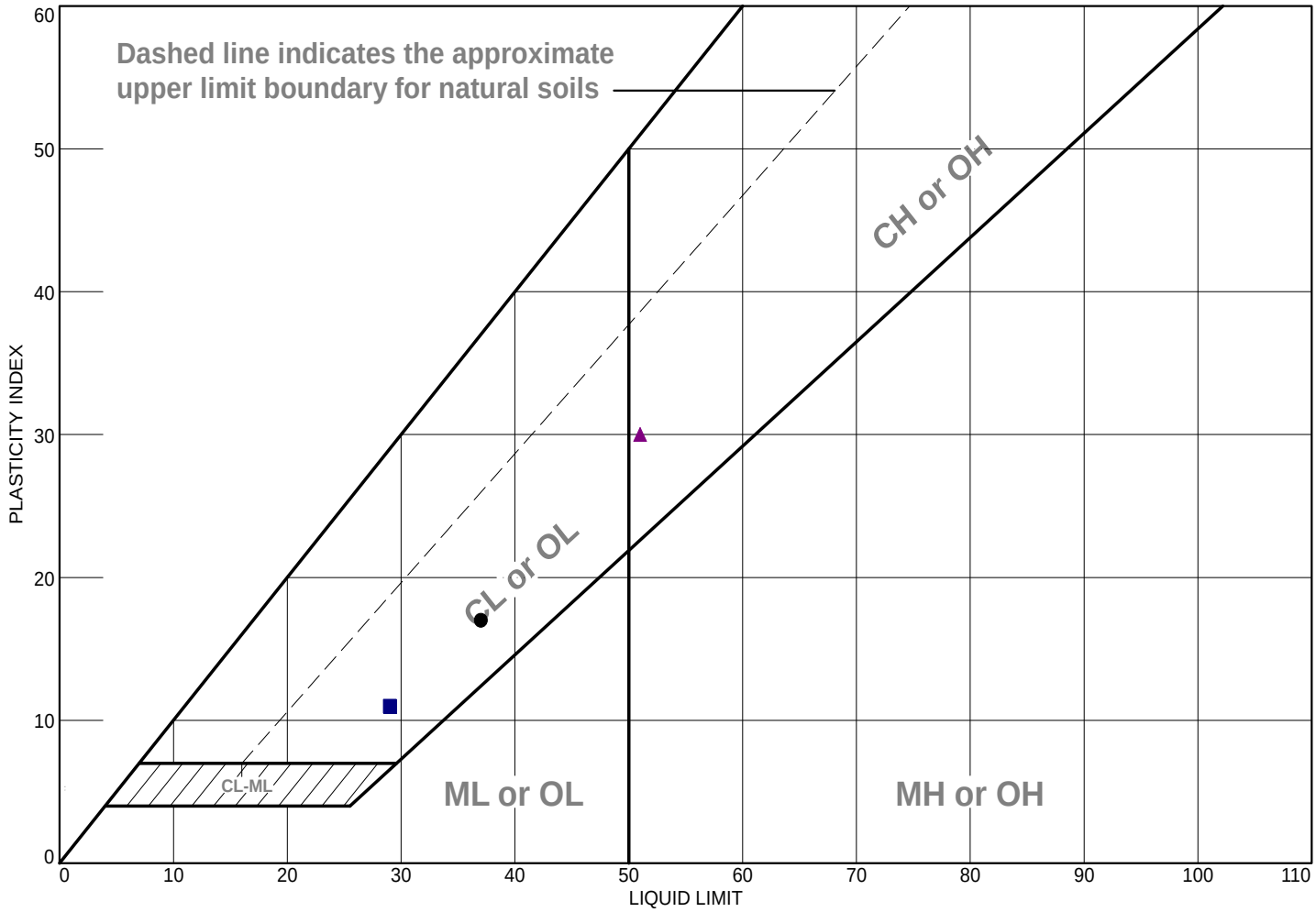
Job No: 7121.01.04.2 | Date: JAN 2018

SOIL CLASSIFICATION AND KEY TO TEST DATA
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
15

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown Sandy Clay (CL)	37	20	17	82.5	65.4	CL
■	Brown Sandy Clay (CL)	29	18	11	88.3	68.7	CL
▲	Brown Clayey Sand W/ Gravel (SC)	51	21	30		27.5	SC

● **Source of Sample:** B-3 **Depth:** 1',1.5',3' & 3.5'
■ **Source of Sample:** B-5 **Depth:** 1.5' & 2.0'
▲ **Source of Sample:** B-6 **Depth:** 7.5' & 8.0'

Tested By: SCW **Checked By:** SEF

Remarks:
● Expansion Index = 58 (Medium)
■ Expansion Index = 32 (Low)
▲
Sampled: 10/30/2017
Received: 11/7/2017
Reported: 11/20/2017

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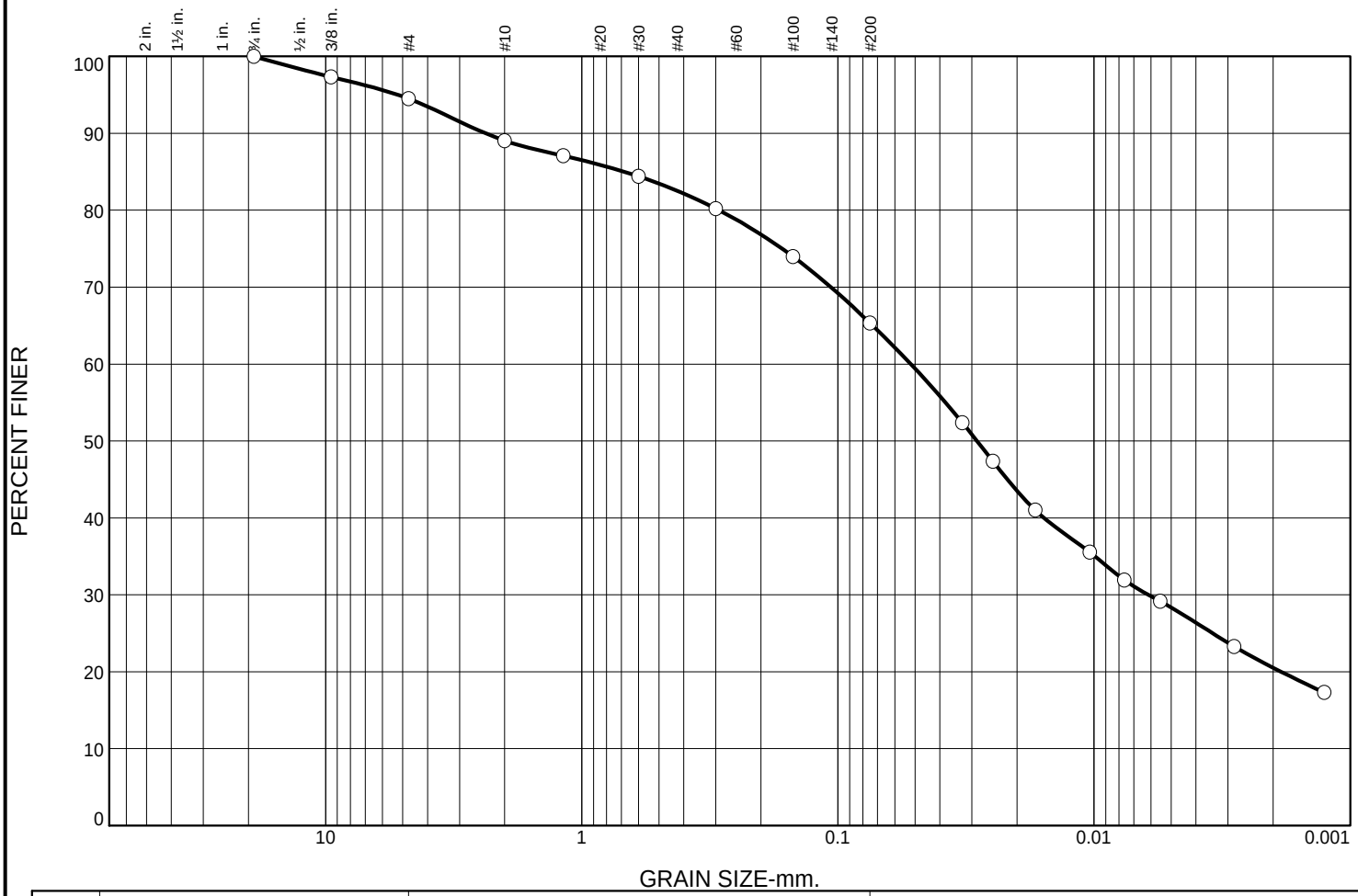
Job No: 7121.01.04.2 Date: JAN 2018

CLASSIFICATION TEST DATA
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
16

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.5	5.5	6.5	17.1	37.1	28.3

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-3		1',1.5',3' &	Brown Sandy Clay (CL)	CL
			3.5'	Sampled: 10/30/2017	
				Received: 11/7/2017	
				Reported: 11/20/2017	

Tested By: SCW **Checked By:** SEF

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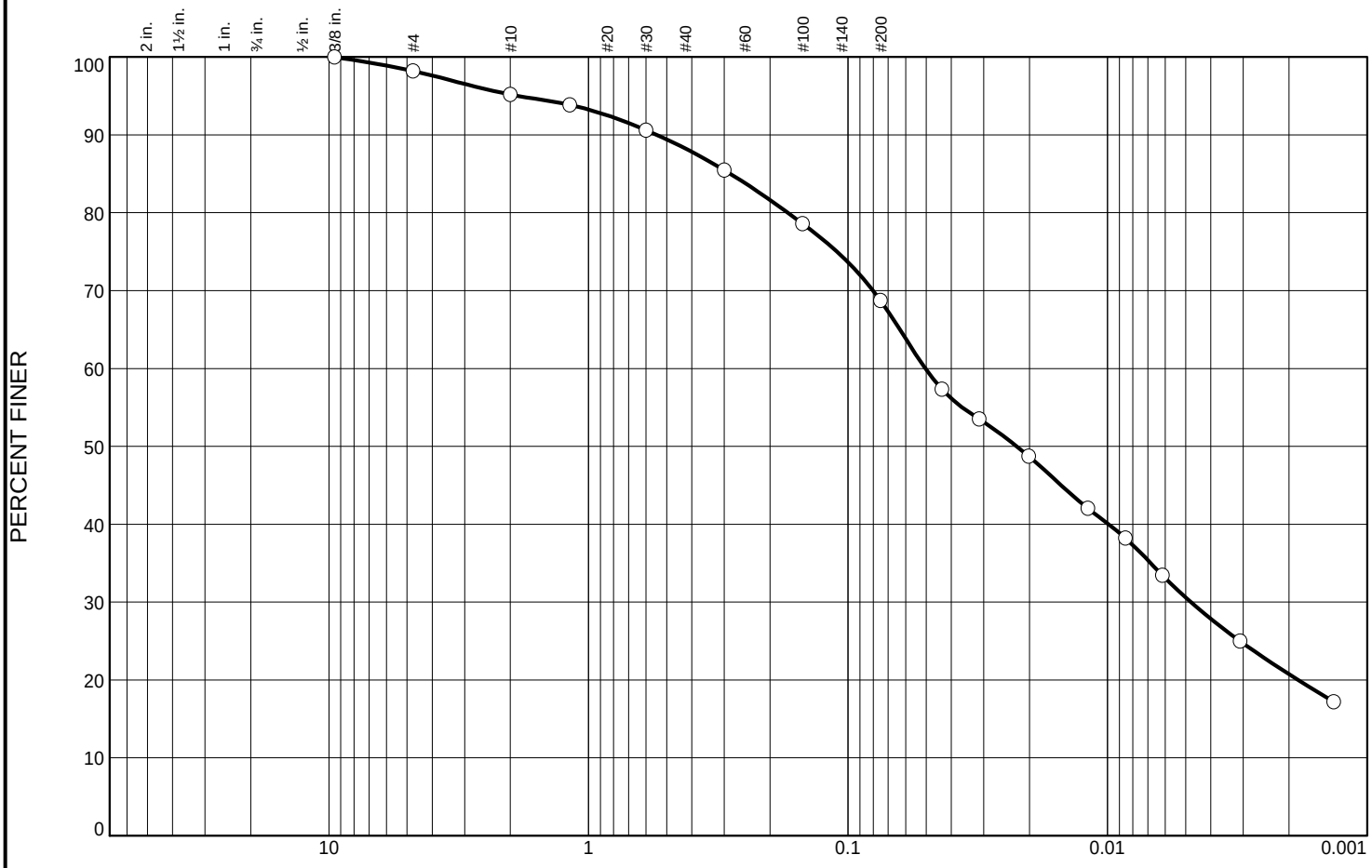
Job No: 7121.01.04.2 Date: JAN 2018

PARTICLE SIZE DISTRIBUTION
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
17

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.8	3.0	6.9	19.6	38.1	30.6

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-5		1.5' & 2.0'	Brown Sandy Clay (CL)	CL
				Sampled: 10/30/2017	
				Received: 11/7/2017	
				Reported: 11/20/2017	

Tested By: SCW **Checked By:** SEF

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Job No: 7121.01.04.2 Date: JAN 2018

PARTICLE SIZE DISTRIBUTION
Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
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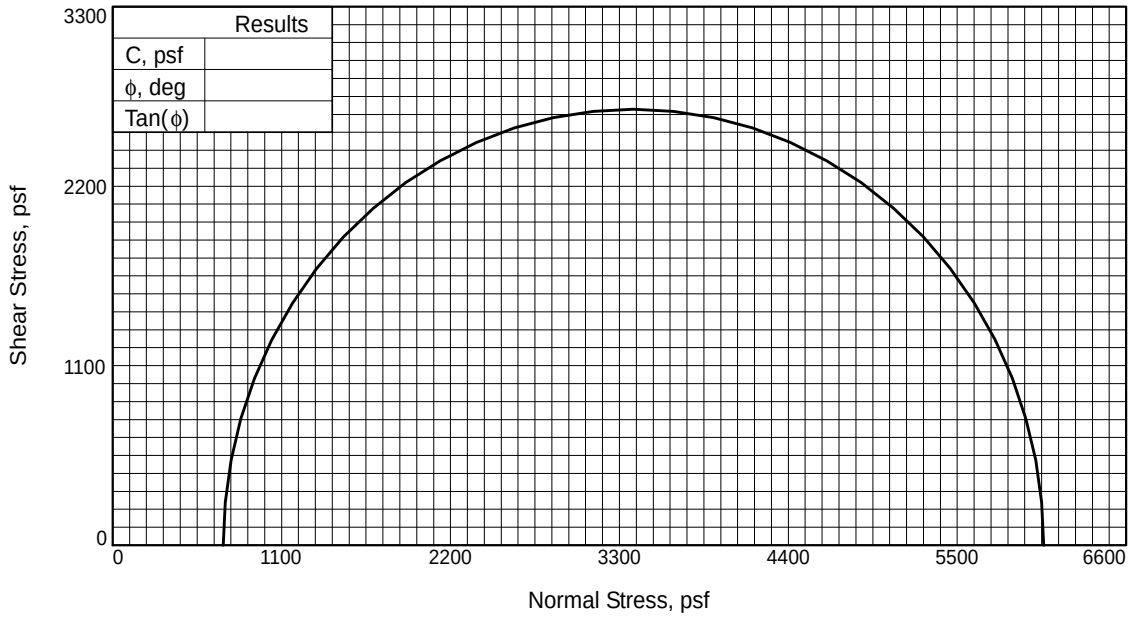

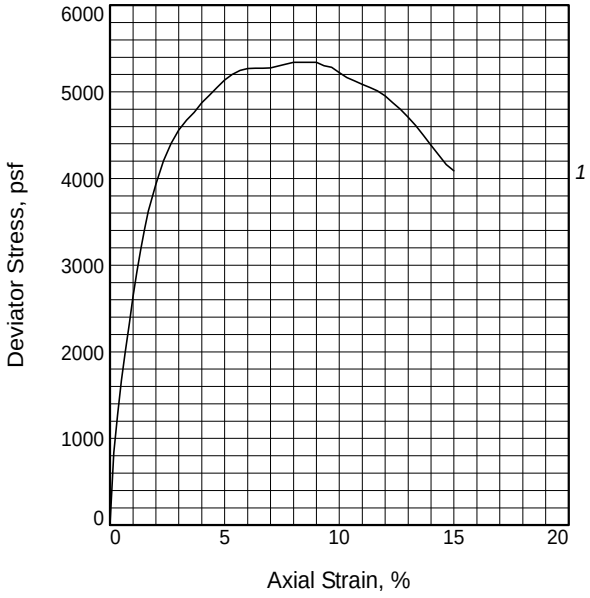

Sample No.		1
Initial	Water Content, %	21.4
	Dry Density, pcf	105.2
	Saturation, %	96.0
	Void Ratio	0.6019
	Diameter, in.	2.42
	Height, in.	6.00
At Test	Water Content, %	21.4
	Dry Density, pcf	105.2
	Saturation, %	96.0
	Void Ratio	0.6019
	Diameter, in.	2.42
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		5343
Strain, %		9.0
Ult. Stress, psf		5343
Strain, %		9.0
σ_1 Failure, psf		6063
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Sandy Clay (CH)

Assumed Specific Gravity= 2.70

Tested By: SCW

Checked By: SEF

Client: RGH Consultants

Project: Zinfandel Subdivision

Source of Sample: B-1 **Depth:** 6.0'

Proj. No.: 7121.01.04.2 **Date Sampled:** 10/30/2017

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Job No: 7121.01.04.2 | Date: JAN 2018

STRENGTH TEST DATA

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
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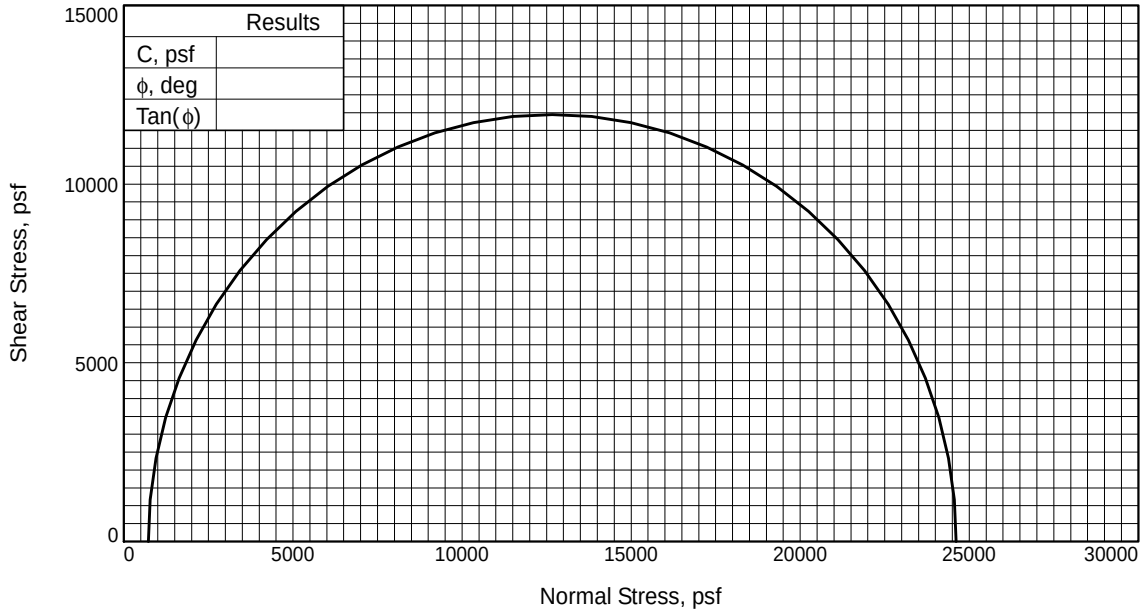

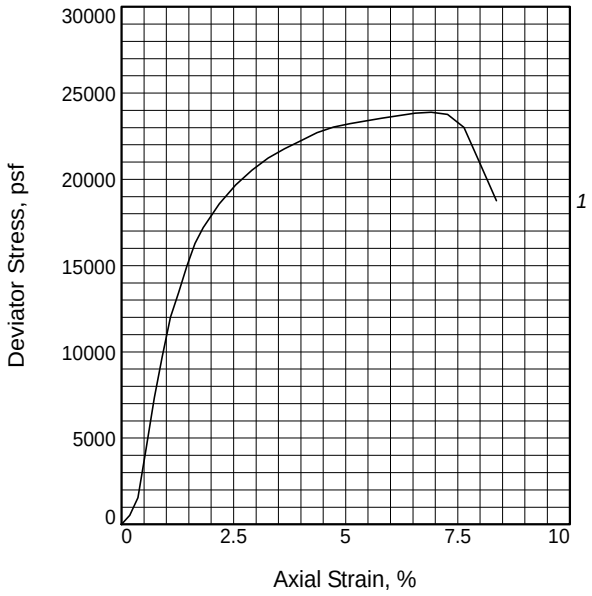

Sample No.		1
Initial	Water Content, %	18.3
	Dry Density, pcf	110.8
	Saturation, %	94.6
	Void Ratio	0.5210
	Diameter, in.	2.42
	Height, in.	5.50
At Test	Water Content, %	18.3
	Dry Density, pcf	110.8
	Saturation, %	94.6
	Void Ratio	0.5210
	Diameter, in.	2.42
	Height, in.	5.50
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		23896
Strain, %		6.9
Ult. Stress, psf		23896
Strain, %		6.9
σ_1 Failure, psf		24616
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Clay W/ Sand (CH)

Assumed Specific Gravity= 2.70

Tested By: SCW

Checked By: SEF

Client: RGH Consultants

Project: Zinfandel Subdivision

Source of Sample: B-2 **Depth:** 3.0'

Proj. No.: 7121.01.04.2 **Date Sampled:** 10/30/2017

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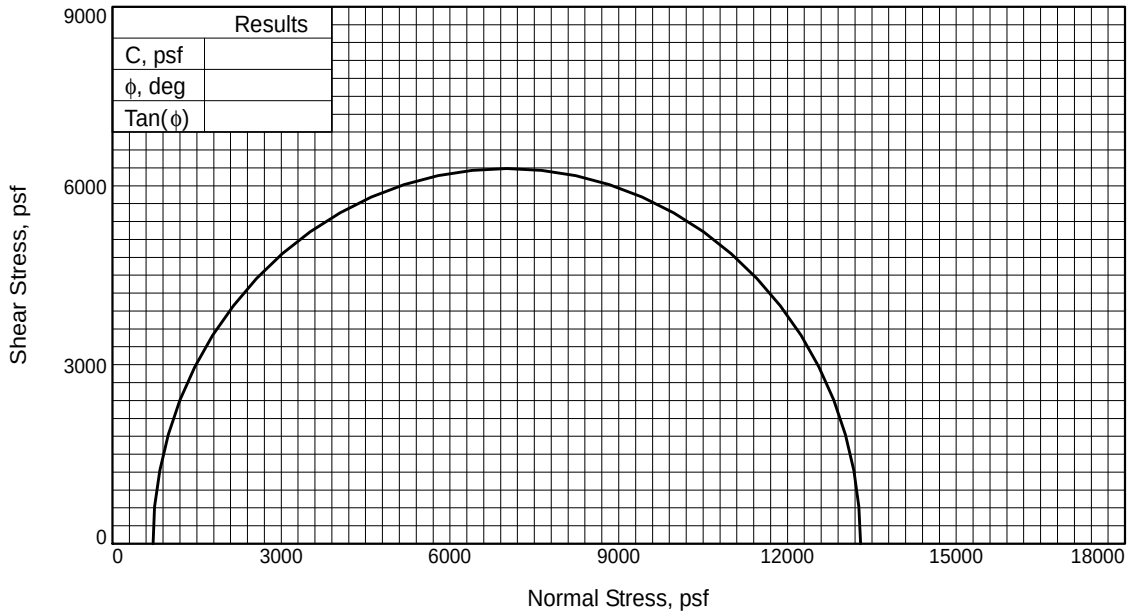
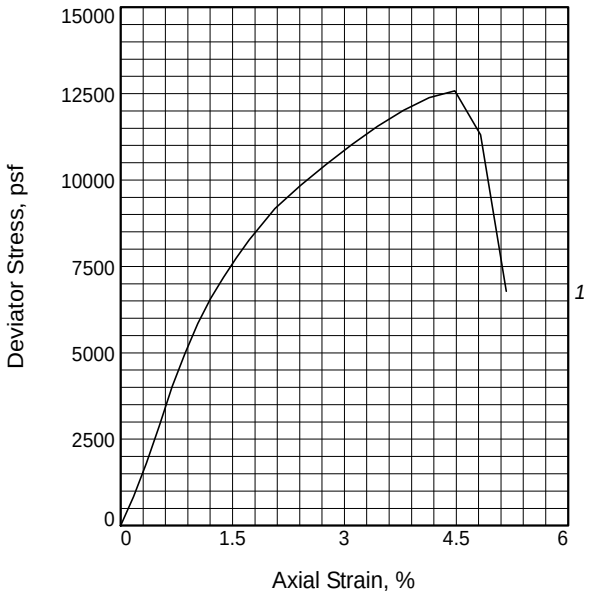
Job No: 7121.01.04.2 | Date: JAN 2018

STRENGTH TEST DATA

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
20





Sample No.		1
Initial	Water Content, %	21.0
	Dry Density, pcf	103.4
	Saturation, %	90.1
	Void Ratio	0.6297
	Diameter, in.	2.39
	Height, in.	5.80
At Test	Water Content, %	21.0
	Dry Density, pcf	103.4
	Saturation, %	90.1
	Void Ratio	0.6297
	Diameter, in.	2.39
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		12580
Strain, %		4.5
Ult. Stress, psf		12580
Strain, %		4.5
σ_1 Failure, psf		13300
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Clay W/ Sand (CH)

Assumed Specific Gravity= 2.70

Tested By: SCW

Checked By: SEF

Client: RGH Consultants

Project: Zinfandel Subdivision

Source of Sample: B-2 **Depth:** 5.0'

Proj. No.: 7121.01.04.2 **Date Sampled:** 10/30/2017

RGH
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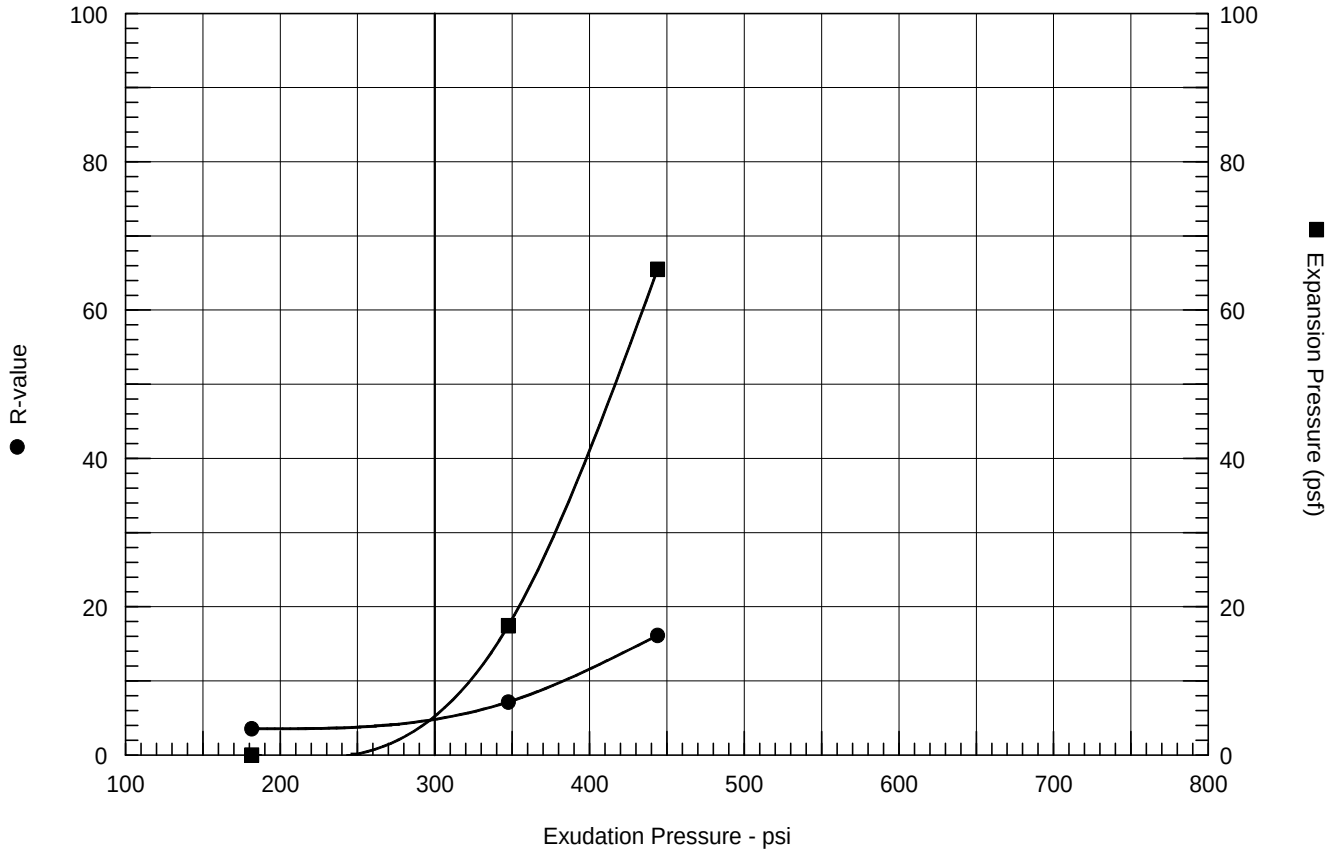
Job No: 7121.01.04.2 | Date: JAN 2018

STRENGTH TEST DATA

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE
21

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psf	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	85	109.3	17.6	17	137	2.60	348	7	7
2	35	105.2	20.0	0	148	2.54	182	4	4
3	185	116.1	15.5	65	124	2.46	444	16	16

Test Results	Material Description
R-value at 300 psi exudation pressure = 5 **Exp. pressure at 300 psi exudation pressure =** 5 psf	Brown Clay (CL)
Project No.: 7121.01.04.2 **Project:** Zinfandel Subdivision **Source of Sample:** B-1,5,6 & 7 Composite **Depth:** 0.5'-3.0' **Date:** 11/17/2017	**Tested by:** SEF **Checked by:** SCW **Remarks:** Possible (CH) Sampled 10/30/17 Received 11/7/17 Reported 11/17/17

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Job No: 7121.01.04.2 | Date: JAN 2018

R-VALUE TEST RESULTS

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE

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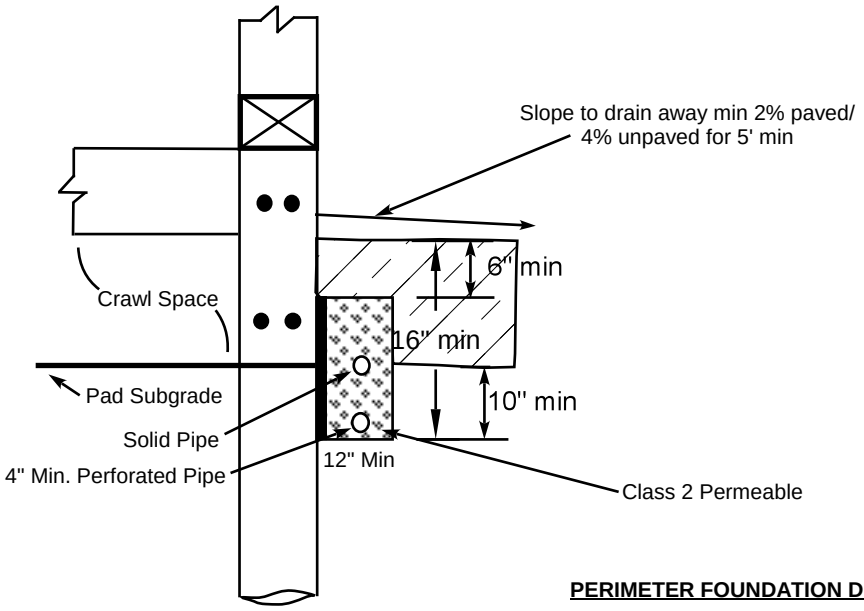
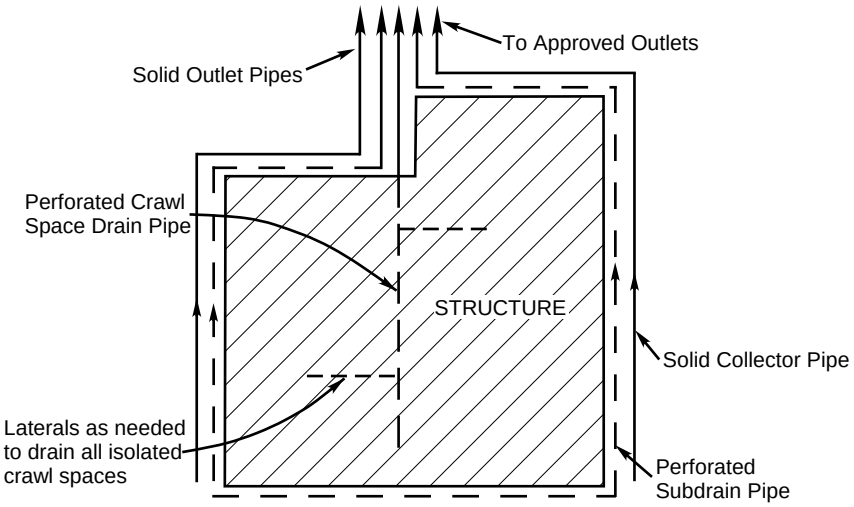
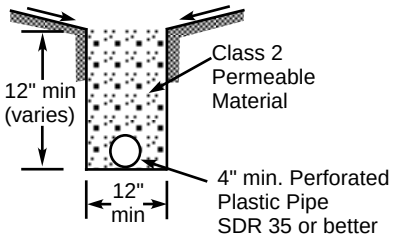


PERIMETER FOUNDATION DRAINS

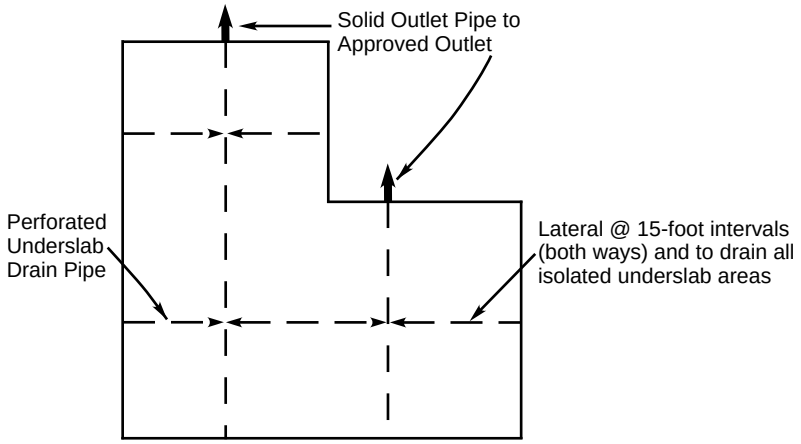
Pier And Grade Beam



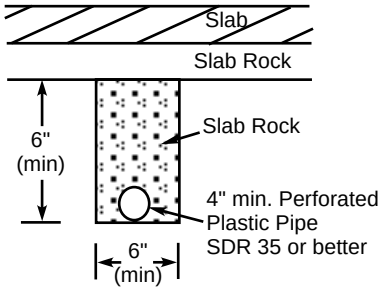
TYPICAL FOUNDATION DRAIN PLAN



CRAWL SPACE DRAIN



TYPICAL UNDERSLAB DRAIN PLAN



SLAB UNDERDRAIN

RGH CONSULTANTS

Job No: 7121.01.04.2 | Date: JAN 2018

TYPICAL SUBDRAIN DETAILS

Zinfandel Subdivision
1583 / 1657 El Centro Avenue
Napa, California

PLATE

23

APPENDIX B - REFERENCES

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Youd, T.L., and Idriss, I.M., and 19 others, 2001, Liquefaction Resistance of Soils: summary report from the 1996 NCEER and 1998 NCEER/NSF workshops on evaluation of liquefaction resistance of soils: ASCE Geotechnical and Geoenvironmental Journal, v. 127, no. 10, p. 817-833.

APPENDIX C - DISTRIBUTION

Biale Family (3,e)
c/o Randy Gularte
780 Trancas Street
Napa, CA 94558
RAGularte@heritagesir.com

SCL:EGC:scl:ejw

FCS
An ADEC Innovation

D.2 - Stormwater Control Plan

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STORMWATER CONTROL PLAN FOR A REGULATED PROJECT

ZINFANDEL SUBDIVISION
1583 EL CENTRO AVENUE
NAPA, CALIFORNIA 94558

Prepared for:

Trinity Project, LLC

Project #4117017.0

September 15, 2023

1515 Fourth Street Napa, CA 94559 www.rsacivil.com 707.252.3301 v 707.252.4966 f

Table of Contents

TABLES

FIGURES

ATTACHMENTS

I. Project Data

Table 1. Project Data Form

Project Name/Number	Zinfandel Subdivision / PL19-0016 / 4117017.0
Application Submittal Date	
Project Location	1583 El Centro Avenue Napa, California 94558 APN: Pending, Adjusted Parcel 2 per 2019-0016141
Project Phase No.	Not Applicable
Project Type and Description	Construction of a 51-lot single family residential subdivision including streets, driveways, utilities bioretention facilities and detention ponds.
Total Project Site Area	9.7 acres
Total New and Replaced Impervious Surface Area	199,285 sq. ft (including El Centro Avenue half street frontage & Lassen Street frontage)
Total Pre-Project Impervious Surface Area	26,197 sq. ft (including El Centro Avenue half street frontage & Lassen Street frontage)
Total Post-Project Impervious Surface Area	199,285 sq. ft (including El Centro Avenue half street frontage and Lassen Street frontage)

II. Setting

II.A. Project Location and Description

This project involves the demolition of an existing residential house and barn with asphalt driveway. The site will be developed to a 51-lot single family residential subdivision with public roads. This development is located at 1583 El Centro Avenue in Napa, California as shown in Figure 1 below.

Figure 1. Vicinity Map

The proposed use is consistent with the current RS 4 zoning. The project will include the construction of 51 residential houses, connecting public roads and installation of new public utilities along with stormwater quality control bioretention and detention facilities.

Refer to Attachment 2 for the overall scope of the project.

II.B. Existing Site Features and Conditions

The project site is irregular in shape and is generally flat. The site is currently used as vineyards with a residential house that fronts El Centro Avenue. The site is bounded by El Centro Avenue to the north and residential developments with public roads to the east, west and south. See Figure 2 below for existing site conditions.

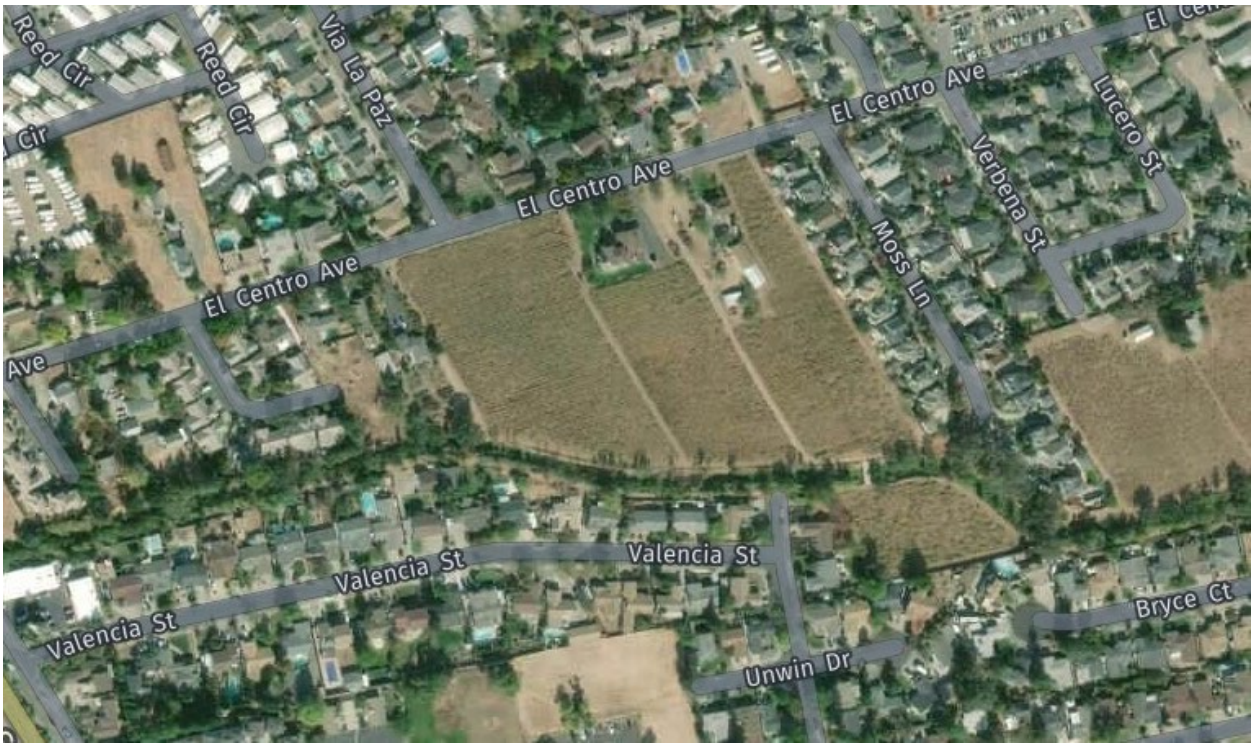


Figure 2. Existing Site Conditions

Mapping by the U.S. Conservation Service has classified soil over this project area as Clear Lake Clay (116) which is of the Hydraulic Soil Group D and Haire Loam (145) which is of the Hydraulic Soil Group D. Refer to Attachment 1 for Soils Map. Natural drainage from these parcels generally flows towards Salvador Channel. Stormwater is ultimately conveyed to the Napa River.

II.C. Opportunities and Constraints for Stormwater Control

Stormwater treatment facilities have been integrated into the planning, design, construction, operation, and maintenance of the proposed development. The following potential opportunities and constraints were considered in determining the best stormwater control design for this development.

Opportunities for this site are the availability of landscaped areas in the front and rear yards. Landscape areas on the parcels along Salvador Channel will be used as self-treating management areas since these

parcels will be predominantly pervious areas. Bioretention facilities will be installed to treat stormwater runoff prior to discharge from the site. Runoff will be conveyed to the bioretention facilities from roof downspouts and surface flows from the streets. Once in the bioretention basin, runoff will be treated via infiltration together with the pollutant retention capabilities of the plants in the facilities. These bioretention facilities will also be used for detention such that the proposed post-developed flow discharge from the development will be maintained at, or below pre-developed levels that will outfall to Salvador Channel. See Attachment 2 for locations of bioretention facilities.

Constraints will be the excavation of approximately 5,000 CY terrace along Salvador Channel to widen the channel laterally to mitigate development fill in the flood plain. In order to reduce the flood hazard to the development and other neighbors downstream, vegetation and native trees will be planted along this terrace to help prevent the land from eroding downstream. Additional channel restoration mitigation measures and plans approved by the City will be implemented to help reduce potential flood hazard.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

1. Limitation of development envelope
   The development of the houses will occur within the building setback lines per Section 17.08.030 of the City of Napa Municipal Code.
2. Preservation of natural drainage features
   Natural drainage consists of sheet flow over the ground surface that concentrates in man-made surface drainage elements such as ditches, gutters and onsite storm drain pipes. See constraints on Section II.C above.
3. Setbacks from creeks, wetlands, and riparian habitats
   Riparian setback from Salvador Channel to the maximum degree possible and at minimum as required by local ordinances.
4. Minimization of imperviousness
   Landscaping will be used in the front and rear yards. Impervious areas will be minimized to the maximum extent practicable.
5. Use of drainage as a design element
   Bioretention facilities are incorporated into the aesthetic landscape design of the site. Grading and storm drain locations have been designed to direct runoff to bioretention facilities.

III.B. Use of Permeable Pavements

Permeable pavements are not in the scope of this project.

III.C. Dispersal of Runoff to Pervious Areas

Stormwater runoff will be directed to landscaped areas.

III.D. Stormwater Control Measures

Runoff from the project site, including roof and paved areas, will be routed to four bioretention facilities (see Attachment 2). BRF #1 and #2 will also function as stormwater detention basins. All facilities are designed and will be constructed to the criteria in the BASMAA Post-Construction Manual (January 2019), including the following features (see Figure 3):

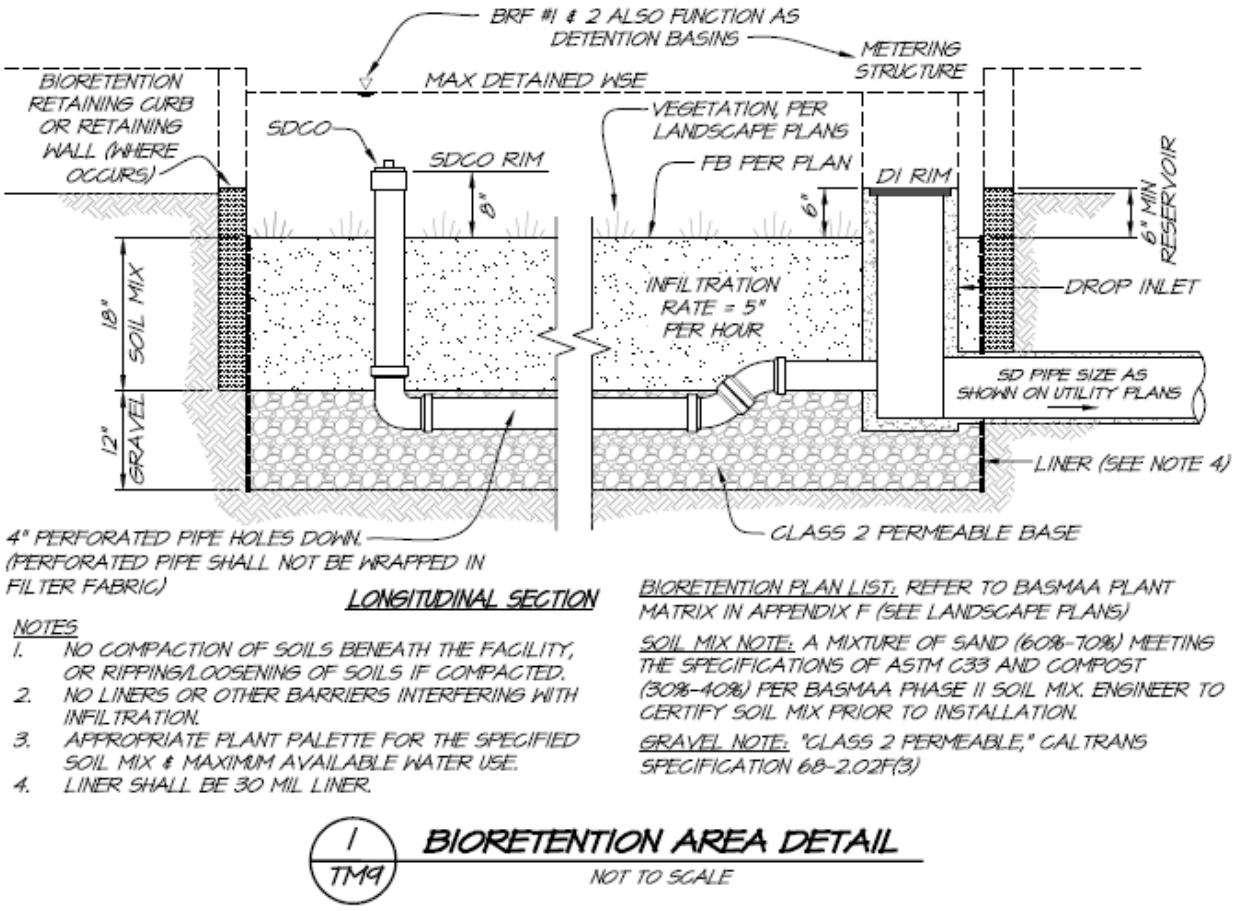


Figure 3. Bioretention Cross Section

- Surrounded by a concrete curb. Where adjacent to pavement, curbs will be thickened and an impermeable vertical cutoff wall will be included.
- Each layer built flat, level, and to elevations specified in the plans:
  - Bottom of Gravel Layer (BGL)
  - Top of Gravel Layer (TGL)
  - Top of Soil Layer (TSL)
  - Overflow Grate
  - Facility Rim
- 12 inches of Class 2 permeable, Caltrans specification 68-2.02F (3).

- 18 inches sand/compost mix meeting BASMAA specifications.
- 4-inch diameter PVC SDR 35 perforated pipe underdrain, installed with the invert at the top of the Class 2 permeable layer with holes facing down, and connected to the overflow structure at that same elevation.
- 6-inch-deep reservoir between top of soil elevation and overflow grate elevation.
- Concrete drop inlet with frame overflow structure, with grate set to specified elevation, connected to the on-site storm drain system.
- Vertical cutoff walls to protect adjacent pavement.
- Plantings selected for water conservation.
- Irrigation system on a separate zone, with drip emitters and "smart" irrigation controllers.
- Sign identifying the facility as a stormwater treatment facility.

Areas on the site which do not drain to a bioretention facility are the following (see Attachment 2 for reference):

- DMA 5 – The west portion of the private driveway along the Lassen Street frontage, totaling 700 square feet. Grading in this area must conform with existing street elevations. As a result, stormwater runoff from this DMA leaves the site untreated.
- DMA 6 – The southern flood terrace and maintenance path near lots 50-51, totaling 13,216 square feet. This DMA is considered as self-treating area (See Section 4.1 for BASMAA requirements for self-treating areas).
- DMA 7 – The northern flood terrace and access road near lots 2-19, totaling 45,697 square feet. This DMA is considered as self-treating area (See Section 4.1 for BASMAA requirements for self-treating areas).
- DMA 8 – The north portion of Lot 1, totaling 1,445 square feet. This DMA is considered as self-treating area (See Section 4.1 for BASMAA requirements for self-treating areas).
- DMA 9 – The north half street area of El Centro Avenue along Lot 1, totaling 3,734 square feet. Grading in this areas must conform with existing street elevations. As a result, stormwater runoff from this DMA leaves the site untreated.

The bioretention facilities that will collect and treat onsite stormwater will also function as Multi-Benefit Trash Treatment Systems in accordance with the State Water Board standards. They are designed to trap trash particles that are 5-mm and greater for the peak flow rate generated by the 1-year, 1-hour storm event from each drainage management area. The bioretention facilities will provide a 6" ponding reservoir per BASMAA requirements, which is sufficient depth such that the 1-year, 1-hour storm event will not reach the overflow elevations. Thus, all trash is captured at the surface of each bioretention facility. The overflow inlets have a grated lid for larger storm events.

IV. Documentation of Drainage Design

IV.A. Descriptions of Each Drainage Management Areas

IV.A.1. Drainage Management Areas

Table 2. Drainage Management Areas (DMAs) as shown on Attachment 2.

DMA Name	DMA_{perv} (Pervious Area, square feet)	DMA_{imp} (Impervious Area, square feet)	Pervious Pavers Area (square feet)	Total Area (square feet)	Bioretention Facility Name
1	129,479	161,020	--	298,293	BRF #1
2	13,038	13,866	--	27,627	BRF #2
3	8,587	14,637	--	23,876	BRF #3
4	1,713	4,400	--	6,306	BRF #4
5	54	646	--	700	Untreated
6	13,216	0	--	13,216	Self-Treating
7	44,209	1,488	--	45,697	Self-Treating
8	1,445	0	--	1,445	Self-Treating
9	506	3,228	--	3,734	Untreated

IV.A.2. Drainage Management Area Descriptions

DMA 1: Totaling 298,293 square feet, this DMA consists of Lots 2 to 19, 20 to 26, 29 to 46, 49, and portions of Lots 1, 27 to 28, 47, 48, and parcel A. It also includes Clementina Circle, a small portion of street of El Centro Avenue intersecting Clementina Circle along the project frontage. Runoff from the roof will drain out from downspouts to splash boxes that flows towards the street via landscape areas then along the street gutter toward the street catch basins then to a storm drain pipe that outfalls to BRF #1. This bioretention facility has a total treatment area of 7,794 square feet and will also function as a stormwater detention basin.

DMA 2: Totaling 27, 627 square feet, this DMA consists of Lots 50 to 51 and a large portion of the private driveway and parcel C. Runoff from the roof will drain out from downspouts to splash boxes that flows towards the street via landscape areas then along the driveway gutter toward the curb opening inlet adjacent to BRF #2. This bioretention facility has a total treatment area of 723 square feet and will also function as a stormwater detention basin.

DMA 3: Totaling 23,876 square feet, this DMA consists of portions of Lots 28, 47, 48 and APN 036-361-043 together with the half street frontage portion of El Centro Avenue along these areas. Runoff from the roof will drain out from downspouts to splash boxes that flows towards the street via landscape areas then along the street gutter toward the curb opening inlet adjacent to BRF #3. This bioretention facility has a total treatment area of 652 square feet.

DMA 4: Totaling 6,306 square feet, this DMA consists of a portion of Lot 27 together with the half street frontage portion of El Centro Avenue along this area. Runoff from the roof will drain from downspouts to splash boxes that flow toward the street via landscape areas then along the street gutter toward the curb opening inlet adjacent to BRF #4. This bioretention facility has a total treatment area of 193 square feet.

DMA 5: The west portion of the private driveway along the Lassen Street frontage, totaling 700 square feet, a small portion of parcel C. Grading in this area must conform with existing street elevations. As a result, stormwater runoff from this DMA leaves the site untreated.

DMA 6: The southern flood terrace and maintenance path near Lots 50 to 51, totaling 13,216 square feet, a portion of parcel C. This DMA is considered as self-treating area meeting the following BASMAA requirements: 1) There are no impervious areas or very small impervious area (5% or less) relative to the receiving pervious area; and, 2) Slopes are gentle enough to ensure runoff will be absorbed into the vegetation and soil.

DMA 7: The northern flood terrace and access road near Lots 2 to 19, totaling 45,697 square feet. This DMA is considered self-treating area meeting the following BASMAA requirements: 1) There are no impervious areas or very small impervious area (5% or less) relative to the receiving pervious area; and, 2) Slopes are gentle enough to ensure runoff will be absorbed into the vegetation and soil.

DMA 8: The north portion of Lot 1, totaling 1,445 square feet. This DMA is considered self-treating area meeting the following BASMAA requirements: 1) There are no impervious areas or very small impervious area (5% or less) relative to the receiving pervious area; and, 2) Slopes are gentle enough to ensure runoff will be absorbed into the vegetation and soil.

DMA 9: The north half street area of El Centro Avenue along Lot 1, totaling 3,734 square feet. Grading in these areas must conform with existing street elevations. As a result, stormwater runoff from this DMA leaves the site untreated.

IV.B. Tabulation and Sizing Calculations

Refer to Attachment 3 for Provision E.12 Sizing Calculator Spreadsheet.

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

On-site activities that could potentially produce stormwater pollutants include:

- On-site storm drains
- Interior floor drains
- Pest control
- Landscaping
- Refuse areas
- Fire sprinkler test water
- Miscellaneous drain water
- Streets and sidewalks

V.B. Potential Pollutant Sources and Source Control Measures

The site activities and potential sources of pollutants for the Zinfandel Subdivision project are listed in Table 3, below.

Table 3. Potential Pollutant Sources and Source Control Measures

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
A. On-site storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	☐ Mark all inlets with the words "No Dumping! Flows to River" or similar.	☐ Maintain and periodically repaint or replace inlet markings. ☐ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☐ See applicable operational BMPs in Fact Sheet SC-74, "Drainage System Maintenance."
B. Interior floor drains and elevator shaft sump pumps	☐ Interior floor drains and elevator shaft sump pumps will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.
D_1. Need for future indoor & structural pest control	☐ Building design shall incorporate features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees, and operators.
D_2. Landscape / outdoor pesticide use / building and grounds maintenance	Final landscape plans will accomplish all of the following: ☐ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☐ Minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☐ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☐ Use pest-resistant plants, especially adjacent to hardscape. ☐ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☐ Maintain landscaping using minimum or no pesticides. ☐ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance." ☐ Provide IPM information to new owners, lessees and operators.
G. Refuse areas	☐ Refuse areas shall be paved with an impervious surface, designed not to allow run-on from adjoining areas, and screened to prevent off-site transport of trash. ☐ Refuse areas shall contain a roof to minimize direct precipitation. ☐ No drain connections shall be made to the Refuse area.	☐ Provide adequate number of receptacles. ☐ Inspect receptacles regularly; repair or replace leaky receptacles. ☐ Keep receptacles covered. ☐ Prohibit/prevent dumping of liquid or hazardous wastes. ☐ Post "no hazardous materials" signs. ☐ Inspect and pick up litter daily and clean up spills immediately.

Potential Sources of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
		☐ Keep spill control materials available on-site. ☐ Clean by dry-sweeping only, or with wet/dry vacuum. ☐ See Fact Sheet SC-34, "Waste Handling and Disposal"
N. Fire sprinkler test water	☐ Fire sprinkler test water shall be discharged to the sanitary sewer.	☐ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance"
O. Miscellaneous drain or wash water or other sources • Boiler drain lines • Condensate drain lines • Rooftop equipment • Drainage sumps • Roofing, gutters, and trim • Other sources	☐ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain. ☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☐ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	If architectural copper is used, implement the following BMPs for management of rinse water during installation: ☐ If possible, purchase copper materials that have been pre-patinated at the factory. ☐ If patination is done on-site, prevent rinse water from entering storm drains by discharging to landscaping or by collecting in a tank and hauling off-site. ☐ Consider coating the copper materials with an impervious coating that prevents further corrosion and runoff. ☐ Implement the following BMPs during routine maintenance: ☐ Prevent rinse water from entering storm drains by discharging to landscaping or by collecting in a tank and hauling off-site.
P. Plazas, sidewalks, and parking lots		☐ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

VI. Stormwater Facility Maintenance

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

Maintenance of stormwater facilities will be the responsibility of the property owner and will be performed by the owner's contractors or employees as part of routine maintenance of buildings, grounds and landscaping. The applicant will review the Post-Construction BMP Maintenance Agreement with the City of Napa regarding the maintenance of the stormwater facilities and commit to execute any necessary agreements prior to completion of construction. Applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until such time as this responsibility is formally transferred to a subsequent owner.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

The bioretention/detention facilities will be maintained on the following schedule at a minimum. Details of maintenance responsibility and procedures will be included in an Operation and Maintenance Plan to be submitted for approval prior to the completion of construction.

At no time will synthetic pesticides or fertilizers be applied, nor will any soil amendments, other than aged compost mulch or sand/compost mix, be introduced.

Daily: The facilities will be examined for visible trash during regular policing of the site, and trash will be removed.

After Significant Rain Events: A significant rain event is one that produces approximately a half-inch or more rainfall in a 24-hour period. Within 24 hours after each such event, the following will be conducted:

- The surface of the facility will be observed to confirm there is no excessive ponding. All facilities are designed to pond up to a 6" reservoir for stormwater treatment, and BRF #1 & #2 are designed to further detain up to a 24-hour, 100-year rainfall event.
- Inlets will be inspected, and any accumulations of trash or debris will be removed.
- The surface of the mulch layer will be inspected for movement of material. Mulch will be replaced and raked smooth if needed.
- At BRF #1 & #2, the metering structure and orifice will be inspected, and any accumulations of debris or sediment will be removed.

Prior to the Start of the Rainy Season: In September of each year, the facility will be inspected to confirm there is no accumulation of debris that would block flow, and that growth and spread of plantings does not block inlets or the movement of runoff across the surface of the facility. At BRF #1 & #2, the metering structure and orifice will be inspected, and any accumulations of debris or sediment will be removed.

Annual Landscape Maintenance: In December – February of each year, vegetation will be cut back as needed, debris removed, and plants and mulch replaced as needed. The concrete work will be inspected for damage. The elevation of the top of soil and mulch layer will be confirmed to be consistent with the 6-inch reservoir depth.

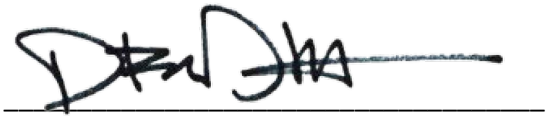
VII. Construction Plan E.12 Checklist

Table 4. Construction Plan E.12 Checklist

Stormwater Control Plan Page #	Source Control or Treatment Control Measure	See Plan
1	Bioretention Facilities	SCP Site Plan in Attachment 2

VIII. Certifications

The preliminary design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the current edition of the BASMAA Post-Construction Manual, dated January 2019.



Preparer
Derek Dittman, PE

ATTACHMENT 1

SOIL CLASSIFICATION

122° 19' 2" W
122° 18' 43" W
38° 20' 10" N
38° 20' 0" N

Map Scale: 1:2,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Napa County, California
Survey Area Data: Version 10, Sep 25, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2015—Oct 18, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
116	Clear Lake clay, drained, 0 to 2 percent slopes, MLRA 14	D	1.2	11.9%
145	Haire loam, 0 to 2 percent slopes	D	9.2	88.1%
Totals for Area of Interest			**10.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

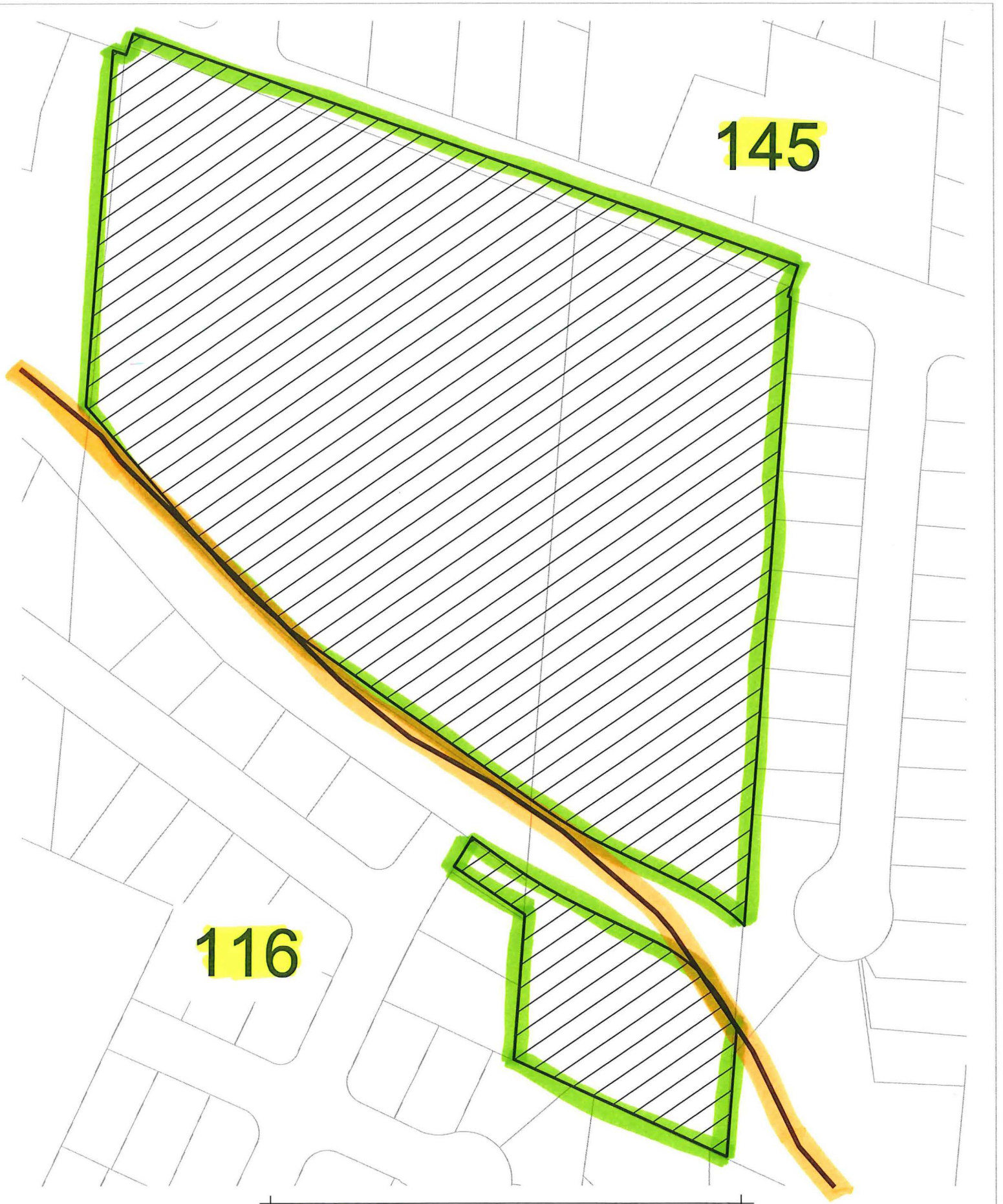
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

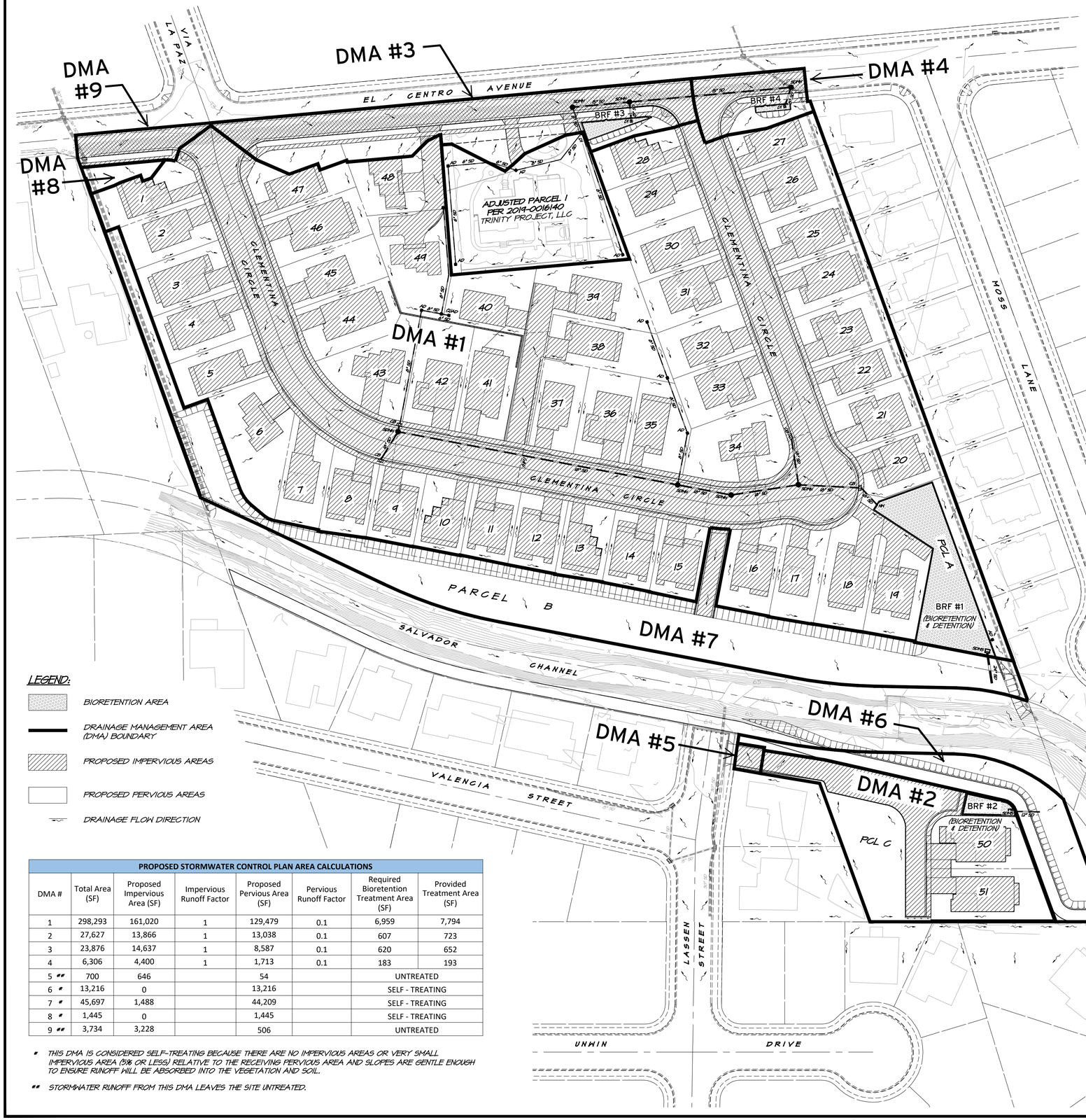
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



SCS SOIL CLASSIFICATION EXHIBIT
FOR PRELIMINARY
DETENTION SYSTEM CALCULATION

ATTACHMENT 2

STORMWATER CONTROL PLAN (SHEET TM9)



LEGEND:

- BIORETENTION AREA
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- PROPOSED IMPERVIOUS AREAS
- PROPOSED PERVIOUS AREAS
- DRAINAGE FLOW DIRECTION

PROPOSED STORMWATER CONTROL PLAN AREA CALCULATIONS

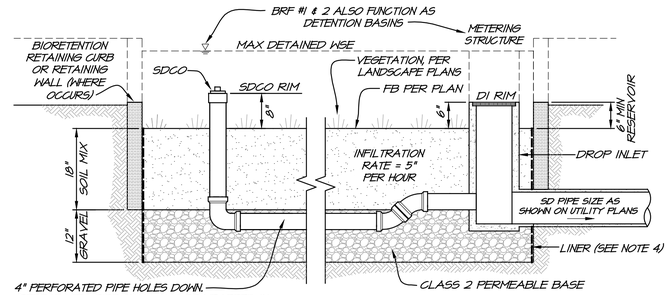
DMA #	Total Area (SF)	Proposed Impervious Area (SF)	Impervious Runoff Factor	Proposed Pervious Area (SF)	Pervious Runoff Factor	Required Bioretention Treatment Area (SF)	Provided Treatment Area (SF)
1	298,293	161,020	1	129,479	0.1	6,959	7,794
2	27,627	13,866	1	13,038	0.1	607	723
3	23,876	14,637	1	8,587	0.1	620	652
4	6,306	4,400	1	1,713	0.1	183	193
5 **	700	646		54		UNTREATED	
6 *	13,216	0		13,216		SELF - TREATING	
7 *	45,697	1,488		44,209		SELF - TREATING	
8 *	1,445	0		1,445		SELF - TREATING	
9 **	3,734	3,228		506		UNTREATED	

* THIS DMA IS CONSIDERED SELF-TREATING BECAUSE THERE ARE NO IMPERVIOUS AREAS OR VERY SMALL IMPERVIOUS AREA (5% OR LESS) RELATIVE TO THE RECEIVING PERVIOUS AREA AND SLOPES ARE GENTLE ENOUGH TO ENSURE RUNOFF WILL BE ABSORBED INTO THE VEGETATION AND SOIL.

** STORMWATER RUNOFF FROM THIS DMA LEAVES THE SITE UNTREATED.

PROPOSED POST CONSTRUCTION BMP's

BMP (BEST MANAGEMENT PRACTICES)	TREATMENT AREA
1. BIORETENTION AREAS, 4 EACH (SEE DETAIL 1/TM9 IN THIS SHEET)	SEE MAP FOR DMA
2. 'NO DUMPING, DRAINS TO RIVER' STAMPING ON ALL INLETS (SEE DETAIL 2/TM9 IN THIS SHEET)	ENTIRE PROJECT
3. 'WATER QUALITY FEATURE ON SITE' STAMPING ON ALL BIORETENTION INLETS (SEE DETAIL 3/TM9 IN THIS SHEET)	ENTIRE PROJECT
4. SPLASH BLOCKS ON ALL DOWNSPOUTS (SEE DETAIL 4/TM9 IN THIS SHEET)	ENTIRE PROJECT
5. HOMEOWNER EDUCATION: COPY OF SCP AND MAINTENANCE AGREEMENT TO BE PROVIDED TO OWNER	ENTIRE PROJECT



LONGITUDINAL SECTION

NOTES:
1. NO COMPACTION OF SOILS BENEATH THE FACILITY, OR RIPPING/LOOSENING OF SOILS IF COMPACTED.
2. NO LINERS OR OTHER BARRIERS INTERFERING WITH INFILTRATION.
3. APPROPRIATE PLANT PALETTE FOR THE SPECIFIED SOIL MIX & MAXIMUM AVAILABLE WATER USE.
4. LINER SHALL BE 30 MIL LINER.

BIORETENTION PLAN LIST: REFER TO BASMAA PLANT MATRIX IN APPENDIX F (SEE LANDSCAPE PLANS)

SOIL MIX NOTE: A MIXTURE OF SAND (60%-70%) MEETING THE SPECIFICATIONS OF ASTM C33 AND COMPOST (30%-40%) PER BASMAA PHASE II SOIL MIX. ENGINEER TO CERTIFY SOIL MIX PRIOR TO INSTALLATION.

GRAVEL NOTE: "CLASS 2 PERMEABLE" CALTRANS SPECIFICATION 68-2.02F(3)

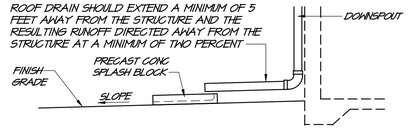
1/TM9 **BIORETENTION AREA DETAIL**
NOT TO SCALE

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 inch = 50 FT

2/TM9 **DROP INLET MARKER**
NOT TO SCALE

NOTES
1. EACH BIORETENTION FACILITY WITHIN THE CITY LIMITS SHALL BE MARKED WITH A "WATER QUALITY FEATURE ON SITE - DO NOT ALTER OR REMOVE" MARKER.
2. CONTRACTOR IS TO PURCHASE THESE MARKERS FROM THE PUBLIC WORKS DEPARTMENT LOCATED AT 1600 FIRST STREET.

3/TM9 **BIORETENTION FACILITY MARKER**
NOT TO SCALE



4/TM9 **SPLASH BLOCK DETAIL**
NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

NO.	DATE	REVISIONS	BY	APPD

RSA+ CONSULTING CIVIL ENGINEERS + SURVEYORS +
1515 FOURTH STREET NAPA, CALIFORNIA 94559
OFFICE (707)252.3301
+ WWW.RSACIVIL.com +

ZINFANDEL SUBDIVISION
STORMWATER CONTROL PLAN
NAPA
CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
DEREK MASON DITMAN
No. 90885
Exp. 03.31.2024
CIVIL ENGINEER
STATE OF CALIFORNIA

DATE	JUNE 9, 2023
DRAWN	DEL
DESIGNED	RAY
CHECKED	DMD
JOB NO.	4117017.0

SHEET NO.
TM9
10 OF 11 SHEETS

ATTACHMENT 3

PROVISION E.12 SIZING CALCULATOR SPREADSHEET

Provision E.12 Sizing Calculator

See the instructions and the BASMAA Post-Construction Manual

Step 1: Enter Total Site Area	**Step 2:** List names of all DMAs and square footage of each	**Step 3:** If DMA is "Self-Treating" or "Self-Retaining," **copy** square footage to appropriate column		**Step 4:** If the DMA is "Drains to Self Retaining" or "Drains to Bioretention" enter runoff factor from Table 4-1		**Step 6:** For "Drains to Self-Retaining" DMAs, enter the **name of receiving DMA**	**Step 5:** Slide (move) number from this column to correct column (F or H-Q)							
Total Site Area:	420,894							**BIORETENTION FACILITIES**						
DMA Names	**Square Feet**	**Self-Treating**	**Self-Retaining**	**Runoff Factor**	**Untreated**	**Name of Receiving DMA**	**BRF #1**	**BRF #2**	**BRF #3**	**BRF #4**				
DMA-1_{perv}	129,479			0.1			12,948							
DMA-1_{imp}	161,020			1			161,020							
DMA-2_{perv}	13,038			0.1				1,304						
DMA-2_{imp}	13,866			1				13,866						
DMA-3_{perv}	8,587			0.1					859					
DMA-3_{imp}	14,637			1					14,637					
DMA-4_{perv}	1,713			0.1						171				
DMA-4_{imp}	4,400			1						4,400				
DMA-5_{perv}	54				54									
DMA-5_{imp}	646				646									
DMA-6_{perv}	13,216	13,216												
DMA-6_{imp}	0	0												
DMA-7_{perv}	44,209	44,209												
DMA-7_{imp}	1,488	1,488												
DMA-8_{perv}	1,445	1,445												
DMA-8_{imp}	0	0												
DMA-9_{perv}	506				506									
DMA-9_{imp}	3,228				3,228									
Total DMAs	**411,532**	**60,358**	**0**		**4,434**		**173,968**	**15,170**	**15,496**	**4,571**	**0**	**0**	**0**	**0**
						Sizing Factor	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
						Minimum Size	**6,959**	**607**	**620**	**183**	**0**	**0**	**0**	**0**
Total Facilities	**9,362**	**Step 7:** Enter Facilty Footprints				**Footprint on Exhibit**	7,794	723	652	193	0	0	0	0
DMAs + Facilities	**420,894**						**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**
	OK	**Step 8:** Iterate sizes of facility footprints and DMAs until all footprints are at least the minimum **AND** DMAs + Facilities equals Total Site Area												
		Step 9: Check to make sure Areas Draining to each Receiving Self-Retaining Area do not exceed maximum 2:1 ratio.												
		Step 10: Check results on this spreadsheet are consistent with what is shown on the SCP Exhibit.												

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An ADEC Innovation

D.3 - Erosion and Sediment Control Plan

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SECTION 3. MODEL ESCP TEMPLATE

1. Tracking Documentation

Official Use Only: Tracking Documentation			
Tracking Number:		ESCP Status	Date
Permit Number:		☐ Approved:	
ESCP Submittal Date:		☐ Revise and Resubmit:	
Returned to Applicant for Revision Date:			
Submittal Checked By:		☐ Modification Approved:	
ESCP Resubmittal Date:		☐ Modification Approved:	
Resubmittal Checked By:		☐ Modification Approved:	

2. Staff Comments

Official Use Only: Reviewer Comments	
Item	**Comment**

Erosion and Sediment Control Plan

3. Project Information

Official Use Only				Applicant Complete this Section
	Yes	No	Comments	
A	☐	☐	☐	Project Name: Zinfandel Subdivision
B	☐	☐	☐	Tract Number N/A
C	☐	☐	☐	Assessor's Parcel Number Pending, Adjusted Parcel 2 per 2019-0016141
D	☐	☐	☐	Location 1583 El Centro Avenue Napa, California 94558
E	☐	☐	☐	Name and Distance to Nearest Receiving Water Adjacent to Salvador Channel
F	☐	☐	☐	Area of Disturbance (in acres or square feet) 10.8 acres
G	☐	☐	☐	Total Project Size (in acres or square feet) 9.7 acres
H	☐	☐	☐	Planned Project Start Date April 15, 2020
I	☐	☐	☐	Planned Grading Completion Date June 15, 2020
J	☐	☐	☐	Planned Project Completion Date December 15, 2022
K	☐	☐	☐	Project Description and Purpose Demolition of existing residential house and barn, and construction of a 53-lot subdivision including new houses, streets, driveways, utilities, bioretention facilites, detention basins and landscaping.

Erosion and Sediment Control Plan

3. Applicant Information

Official Use Only				Applicant Complete this Section
	Yes	No	Comments	
A	☐	☐	☐	**Project Owner** Name: Trinity Project, LLC
	☐	☐	☐	Address: 1583 El Centro Avenue Napa, California 94558
	☐	☐	☐	Phone:
B	☐	☐	☐	**Contractor** Name: TBD
	☐	☐	☐	Address:
	☐	☐	☐	Phone: (24/7 Contact Number)
C	☐	☐	☐	Applicant Certification
				I certify that the information provided in the Erosion and Sediment Control Plan is, to the best of my knowledge and belief, true, accurate, and complete and that it will be implemented throughout the project. I further certify that I will notify the City of Napa CA and submit revised information if any of the information or conditions documented in this Erosion and Sediment Control Plan change. I understand there are significant penalties for submitting false information or for not implementing the Erosion and Sediment Control Plan per NMC 8.36.00 Stormwater Runoff Pollution Control. I will retain a copy of the Erosion and Sediment Control Plan at the project site. Signature: _____ Print/Type Name: Derek Dittman, RSA+ Title: Project Engineer Date: October 17, 2019

Erosion and Sediment Control Plan

4. Identify Other Permits or Controls Required

Identify whether other permits or local controls that affect water courses or water quality are required. Attach proof that the necessary permits have been applied for and obtained. Grading/Building Permits will not be issued until proof is submitted that these other permits have been obtained or that local controls have been satisfied.

Official Use Only				Applicant Complete this Section	
	Yes	No	Comments	Permit/Agreement	Attached
A	☐	☐	☐	**Construction General Permit (CGP)** ☐ Not Applicable ☑ Applicable	☐ Proof of submission ☐ Proof permit was obtained
B	☐	☐	☐	**Section 404 Permit** ☑ Not Applicable ☐ Applicable	☐ Proof of submission ☐ Proof permit was obtained
C	☐	☐	☐	**Section 401 Water Quality Certification** ☐ Not Applicable ☑ Applicable	☐ Proof of submission ☐ Proof permit was obtained
D	☐	☐	☐	**Streambed/Lake Alteration Agreement (1600 Agreements)** ☐ Not Applicable ☑ Applicable	☐ Proof of submission ☐ Proof permit was obtained
E	☐	☐	☐	**Napa County Sensitive Domestic Water Supply Drainages** ☑ Not Applicable ☐ Applicable	☐ Proof requirements were satisfied
F	☐	☐	☐	**Other: (Identify)** *List any specific permits required by the local, state, federal, or regional agencies* _____ _____ _____ _____	☐ Proof of submission ☐ Proof permit was obtained

Erosion and Sediment Control Plan

5. Site Plan and BMP Implementation Schedule

Official Use Only				Applicant Complete this Section	
	Yes	No	Comments		
A	☐	☐	☐	Site Plan	Attach site plan and list relevant plan sheets depicting the project site and scope of construction. Show any creek setbacks and areas where existing vegetation will be preserved on the site plans. See TM plans.
B	☐	☐	☐	BMP Locations	Attach site plan and list relevant plan sheets depicting locations of and types of proposed BMPs. Some BMPs may be included as notes on the site plan. See Sheet TM10 (ESCP Site Plan).
C	☐	☐	☐	BMP Implementation Schedule:	Identify schedule for BMP implementation with the commencement of the construction activities and that BMPs will be implemented year round, as appropriate, until the project is complete. Include final site stabilization in the schedule. The schedule may be shown on the site plan(s) or as a separate document. Temporary BMPs shall be installed prior to the start of site clearing and be maintained until final landscaping and stabilization. A more detailed implementation schedule will be provided with future Construction Documents.

Erosion and Sediment Control Plan

6. BMP Information

Identify and describe the BMPs that will be implemented for the project. At a minimum, the ESCP must include the NCSPPP minimum erosion control, sediment control, and good housekeeping BMPs. Provide a rationale for the selected BMPs, including if needed, soil loss calculations. Use the rationale to demonstrate that the selected control measures are appropriate site specific BMPs.

Official Use Only				Applicant Complete this Section	
	Yes	No	Comments	**BMP**	**Rationale**
				EROSION CONTROL BMPS	
A	☐	☐	☐	**Preserve Existing Vegetation** ☐ Yes ☒ Not Applicable	Nearly all existing vineyards, trees & vegetation will be removed for the proposed development.
B	☐	☐	☐	**Track Walk Slopes** ☐ Yes ☒ Not Applicable	There are no slopes on the site large enough to track walk.
C	☐	☐	☐	**Erosion Control Blankets or equivalent** ☒ Yes ☐ Not Applicable	There will be cut slopes along graded terrace along Salvador Channel and the additional terrace/storage area where blankets would be appropriate. See Sheet TM10 (ESCP Site Plan).

Erosion and Sediment Control Plan

Official Use Only			Applicant Complete this Section	
Yes	No	Comments	BMP	Rationale
D ☐	☐	☐	**Soil Cover** ☒ Yes ☐ Not Applicable	All disturbed areas shall be seeded or temporarily stabilized during construction.
E ☐	☐	☐	**Revegetation** ☒ Yes ☐ Not Applicable	All disturbed areas shall be permanently landscaped or seeded at the end of construction.
			SEDIMENT CONTROL BMPS	
F ☐	☐	☐	**Stabilized Site Entrance** ☒ Yes ☐ Not Applicable	Stabilized site entrance shall be provided per CASQA TC-1. See Sheet TM10 (ESCP Site Plan).
G ☐	☐	☐	**Fiber Rolls,** (e.g., Straw Wattles) ☒ Yes ☐ Not Applicable	Fiber rolls shall be provided per CASQA SE-5. See Sheet TM10 (ESCP Site Plan).

Erosion and Sediment Control Plan

Official Use Only			Applicant Complete this Section	
Yes	No	Comments	**BMP**	**Rationale**
H ☐	☐	☐	**Silt Fence** ☒ Yes ☐ Not Applicable	Silt fence shall be provided per CASQA SE-1. See Sheet TM10 (ESCP Site Plan).
I ☐	☐	☐	**Drain Inlet Protection** ☒ Yes ☐ Not Applicable	Drain inlet protection shall be provided per CASQA SE-10. See Sheet TM10 (ESCP Site Plan).
			GOOD HOUSEKEEPING, MATERIALS AND WASTE MANAGEMENT BMPs	
J ☐	☐	☐	**Concrete Washout** ☒ Yes ☐ Not Applicable	Concrete washout shall be provided per CASQA WM-8. See Sheet TM10 (ESCP Site Plan).
K ☐	☐	☐	**Stockpile Management** ☒ Yes ☐ Not Applicable	Stockpiles shall be managed per CASQA WM-3. See Sheet TM10 (ESCP Site Plan).

Erosion and Sediment Control Plan

Official Use Only			Applicant Complete this Section	
Yes	No	Comments	BMP	Rationale
L ☐	☐	☐	**Hazardous Material and Refuse Management** ☒ Yes ☐ Not Applicable	Refuse shall be managed per CASQA WM-1. Hazardous waste shall not be stored on site.
M ☐	☐	☐	**Sanitary Waste Management** ☒ Yes ☐ Not Applicable	Temporary construction toilets shall be provided per CASQA WM-9.
N ☐	☐	☐	**Equipment and Vehicle Maintenance** ☐ Yes ☒ Not Applicable	Maintenance shall be conducted off-site.

Erosion and Sediment Control Plan

Official Use Only			Applicant Complete this Section
Yes	No	Comments	**BMP** **Rationale**
			OTHER BMPS, *LIST:*
O ☐	☐	☐	_____ ☐ Yes N/A ☐ Not Applicable
☐	☐	☐	_____ ☐ Yes ☐ Not Applicable
☐	☐	☐	_____ ☐ Yes ☐ Not Applicable
☐	☐	☐	_____ ☐ Yes ☐ Not Applicable

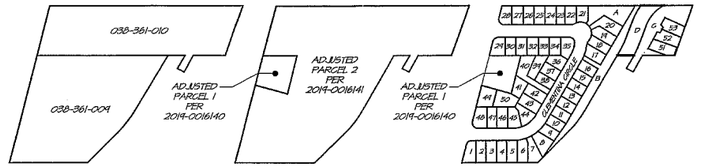
Duplicate this page if needed to describe additional BMPs

TENTATIVE SUBDIVISION MAP
ZINFANDEL SUBDIVISION
NAPA CALIFORNIA

VICINITY MAP
SCALE: 1" = 1000'

GRAPHIC SCALE
60 0 60 120
(IN FEET)
1 inch = 60 FT

SITE PLAN
SCALE: 1" = 60'



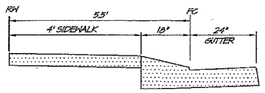
FORMER PARCELS
SCALE: 1" = 300'

EXISTING PARCELS (RECORDED LLA)
SCALES: 1" = 300'

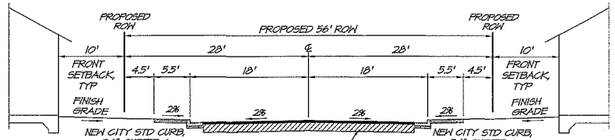
PROPOSED PARCELS
SCALE: 1" = 300'

SYMBOL LEGEND

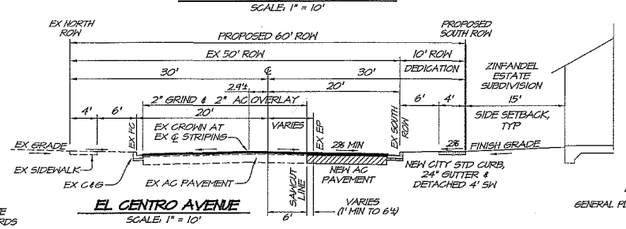
EXISTING		EXISTING		PROPOSED	
	EDGE OF PAVEMENT	EX AD	AREA DRAIN		EDGE OF PAVEMENT/CONCRETE
EX 10	STORM DRAIN LINE	EX BIO	BIOFF	W	WATER LINE
EX SS	SANITARY SEWER LINE	EX DI	DROP INLET		STANDARD SIDEWALK
EX W	WATER LINE		WATER WELL		STD CURB AND GUTTER
EX SSMH	SANITARY SEWER MANHOLE	HB	HOSE BIB	WV	STD WATER VALVE
EX SDMH	STORM DRAIN MANHOLE	EX WM	WATER METER	DI	DROP INLET
	CURB AND GUTTER	EX GM	GAS METER		RETAINING WALL/CURB
EX CB	CATCH BASIN	EX SSCO	SEWER CLEANOUT		100-YEAR OVERLAND RELEASE PATH
	SIDEWALK	SL	SEWER LATERAL		FLOW DIRECTION
EX FH	FIRE HYDRANT	WS	WATER SERVICE		MODIFIED DRIVEWAY
EX WV	WATER VALVE				STREET MONUMENT
	WOOD FENCE			SD	STORM DRAIN LINE
	DRIVEWAY			SS	SANITARY SEWER LINE
865	CONTOUR LINE			CB	CATCH BASIN
+865	SPOT ELEVATION			FH	FIRE HYDRANT
	RETAINING WALL			SDMH	STORM DRAIN MANHOLE
	STREET SIGN			SSMH	SANITARY SEWER MANHOLE
	HANDICAP RAMP				HANDICAP RAMP
	UTILITY VAULT			SSFH	SANITARY SEWER FLUSH HOLE
ICV	IRRIGATION CONTROL VALVE				SLOPE AS NOTED ON PLANS
				SDMS	STORM DRAIN METERING STRUCTURE
				BFP HM WS	WATER SERVICE W/ BFP & HM
				CO SL	SEWER LATERAL W/ CLEANOUT
				AD	AREA DRAIN
					STREET LIGHT
				MB	MAIL BOX



TYP DRIVEWAY WITH 4' SIDEWALK
SCALE: 1"=2'



CLEMENTINA CIRCLE (PUBLIC)
SCALE: 1" = 10'



EL CENTRO AVENUE
SCALE: 1" = 10'

SHEET INDEX

ABBREVIATIONS

AB	AGGREGATE BASE	FM	FINAL MAP	R	RADIUS
AC	ASPHALT CONCRETE	FT	FEET	RC	RETAINING CURB
AD	AREA DRAIN	GAR	GARAGE	RCP	REINFORCED CONCRETE PIPE
ADA	AMERICANS WITH DISABILITIES ACT	GB	GRADE BREAK	RET	RETAINING
APN	ASSESSOR'S PARCEL NUMBER	GF	GARAGE FLOOR	ROW	RIGHT OF WAY LINE
APPROX	APPROXIMATE	GM	GAS METER	RW	RETAINING WALL
AT&T	AMERICAN TELEPHONE & TELEGRAPH	GPS	GLOBAL POSITIONING SYSTEM	RS	RECORD SURVEY
BASMAA	BAY AREA STORMWATER MANAGEMENT AGENCIES ASSOCIATION	GR	GRADE	S	SLOPE ; SOUTH
		HB	HOSE BIB	SCP	STORMWATER CONTROL PLAN
BFE	BASE FLOOD ELEVATION	HOA	HOMEOWNERS ASSOCIATION	SD	STORM DRAIN
BFP	BACKFLOW PREVENTER DEVICE	HP	HIGH POINT	SDCO	STORM DRAIN CLEANOUT
BIO	BIORETENTION	HW	HEADWALL	SDE	STORM DRAIN EASEMENT
BMP	BEST MANAGEMENT PRACTICE	ICV	IRRIGATION CONTROL VALVE	SDMH	STORM DRAIN MANHOLE
BO	BLOW OFF	INV	INVERT ELEVATION	SDMS	STORM DRAIN METERING STRUCTURE
BRF	BIORETENTION FACILITY	JP	JOINT POLE	SQ FT, SF	SQUARE FEET
BSW	BACK OF SIDEWALK	L	LENGTH	SFR	SINGLE FAMILY RESIDENCE
BW	BOTTOM OF WALL ELEVATION	LLA	LOT LINE ADJUSTMENT	SL	STREET LIGHT
CATV	CABLE TELEVISION	LF	LINEAL FOOT/FEET	SL	SEWER LATERAL
CB	CATCH BASIN	LP	LOW POINT	SS	SANITARY SEWER
CI	CAST IRON	MAX	MAXIMUM	SSCO	SANITARY SEWER CLEANOUT
℄	CENTERLINE	MB	MAILBOX	SSE	SANITARY SEWER EASEMENT
CO	CLEANOUT	MIN	MINIMUM	SSFH	SANITARY SEWER FLUSH HOLE
CONC	CONCRETE	N	NORTH	SSMH	SANITARY SEWER MANHOLE
CR	CURB RETURN	NAD	NORTH AMERICAN DATUM	STD	STANDARD
CONF	CONFORM	NAPASAN	NAPA SANITATION DISTRICT	SW	SIDEWALK
DET	DETENTION	NAVD	NORTH AMERICAN VERTICAL DATUM	(T)	TOTAL
DI	DROP INLET	NCR	NAPA COUNTY RECORDS	TA	TREATMENT AREA
DIP	DUCTILE IRON PIPE	NCFCWCD	NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	TC	TOP OF CURB ELEVATION
DMA	DRAINAGE MANAGEMENT AREA			TEL	TELEPHONE
E	EAST	NO	NUMBER	TP	TELEPHONE POLE
EG	EXISTING GRADE	OH	OVERHEAD UTILITIES	TYP	TYPICAL
ELEV	ELEVATION	OR	OFFICIAL RECORDS	TW	TOP OF WALL
EP	EDGE OF PAVEMENT	P	PARKING SPACE	UE	UTILITY EASEMENT
ELEC	ELECTRIC	PCL	PARCEL	VAR	VARIES
EX	EXISTING	PAE	PRIVATE ACCESS EASEMENT	W	WATER ; WEST
FB	FLAT BOTTOM ELEVATION	PG&E	PACIFIC GAS & ELECTRIC	WM	WATER METER
FC	FACE OF CURB	PL	PROPERTY LINE	WS	WATER SERVICE
FF	FINISH FLOOR ELEVATION	PSDE	PRIVATE STORM DRAIN EASEMENT	WSE	WATER SURFACE ELEVATION
FH	FIRE HYDRANT	PUE	PUBLIC UTILITY EASEMENT	WV	WATER VALVE
FL	FLOW LINE	PVC	POLYVINYL CHLORIDE		
		PVT	PRIVATE		

BASIS OF BEARINGS

THE BEARING OF NORTH 73°22'58" EAST BETWEEN THE FOUND MONUMENTS ON THE CENTERLINE OF EL CENTRO AVENUE PER BOOK 14 OF RECORD MAPS AT PAGE 100, NAPA COUNTY RECORDS AND BOOK 20 OF RECORD MAPS AT PAGES 7-10, NAPA COUNTY RECORDS.

TOPOGRAPHY NOTE

TOPOGRAPHY SHOWN ON THESE PLANS WAS COMPILED FROM A FIELD SURVEYS BY RSA+ DONE ON JUNE 2017.

HORIZONTAL AND VERTICAL BENCHMARKS

G.P.S. CONTROL COORDINATE DATA
NAD 1983/NAVD 1988 PER 41 RS 44/41, NAPA COUNTY RECORDS

#	GROUND NORTHING	GROUND EASTING	ELEVATION	DESCRIPTION
22	1862664.801	6411071.274	70.221'	2" BRASS DISC IN HELL AT INTERSECTION OF JEFFERSON STREET & CASK DRIVE
26	1865246.580	6412246.231	70.212'	3" BRASS DISC IN HELL AT INTERSECTION OF JEFFERSON STREET AND SHEETBOAR DRIVE (IN NORTHBOUND LANE OF JEFFERSON STREET)
27	1866684.244	6411049.118	76.451'	2" BRASS DISC IN HELL IN WESTBOUND LANE OF SALVADOR AVENUE AT JEFFERSON STREET
38	1863434.940	6414442.546	60.241'	3" BRASS DISC IN HELL AT INTERSECTION OF TROWER AVENUE & STOVER STREET

PROJECT NOTES

1. TOPOGRAPHIC INFORMATION SHOWN ON THESE PLANS ARE FROM A FIELD SURVEY PERFORMED BY RSA+ IN JUNE 2017.
2. BOUNDARY INFORMATION SHOWN IS FROM A RECORD OF SURVEY PERFORMED BY RSA+ IN OCTOBER 2017.
3. SUBJECT PROPERTY IS ADJACENT TO A FLOODPLAIN AND PORTIONS OF THE PROPERTY DO LIE WITHIN THE 100 YEAR FLOODPLAIN PER THE BFE'S SHOWN ON THE FLOOD INSURANCE RATE MAP (FIRM) AS SHOWN ON SHEETS TM4 AND TM5.
4. THIS MAP SHOWS ALL CONTIGUOUS PROPERTY OF THE OWNERS.
5. ONE RESIDENTIAL HOUSE AND A BARN EXIST ON THE SUBJECT PROPERTY.
6. EXISTING AND PROPOSED EASEMENTS ARE SHOWN.
7. EXISTING AND PROPOSED UTILITIES ARE SHOWN. EXISTING UNDERGROUND UTILITIES AS SHOWN WERE DRAWN FROM RECORD SOURCES ONLY. BURIED PIPES WERE NOT VERIFIED, NOR WAS ANY SUBSURFACE EXPLORATION CONDUCTED.
8. ALL EXISTING UTILITY POLES AND OVERHEAD LINES ALONG STREET FRONTAGE SHALL BE UNDERGROUNDED.
9. CONTOUR LINES AS SHOWN ON SHEETS TM2, TM4 AND TM5 ARE AT 1 FOOT INTERVALS.
10. THE EXISTING WELL FOR THE EXISTING HOUSE WILL BE REMOVED PER NAPA COUNTY HEALTH DEPARTMENT STANDARDS.
11. THERE IS A SEPTIC TANK FOR THE EXISTING HOUSE WHICH WILL BE REMOVED PER NAPA COUNTY HEALTH DEPARTMENT STANDARDS.
12. THERE IS NO PHASING PLANNED FOR THIS PROJECT.
13. THERE ARE NO PUBLIC RECREATION SITES OR PARKS PROPOSED IN THIS SUBDIVISION. THERE ARE PATHS PROPOSED IN THIS PROJECT AS SHOWN ON PLANS.
14. PRIVATE DRIVEWAYS, BIORETENTION/DETENTION FACILITIES AND TERRACES TO BE MAINTAINED BY HOA.

PROJECT INFORMATION

OWNERS:	TRINITY PROJECT, LLC 977 SALVADOR AVENUE NAPA, CALIFORNIA 94559
ARCHITECT:	KIRK GEYER 1088 ROSS CIRCLE NAPA, CALIFORNIA 94558 (707) 337-3025
LANDSCAPE ARCHITECT:	GSN LANDSCAPE ARCHITECTS, INC. 1100 SCENIC AVENUE, STE 23 NAPA, CALIFORNIA 94559 (707) 255-4690
GEOTECHNICAL ENGINEER:	RGH CONSULTANTS 1303 NORTH DUTTON AVENUE SANTA ROSA, CALIFORNIA 95401 (707) 554-1072
ARBORIST:	FRAMIK, TREES AND ASSOCIATES, LLC P.O. BOX 25 NAPA, CALIFORNIA 94559 (707) 226-2884
CIVIL ENGINEER & SURVEYOR:	RSA + 1515 FOURTH STREET NAPA, CALIFORNIA 94559 (707) 252-3301
PARCEL NO.	ADJUSTED PARCEL 2 (RECORDED LLA)
PARCEL AREA:	9.71± ACRES
EXISTING USE:	RESIDENTIAL
PROPOSED USE:	SINGLE FAMILY RESIDENTIAL
WATER:	CITY OF NAPA
SEWER:	NAPA SANITATION DISTRICT
EXISTING ZONING:	RS 4
PROPOSED ZONING:	RS 4
GENERAL PLAN DESIGNATION:	SFR-20

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PRELIMINARY - NOT FOR CONSTRUCTION

NO.	DATE	REVISIONS	BY	APP'D

RSA+
1515 FOURTH STREET
NAPA, CA 94559
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ZINFANDEL SUBDIVISION
COVER SHEET
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
JEREMY NOEL SILL
No. 73257
Exp. 12.31.2020
CIVIL
STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
DRAWN	DEL	DEL
DESIGNED	RAY	RAY
CHECKED	DD	DD
JOB NO.	417101.0	

SHEET NO.
TM1
1 OF 11 SHEETS

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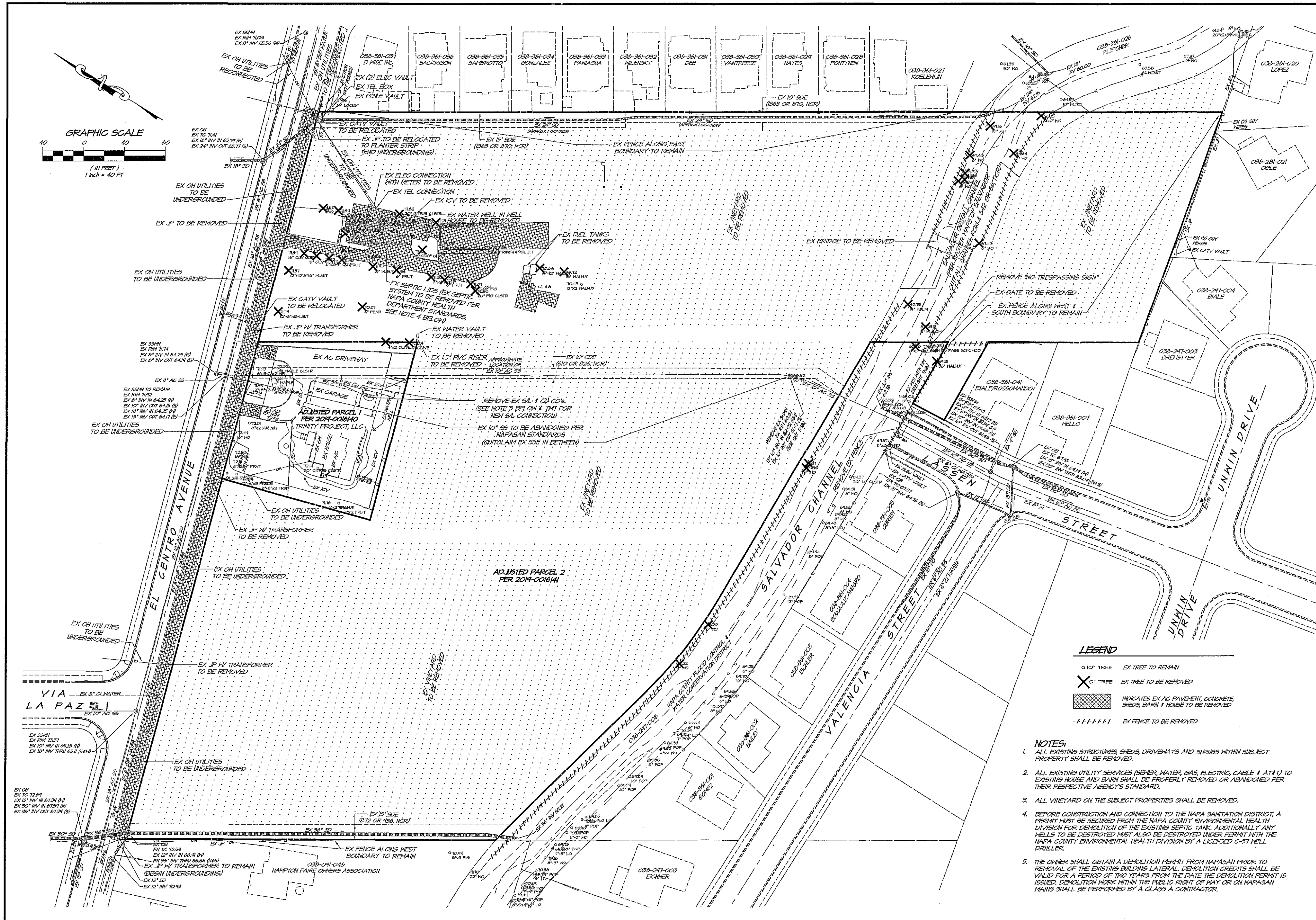

LEGEND

○ 10" TREE	EX TREE TO REMAIN
╳ 10" TREE	EX TREE TO BE REMOVED
(hatched)	INDICATES EX AC PAVEMENT, CONCRETE, SHEDS, BARN & HOUSE TO BE REMOVED
/·/·/·/·/	EX FENCE TO BE REMOVED

NOTES:

1. ALL EXISTING STRUCTURES, SHEDS, DRIVEWAYS AND SHRUBS WITHIN SUBJECT PROPERTY SHALL BE REMOVED.
2. ALL EXISTING UTILITY SERVICES (SEWER, WATER, GAS, ELECTRIC, CABLE & AT&T) TO EXISTING HOUSE AND BARN SHALL BE PROPERLY REMOVED OR ABANDONED PER THEIR RESPECTIVE AGENCY'S STANDARD.
3. ALL VINEYARD ON THE SUBJECT PROPERTIES SHALL BE REMOVED.
4. BEFORE CONSTRUCTION AND CONNECTION TO THE NAPA SANITATION DISTRICT, A PERMIT MUST BE SECURED FROM THE NAPA COUNTY ENVIRONMENTAL HEALTH DIVISION FOR DEMOLITION OF THE EXISTING SEPTIC TANK. ADDITIONALLY ANY WELLS TO BE DESTROYED MUST ALSO BE DESTROYED UNDER PERMIT WITH THE NAPA COUNTY ENVIRONMENTAL HEALTH DIVISION BY A LICENSED C-57 WELL DRILLER.
5. THE OWNER SHALL OBTAIN A DEMOLITION PERMIT FROM NAPASAN PRIOR TO REMOVAL OF THE EXISTING BUILDING LATERAL. DEMOLITION CREDITS SHALL BE VALID FOR A PERIOD OF TWO YEARS FROM THE DATE THE DEMOLITION PERMIT IS ISSUED. DEMOLITION WORK WITHIN THE PUBLIC RIGHT OF WAY OR ON NAPASAN MAINS SHALL BE PERFORMED BY A CLASS A CONTRACTOR.

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ZINFANDEL SUBDIVISION
EXISTING CONDITIONS
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JEREMY NOEL SILL No. 73257 Exp. 12.31.2020 CIVIL ENGINEER STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
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SHEET NO.
TM2
2 OF 11 SHEETS

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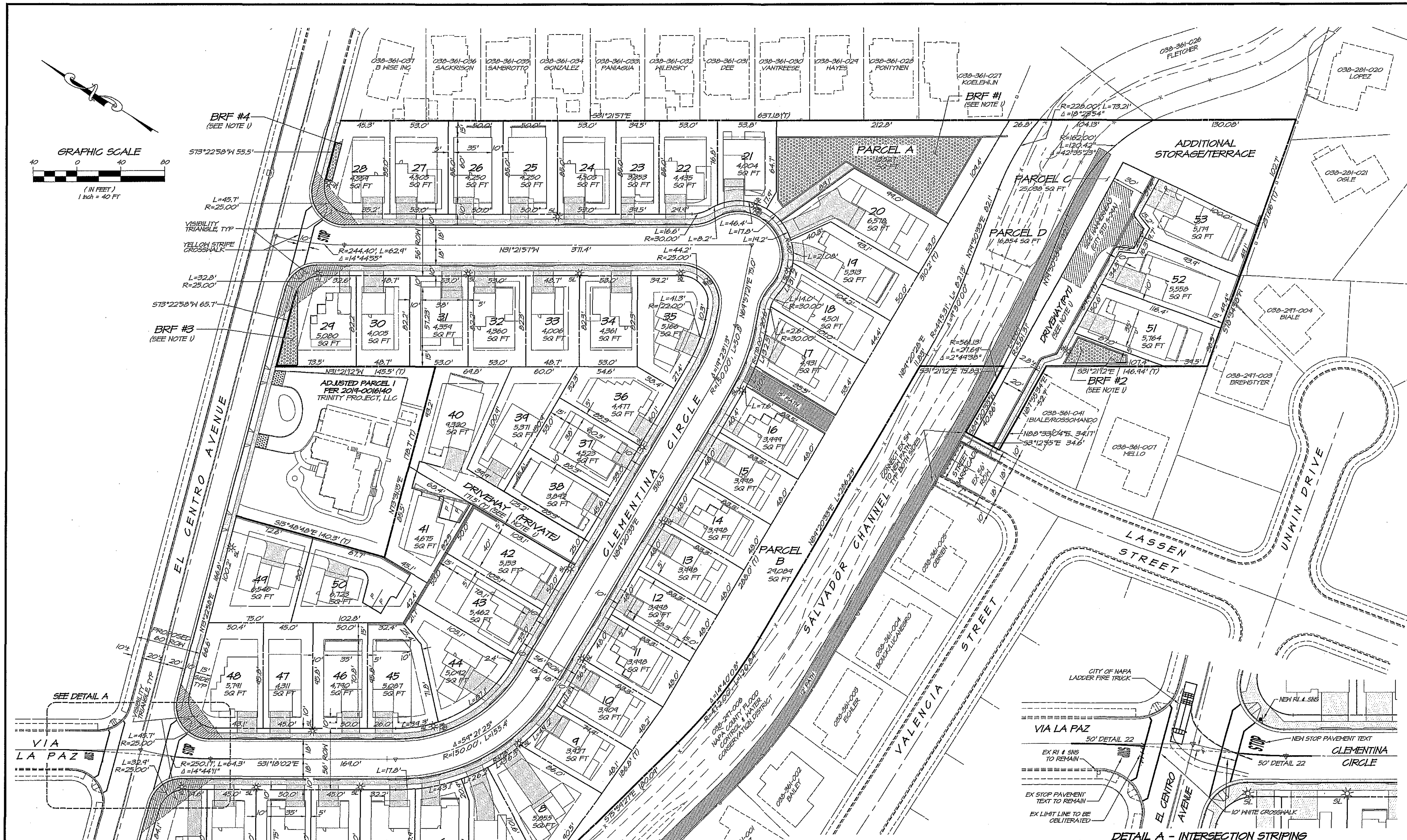

DETAIL A - INTERSECTION STRIPING

SCALE: 1"=30'

SYMBOL LEGEND

◖	STREET SIGN AS DESCRIBED ON PLAN
▬	12" CROSSWALK STRIPE (WHITE OR YELLOW, AS INDICATED ON PLAN)
STOP	CALTRANS STANDARD STOP PAVEMENT TEXT
SL ☼	RESIDENTIAL STREET LIGHT (SEE LANDSCAPE PLANS FOR DETAIL)
DETAIL 22	CENTERLINE STRIPING, NO PASSING ZONE - TWO DIRECTIIONS (CALTRANS STD A20A)
MB ☒	MAIL BOX AS SHOWN ON LANDSCAPE PLANS
P	ON-SITE GUEST PARKING SPACE
△	CITY STD STREET MONUMENT

NOTES:

1. PRIVATE DRIVEWAYS, BIORETENTION/DETENTION FACILITIES AND TERRACES TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
2. SEE SHEET C3.1 FOR LOCATIONS OF ON-STREET PARKING.
3. GARAGES ARE TYPICALLY SET BACK 20' MINIMUM FROM THE BACK OF SIDEWALK OR EDGE OF PRIVATE DRIVEWAY TO PROVIDE ON-SITE PARKING WITHIN THE DRIVEWAY, EXCEPT AT FLAG LOTS 41 AND 50.
4. AT FLAG LOTS 41, 50 AND 53 , ON-SITE GUEST PARKING IS DESIGNATED WITH 'P'.
5. SEE SHEET TM 3.1 FOR LENGTH DIMENSIONS FOR AREAS WHERE ON-STREET PARKING ARE PROPOSED.
6. ALL SIDEWALKS SHALL MAINTAIN AN ADA PATH OF TRAVEL WITHOUT OBSTRUCTIONS. LOCATIONS OF MAILBOXES, FIRE HYDRANTS, STREET LIGHTS AND OTHER POTENTIAL OBSTRUCTIONS SHALL BE LOCATED AT THE BACK OF SIDEWALK. WHERE IT IS NECESSARY TO LOCATE AN OBLECT WITHIN THE CURB-ADJACENT SIDEWALK AREA, THE SIDEWALK SHALL BE BUMPED OUT BEHIND THE OBJECT TO MAINTAIN AN ADA PATH OF TRAVEL. GROUP MAILBOXES AND STREET LIGHTS SHALL BE PLACED BEHIND THE SIDEWALK.
7. LOTS 38 & 42 SHALL HAVE DEEDED PEDESTRIAN ACCESS FROM REAR YARDS TO ADJACENT PRIVATE DRIVEWAY.
8. THIS MAP INCLUDES USE PERMIT APPLICATION FOR SMALL LOT DEVELOPMENT ON LOTS 9-16, 23 & 38.

ZINFANDEL SUBDIVISION DIMENSION PLAN

NAPA CALIFORNIA

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REGISTERED PROFESSIONAL ENGINEER JEREMY NOEL SILL No. 73257 Exp. 12.31.2020 CIVIL ENGINEER STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019
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SHEET NO. TM3
3 OF 11 SHEETS

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GRAPHIC SCALE
40 0 40 80
(IN FEET)
1 inch = 40 FT

SYMBOL LEGEND

SYMBOL	
	CONTRACTOR TO INSTALL
	INDICATES PAINT CURB RED
☼	RESIDENTIAL SEE STREET LIGHT (SEE LANDSPAE PLANS FOR DETAILS)
MB	MAIL BOX AS SHOWN ON LANDSCAPE PLANS
FH	FIRE HYDRANT

NOTES

1. GARAGES ARE TYPICALLY SET BACK 20' MINIMUM FROM THE BACK OF SIDEWALK OR EDGE OF PRIVATE DRIVEWAY TO PROVIDE ON-SITE PARKING WITHIN THE DRIVEWAY, EXCEPT AT FLAG LOTS 41 AND 50.
2. AT FLAG LOTS 41, 50 & 53, ON-SITE GUEST PARKING IS DESIGNATED WITH 'P'.
3. ON-STREET PARKING SPACES ARE SHOWN ABOVE.
4. CURBS TO BE PAINTED RED AT 15' EACH SIDE OF ALL FIRE HYDRANTS.
5. CURBS TO BE PAINTED RED AT MAIL BOXES AS SHOWN.
6. INTERSECTION CURBS SHALL BE PAINTED RED PER CITY STANDARDS 5-25 VISIBILITY TRIANGLE REQUIREMENTS.

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ZINFANDEL SUBDIVISION
PARKING PLAN
CALIFORNIA
NAPA

REGISTERED PROFESSIONAL ENGINEER
MIRIAM NOEL STILL
No. 73257
Exp. 12.31.2020
CIVIL ENGINEER
STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
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SHEET NO.
TM3.1
4 OF 11 SHEETS

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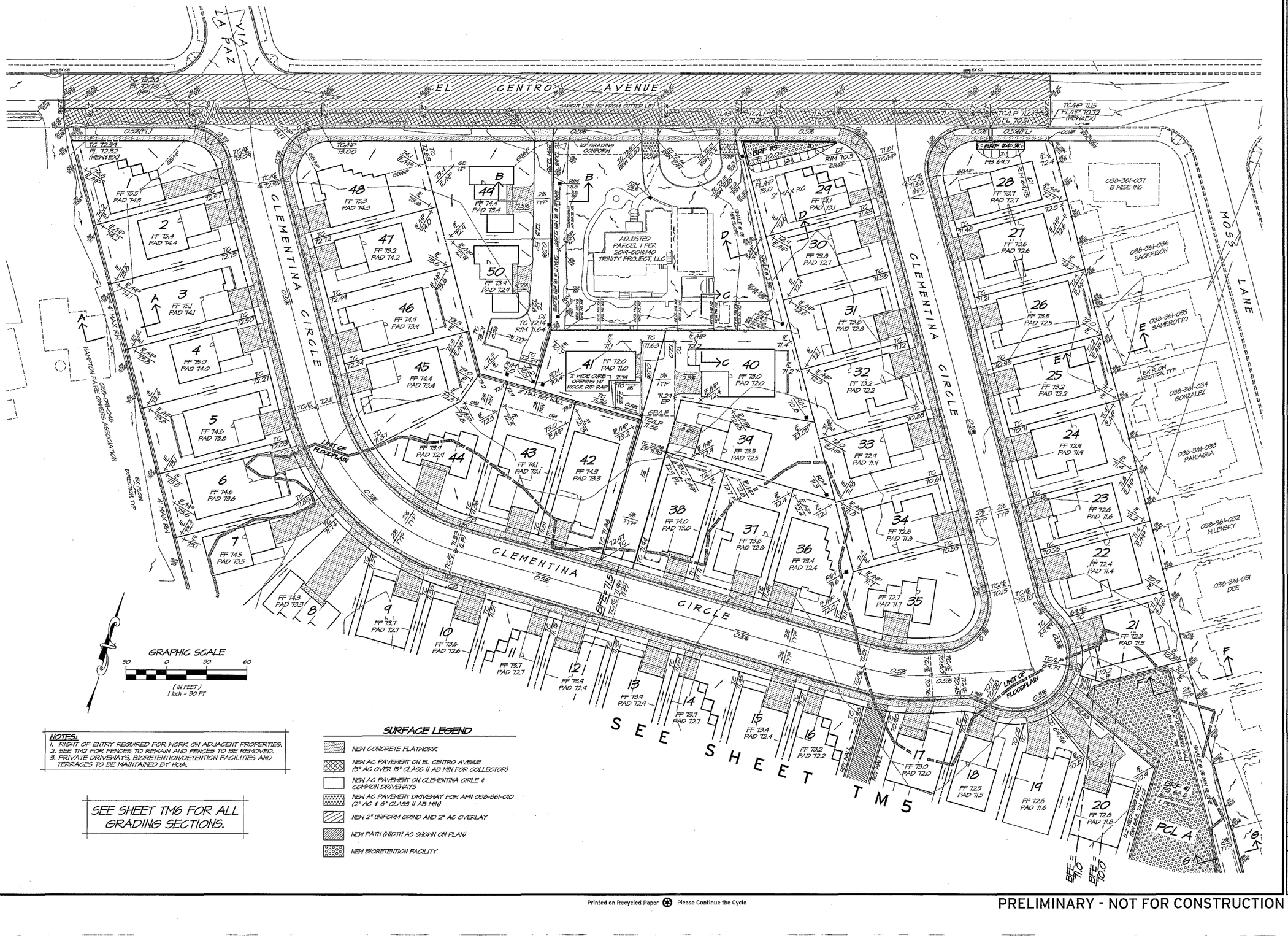

NOTES:
1. RIGHT OF ENTRY REQUIRED FOR WORK ON ADJACENT PROPERTIES.
2. SEE TM2 FOR FENCES TO REMAIN AND FENCES TO BE REMOVED.
3. PRIVATE DRIVEWAYS, BIORETENTION/DETENTION FACILITIES AND TERRACES TO BE MAINTAINED BY HOA.

SEE SHEET TM6 FOR ALL GRADING SECTIONS.

SURFACE LEGEND

- NEW CONCRETE FLATWORK
- NEW AC PAVEMENT ON EL CENTRO AVENUE (3" AC OVER 15" CLASS II AB MIN FOR COLLECTOR)
- NEW AC PAVEMENT ON CLEMENTINA CIRLE & COMMON DRIVEWAYS
- NEW AC PAVEMENT DRIVEWAY FOR APN 038-361-010 (2" AC & 6" CLASS II AB MIN)
- NEW 2" UNIFORM GRIND AND 2" AC OVERLAY
- NEW PATH (WIDTH AS SHOWN ON PLAN)
- NEW BIORETENTION FACILITY

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ZINFANDEL SUBDIVISION
GRADING PLAN (North Portion)

CALIFORNIA

NAPA

REGISTERED PROFESSIONAL ENGINEER BENJAMIN NOEL STILL No. 73251 Exp. 12.31.2020 CIVIL ENGINEER STATE OF CALIFORNIA

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SHEET NO.
TM4
5 OF 11 SHEETS

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SEE SHEET TM4

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 inch = 30 FT

CLEMENTINA CIRCLE

SALVADOR CHANNEL

VALENCIA STREET

LASSEN STREET

PARCEL B

PCL A

PCL C

LIMIT OF FLOODPLAIN

BFE = 77.5

BFE = 71.0

BFE = 69.0

BFE = 68.3

6 FF 74.6 PAD 73.6
7 FF 74.5 PAD 73.5
8 FF 74.8 PAD 73.8
9 FF 73.7 PAD 72.7
10 FF 73.6 PAD 72.6
11 FF 73.7 PAD 72.7
12 FF 73.9 PAD 72.9
13 FF 73.9 PAD 72.9
14 FF 73.7 PAD 72.7
15 FF 73.4 PAD 72.4
16 FF 73.2 PAD 72.2
17 FF 73.0 PAD 72.0
18 FF 72.5 PAD 71.5
19 FF 72.6 PAD 71.6
20 FF 72.8 PAD 71.8
21 FF 72.3 PAD 71.3
35 FF 72.7 PAD 71.7
36 FF 73.4 PAD 72.4
37 FF 73.8 PAD 72.8
38 FF 74.0 PAD 73.0
40
51 FF 72.1 PAD 71.1
52 FF 72.1 PAD 71.1
53 FF 72.1 PAD 71.1

038-241-003 EICHNER
038-361-001 GOMEZ
038-361-002 BAILEY
038-361-003 EICHLER
038-361-004 BOUCKAUCANEGRO
038-361-005 OBRIEN
038-361-041 BIALER/OSSONANDO
038-361-007 MELLO
038-241-008 NAPA CO FLOOD CONTROL & WATER CONSERVATION DISTRICT
038-361-024 HAYES
038-361-028 PONTYNEN
038-361-027 KOELEMIJN
038-241-003 BRENSTYER
038-241-004 BIALE
038-281-021 OBLE
038-281-020 LOPEZ

12' REPAIRED WALL (BY RSA IN 2019)
54.3' BIORETENTION FACILITY
RETAINING WALL TYP
(WALL HEIGHT VARIES)
SEE SHEET TM6 FOR BIORETENTION SECTION
SEE SHEET TM6 FOR RETAINING WALL SECTION

NOTES.
1. RIGHT OF ENTRY REQUIRED FOR WORK ON ADJACENT PROPERTIES.
2. SEE TM2 FOR FENCES TO REMAIN AND FENCES TO BE REMOVED.
3. PRIVATE DRIVEWAYS, BIORETENTION/DETENTION FACILITIES AND TERRACES TO BE MAINTAINED BY HOA.

SEE SHEET TM6 FOR ALL GRADING SECTIONS.

SURFACE LEGEND
- NEW CONCRETE FLATWORK
- NEW AC PAVEMENT ON CLEMENTINA CIRLE & COMMON DRIVEWAYS
- NEW 2" UNIFORM GRIND AND 2" AC OVERLAY
- NEW PATH (WIDTH AS SHOWN ON PLAN)
- NEW BIORETENTION FACILITY
- NEW 2" WIDE AC PLUG

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ZINFANDEL SUBDIVISION
GRADING PLAN (South Portion)
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
BRIAN KOEL STILL
No. 73257
Exp. 12.31.2020
CIVIL ENGINEER
STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
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SHEET NO.
TM5
6 OF 11 SHEETS

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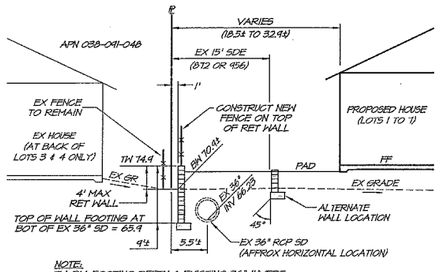
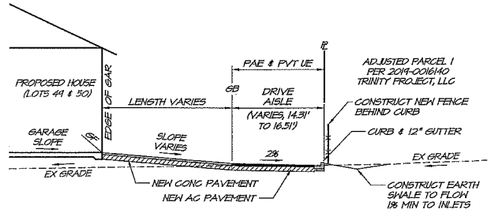
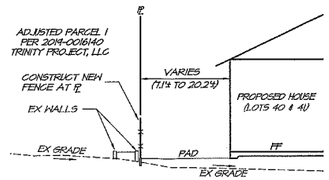


NOTE:
TW, BW, FOOTING DEPTH & EXISTING 36" INVERT ELEVATIONS SHOWN IN THIS SECTION ARE TAKEN AT THE ACTUAL SECTION LINE ON LOT 3 WHERE THE MAXIMUM RETAINING WALL HEIGHT IS APPROXIMATELY 4 FEET.

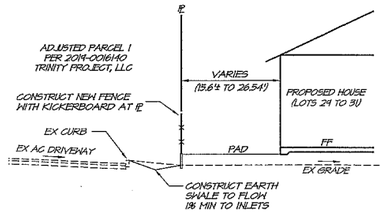
SECTION A-A
SCALE: 1"=10'



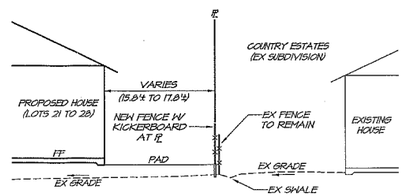
SECTION B-B
SCALE: 1"=10'



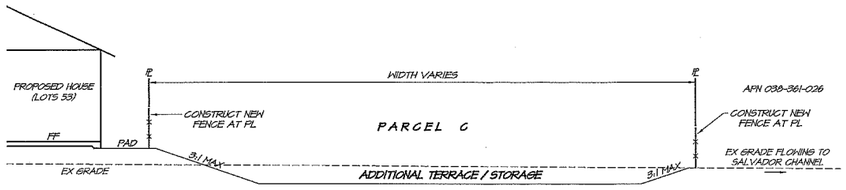
SECTION C-C
SCALE: 1"=10'



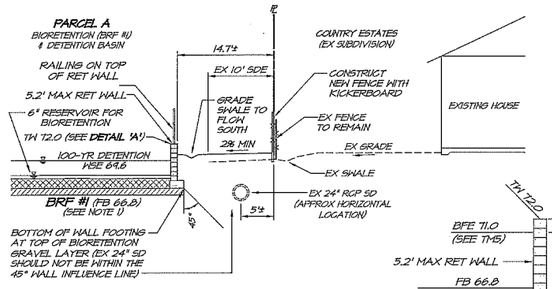
SECTION D-D
SCALE: 1"=10'



SECTION E-E
SCALE: 1"=10'

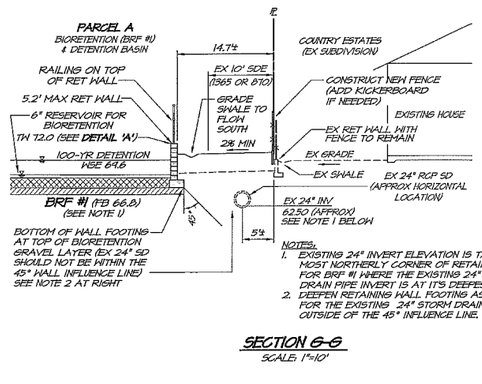


SECTION H-H
SCALE: 1"=10'



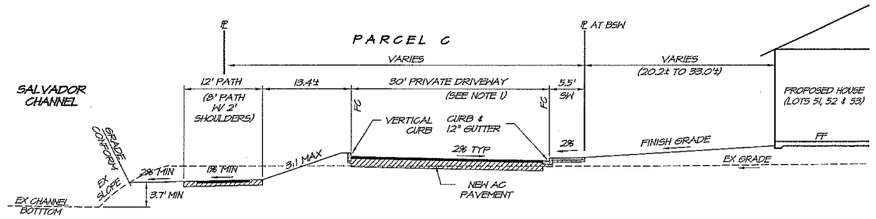
SECTION F-F
SCALE: 1"=10'

DETAIL 'A'
SCALE: 1"=5'

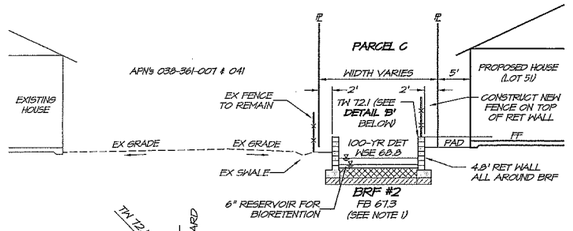


NOTES:
1. EXISTING 24" INVERT ELEVATION IS TAKEN AT THE MOST NORTHERLY CORNER OF RETAINING WALL FOR BRF #1 WHERE THE EXISTING 24" STORM DRAIN PIPE INVERT IS AT IT'S DEEPEST.
2. DEEPEN RETAINING WALL FOOTING AS NEEDED FOR THE EXISTING 24" STORM DRAIN PIPE TO BE OUTSIDE OF THE 45° INFLUENCE LINE.

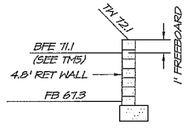
SECTION G-G
SCALE: 1"=10'



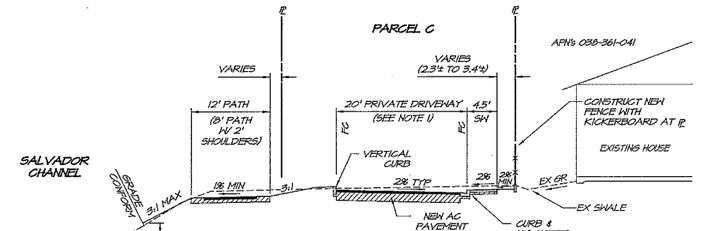
SECTION I-I
SCALE: 1"=10'



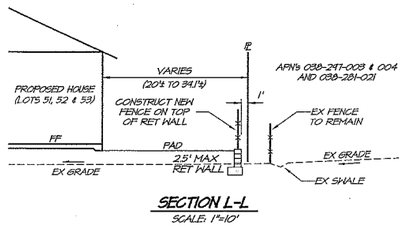
SECTION J-J
SCALE: 1"=10'



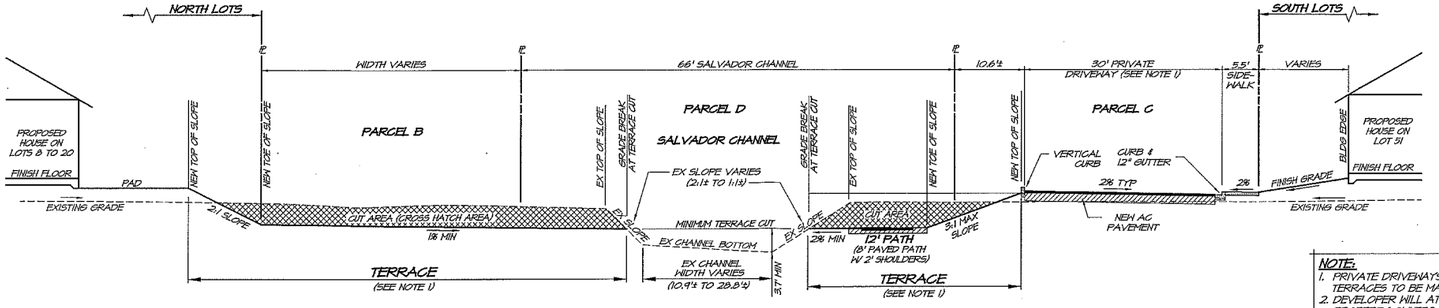
DETAIL 'A'
SCALE: 1"=5'



SECTION K-K
SCALE: 1"=10'



SECTION L-L
SCALE: 1"=10'



TYPICAL SALVADOR CHANNEL CROSS SECTION X-X
SCALE: 1" = 10'

NOTE:
1. PRIVATE DRIVEWAYS, BIORETENTION/DETENTION FACILITIES AND TERRACES TO BE MAINTAINED BY HOA.
2. DEVELOPER WILL ATTEMPT TO COORDINATE WITH NEIGHBORING PROPERTY OWNERS TO CONSTRUCT NEW FENCE ALONG SHARED PROPERTY LINES OR USE EXISTING FENCE IF IT IS IN GOOD CONDITION IN LIEU OF CONSTRUCTING NEW FENCE ADJACENT TO EXISTING FENCE AS SHOWN IN THE SECTIONS ABOVE.

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ZINFANDEL SUBDIVISION
GRADING SECTIONS
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER MIRIAM NOEL STILL No. 72257 Exp. 12.31.2020 CIVIL ENGINEER STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
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SHEET NO.
TM6
7 OF 11 SHEETS

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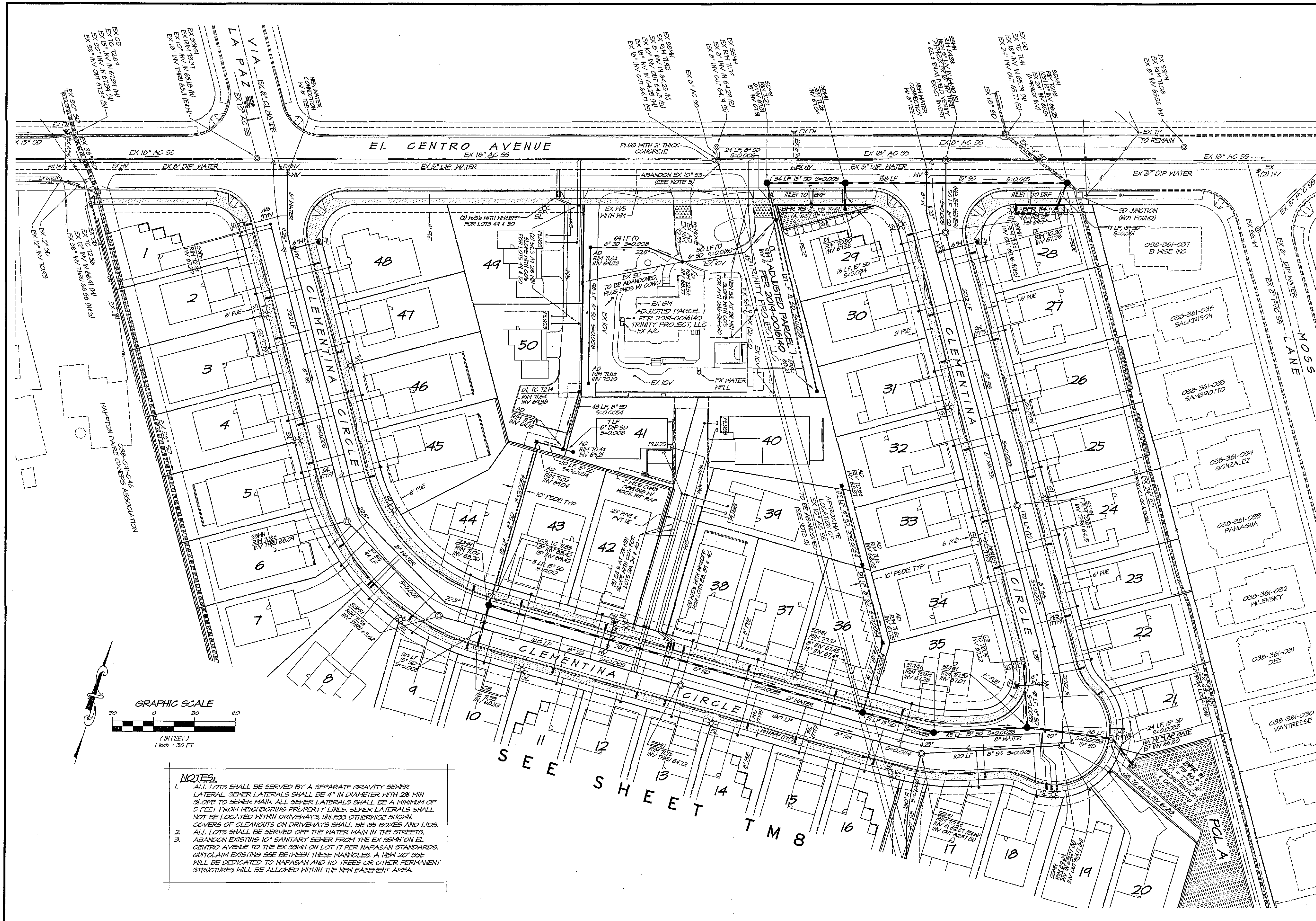
ZINFANDEL SUBDIVISION
UTILITY PLAN (North Portion)

NAPA, CALIFORNIA



NOTES:

1. ALL LOTS SHALL BE SERVED BY A SEPARATE GRAVITY SEWER LATERAL. SEWER LATERALS SHALL BE 4" IN DIAMETER WITH 2% MIN SLOPE TO SEWER MAIN. ALL SEWER LATERALS SHALL BE A MINIMUM OF 5 FEET FROM NEIGHBORING PROPERTY LINES. SEWER LATERALS SHALL NOT BE LOCATED WITHIN DRIVEWAYS, UNLESS OTHERWISE SHOWN. COVERS OF CLEANOUTS ON DRIVEWAYS SHALL BE G5 BOXES AND LIDS.
2. ALL LOTS SHALL BE SERVED OFF THE WATER MAIN IN THE STREETS.
3. ABANDON EXISTING 10" SANITARY SEWER FROM THE EX SSMH ON EL CENTRO AVENUE TO THE EX SSMH ON LOT 17 PER NAPASAN STANDARDS. QUITCLAIM EXISTING SSE BETWEEN THESE MANHOLES. A NEW 20' SSE WILL BE DEDICATED TO NAPASAN AND NO TREES OR OTHER PERMANENT STRUCTURES WILL BE ALLOWED WITHIN THE NEW EASEMENT AREA.

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REGISTERED PROFESSIONAL ENGINEER, JEREMY NOEL SILL, No. 73257, Exp. 12.31.2020, CIVIL ENGINEER, STATE OF CALIFORNIA

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SHEET NO. TM7

8 OF 11 SHEETS

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NOTES:

1. ALL LOTS SHALL BE SERVED BY A SEPARATE GRAVITY SEWER LATERAL. SEWER LATERALS SHALL BE 4" IN DIAMETER WITH 2% MIN SLOPE TO SEWER MAIN. ALL SEWER LATERALS SHALL BE A MINIMUM OF 5 FEET FROM NEIGHBORING PROPERTY LINES. SEWER LATERALS SHALL NOT BE LOCATED WITHIN DRIVEWAYS, UNLESS OTHERWISE SHOWN. COVERS OF CLEANOUTS ON DRIVEWAYS SHALL BE GS BOXES AND LIDS.
2. ALL LOTS SHALL BE SERVED OFF THE WATER MAIN IN THE STREETS.
3. ABANDON EXISTING 10" SANITARY SEWER FROM THE EX SSMH ON EL CENTRO AVENUE TO THE EX SSMH ON LOT 17 PER NAPASAN STANDARDS. QUITCLAIM EXISTING SSE BETWEEN THESE MANHOLES. A NEW 20' SSE WILL BE DEDICATED TO NAPASAN AND NO TREES OR OTHER PERMANENT STRUCTURES WILL BE ALLOWED WITHIN THE NEW EASEMENT AREA.
4. INSTALL 3 SEWER LATERALS AT 2% MIN SLOPE WITH CLEANOUTS FOR LOTS 51, 52 & 53.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 inch = 30 FT

SEE SHEET TM7

CLEMENTINA CIRCLE

PARCEL B

SALVADOR CHANNEL

VALENCIA STREET

LASSEN STREET

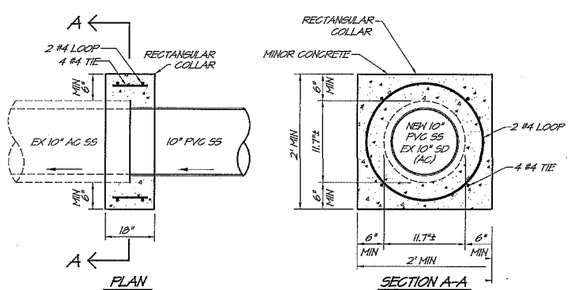
UNWIN DRIVE

PCL A

PCL C

ADDITIONAL TERRACE/ STORAGE

038-241-003 EICHNER
038-361-001 GOMEZ
038-361-002 BAILEY
038-361-003 EICHLER
038-361-004 BOUCKAUVANEGRO
038-361-005 OBRIEN
038-241-008 NAPA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
038-361-080 VANTREESE
038-361-029 HAYES
038-361-028 PONTYNEN
038-361-027 KOELEWIJN
038-361-041 BIALE / ROSSOMANDO
038-361-007 MELLO
038-241-003 BREHSTYER
038-241-004 BIALE
038-281-021 OGLE
038-281-020 LOPEZ



1 / TM8 CONCRETE COLLAR DETAIL
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OFFICE (707) 252-3301
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NO.	DATE	REVISIONS	BY	APPD

ZINFANDEL SUBDIVISION
UTILITY PLAN (South Portion)
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
GREGORY NOEL SILL
No. 73257
Exp. 12.31.2020
CIVIL
STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
DRAWN	DEL	DSL
DESIGNED	RAY	RAY
CHECKED	DD	GS
JOB NO.	4117.01.0	

SHEET NO.
TM8
9 OF 11 SHEETS

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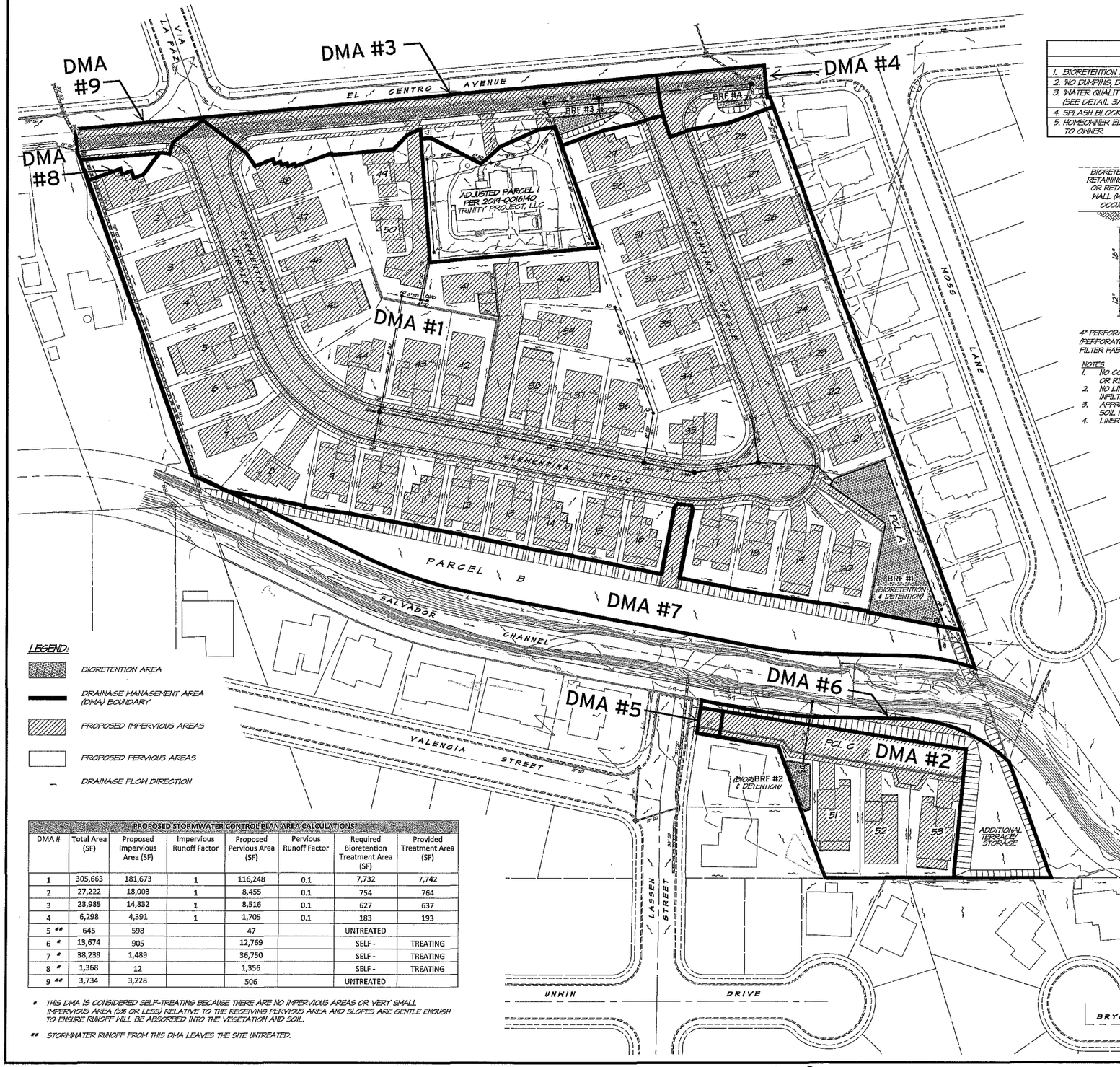


LEGEND:

- BIORETENTION AREA
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- PROPOSED IMPERVIOUS AREAS
- PROPOSED PERVIOUS AREAS
- DRAINAGE FLOW DIRECTION

PROPOSED STORMWATER CONTROL PLAN AREA CALCULATIONS

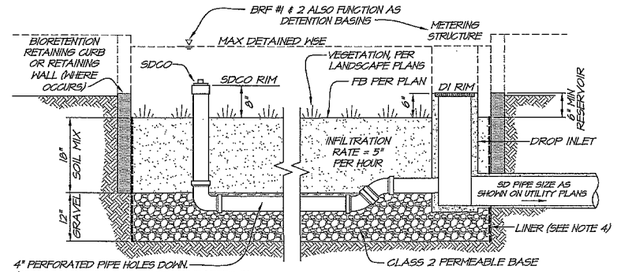
DMA #	Total Area (SF)	Proposed Impervious Area (SF)	Impervious Runoff Factor	Proposed Pervious Area (SF)	Pervious Runoff Factor	Required Bioretention Treatment Area (SF)	Provided Treatment Area (SF)
1	305,663	181,673	1	116,248	0.1	7,732	7,742
2	27,222	18,003	1	8,455	0.1	754	764
3	23,985	14,832	1	8,516	0.1	627	637
4	6,298	4,391	1	1,705	0.1	183	193
5 **	645	598		47		UNTREATED	
6 *	13,674	905		12,769		SELF -	TREATING
7 *	38,239	1,489		36,750		SELF -	TREATING
8 *	1,368	12		1,356		SELF -	TREATING
9 **	3,734	3,228		506		UNTREATED	

* THIS DMA IS CONSIDERED SELF-TREATING BECAUSE THERE ARE NO IMPERVIOUS AREAS OR VERY SMALL IMPERVIOUS AREA (5% OR LESS) RELATIVE TO THE RECEIVING PERVIOUS AREA AND SLOPES ARE GENTLE ENOUGH TO ENSURE RUNOFF WILL BE ABSORBED INTO THE VEGETATION AND SOIL.

** STORMWATER RUNOFF FROM THIS DMA LEAVES THE SITE UNTREATED.

PROPOSED POST CONSTRUCTION BMP's

BMP (BEST MANAGEMENT PRACTICES)	TREATMENT AREA
1. BIORETENTION AREAS, 4 EACH (SEE DETAIL 1/TM4 IN THIS SHEET)	SEE MAP FOR DMA
2. "NO DUMPING, DRAINS TO RIVER" STAMPING ON ALL INLETS (SEE DETAIL 2/TM4 IN THIS SHEET)	ENTIRE PROJECT
3. "WATER QUALITY FEATURE ON SITE" STAMPING ON ALL BIORETENTION INLETS (SEE DETAIL 3/TM4 IN THIS SHEET)	ENTIRE PROJECT
4. SPLASH BLOCKS ON ALL DOWNSPOUTS (SEE DETAIL 4/TM4 IN THIS SHEET)	ENTIRE PROJECT
5. HOMEOWNER EDUCATION: COPY OF SCP AND MAINTENANCE AGREEMENT TO BE PROVIDED TO OWNER	ENTIRE PROJECT



LONGITUDINAL SECTION

NOTES:
1. NO COMPACTION OF SOILS BENEATH THE FACILITY, OR RIPPING/LOOSENING OF SOILS IF COMPACTED.
2. NO LINERS OR OTHER BARRIERS INTERFERING WITH INFILTRATION.
3. APPROPRIATE PLANT PALETTE FOR THE SPECIFIED SOIL MIX & MAXIMUM AVAILABLE WATER USE.
4. LINER SHALL BE 30 MIL LINER.

BIORETENTION PLAN LIST: REFER TO BASMAA PLANT MATRIX IN APPENDIX F (SEE LANDSCAPE PLANS)

SOIL MIX NOTE: A MIXTURE OF SAND (60%-70%) MEETING THE SPECIFICATIONS OF ASTM C33 AND COMPOST (30%-40%) PER BASMAA PHASE II SOIL MIX. ENGINEER TO CERTIFY SOIL MIX PRIOR TO INSTALLATION.

GRAVEL NOTE: "CLASS 2 PERMEABLE," CALTRANS SPECIFICATION 68-2.02F(3)

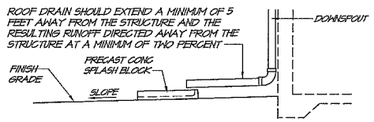
1/TM4 BIORETENTION AREA DETAIL
NOT TO SCALE

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 inch = 50 FT

2/TM4 DROP INLET MARKER
NOT TO SCALE

NOTES:
1. EACH BIORETENTION FACILITY WITHIN THE CITY LIMITS SHALL BE MARKED WITH A "WATER QUALITY FEATURE ON SITE - DO NOT ALTER OR REMOVE" MARKER.
2. CONTRACTOR IS TO PURCHASE THESE MARKERS FROM THE PUBLIC WORKS DEPARTMENT LOCATED AT 1600 FIRST STREET.

3/TM4 BIORETENTION FACILITY MARKER
NOT TO SCALE



4/TM4 SPLASH BLOCK DETAIL
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ZINFANDEL SUBDIVISION
STORMWATER CONTROL PLAN
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — GREGORY NOEL SILL — No. 73257 — Exp. 12.31.2020 — CIVIL ENGINEER — STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019
DRAWN	DEL
DESIGNED	RAY
CHECKED	DD
JOB NO.	4117017.0

SHEET NO.
TM9
10 OF 11 SHEETS

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GRAPHIC SCALE

40 0 40 80

(IN FEET)
1 inch = 40 FT

EL CENTRO AVENUE
VIA LA PAZ
CLEMENTINA CIRCLE
SALVADOR CHANNEL
VALENCIA STREET
LASSEN STREET
UNWIN DRIVE
PARCEL A
PARCEL B
PARCEL C
PARCEL D
ADDITIONAL TERRACE / STORAGE
NEW PATH
LIMIT OF GRADING
BRF #1 (BIORETENTION & DETENTION)
BRF #2 (BIORETENTION & DETENTION)
BRF #3 (BIORETENTION ONLY)
BRF #4 (BIORETENTION ONLY)
INSTALL FIBER ROLL AND ORANGE CONSTRUCTION FENCING AROUND BIORETENTION AREA TO PROTECT PLANTS DURING CONSTRUCTION, TYPICAL ON ALL BIORETENTION FACILITIES
FIBER ROLL SEDIMENT BARRIER, TYP
FIBER ROLL SEDIMENT BARRIER ADJACENT TO CURB OR SIDEWALK, TYP
GRAVEL BAG INLET PROTECTION, TYP
GRAVEL BAG CHECK DAM TYP
CONSTRUCTION FENCE TYP
STABILIZED CONSTRUCTION ENTRANCE/EXIT
RUN-OFF SAMPLE PT #1 AT CURB CUT
RUN-OFF SAMPLE PT #2 AT GUTTER
RUN-OFF SAMPLE PT #3 AT CB
RUN-OFF SAMPLE PT #4 AT CURB CUT
NAPA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
038-361-037 B WISE INC.
038-361-036 SACKRISON
038-361-035 SAMBROTTO
038-361-034 GONZALEZ
038-361-033 PANIAGUA
038-361-032 HILDEBRY
038-361-031 DEE
038-361-030 VANTREESE
038-361-029 HAYES
038-361-028 PONTYNEN
038-361-027 KOELEWIJN
038-361-026 FLETCHER
038-281-020 LOPEZ
038-281-021 GELF
038-241-004 BIALE
038-241-003 BREHSTYER
038-361-041 BIALE/ROSSOMANDO
038-361-007 MELLO
038-241-028 BOUCKLEANEGRO
038-241-029 EIGNER
038-241-027 EIGNER
038-241-002 BIALE
038-241-001 GOMEZ
038-241-048 HAMPTON FAIRE OWNERS ASSOCIATION
ADJUSTED PARCEL 1 PER 2016-0040 PARK PROPERTY, LLC

LEGEND

- (A) MATERIAL AND WASTE STORAGE AREA PER WM-6
- (B) CONCRETE WASH-OUT AREA PER WM-8
- (C) VEHICLE & EQUIPMENT STORAGE AND SERVICE AREA PER NS-8, NS-9, NS-10
- (D) STOCKPILE LOCATION PER WM-3
- DROP INLET / AREA DRAIN SEDIMENT BARRIER
- —x—x— CONSTRUCTION FENCE
- CURB INLET SEDIMENT BARRIER
- GRAVEL BAG CHECK DAM
- FIBER ROLL SEDIMENT BARRIER ADJACENT TO CURB OR SIDEWALK
- STABILIZED CONSTRUCTION ENTRANCE/EXIT
- SAMPLING LOCATIONS
- FIBER ROLL SEDIMENT BARRIER
- BIORETENTION FACILITY

NOTES:

1. INSTALL EROSION CONTROL BLANKETS OR EQUIVALENT ON ALL CUT SLOPES ALONG GRADED TERRACE ALONG SALVADOR CHANNEL AND ADDITIONAL TERRACE/STORAGE AREAS.
2. ALL DISTURBED AREAS SHALL BE SEEDED OR TEMPORARILY STABILIZED DURING CONSTRUCTION.
3. ALL DISTURBED AREAS SHALL BE TEMPORARILY LANDSCAPED OR SEEDED AT THE END OF CONSTRUCTION.

NO.	DATE	REVISIONS	BY	APP'D

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ZINFANDEL SUBDIVISION
ESCP SITE PLAN
NAPA CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — VINOM NOEL SETH — No. 73257 — Exp. 12.31.2020 — CIVIL — STATE OF CALIFORNIA

DATE	OCTOBER 17, 2019	
DRAWN	DEL	
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SHEET NO.
TM10
11 OF 11 SHEETS

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FCS
An ADEC Innovation

D.4 - Paleontological Records Search

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Kenneth L. Finger, Ph.D.
Consulting Paleontologist

18208 Judy St., Castro Valley, CA 94546-2306 510.305.1080 klfpaleo@comcast.net

May 8, 2020

Dana DePietro
FirstCarbon Solutions
1350 Treat Boulevard, Suite 380
Walnut Creek, CA 94597

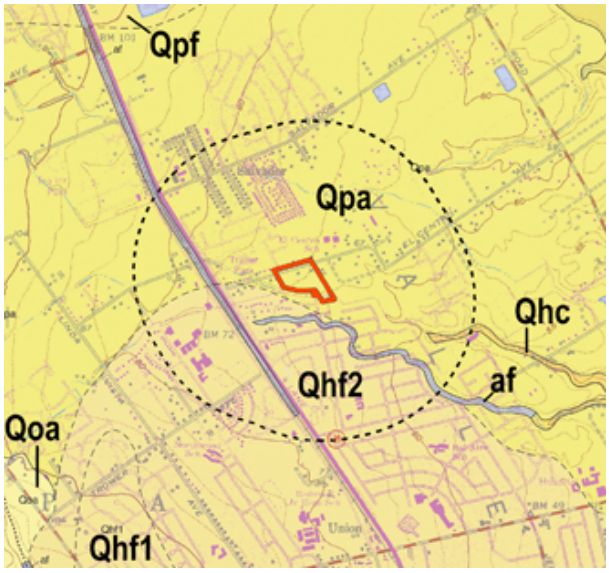
Re: Paleontological Records Search:
Zinfandel Subdivision Project (3552.0019), City of Napa, Napa County

Dear Dr. DePietro:

As per your request, I have performed a records search on the University of California Museum of Paleontology (UCMP) database for the proposed Zinfandel Subdivision in Napa. Its Public Land Survey (PLS) location of the project site is S½, NW¼, SW¼, Sec. 28, T6N, R4W, Napa quadrangle (USGS 7.5-series topographic map). The project site is on relatively flat terrain on the south side of El Centro Avenue. Google Earth imagery shows the surface of this site is occupied by a farm consisting of a house and tilled fields; hence, it has been heavily disturbed.

Geologic Units

According to the part of the geologic map by Clahan et al. (2004) shown here, the entire project site (red outline at center) is on latest Pleistocene alluvium (Qpa). Also within the half-mile search area are Holocene alluvial fan deposits, latest Holocene stream channel deposits (Qhc), and recent artificial fill (af). Older Pleistocene alluvium (Qoa) is mapped about two miles southwest of the project site and probably extends in the to it in the subsurface below the Qpa. Pleistocene alluvium has a high paleontological sensitivity by usually a low or uncertain paleontological potential. The Holocene units are too young to be fossiliferous and therefore have no paleontological sensitivity or potential.



Geologic Units Shown on Map

af	Artificial fill (historic)
Qhc	Stream channel deposits (latest Holocene, <1000 years)
Qha	Alluvium, undivided (Holocene)
Qhf	Alluvial fan deposits (Holocene)
Qpa	Alluvium, undivided (latest Pleistocene)
Qpf	Alluvial fan deposits (latest Pleistocene)
Qoa	Alluvium (early to late Pleistocene)

Records Search Results

The records search performed on the UCMP database focused on the Napa County and revealed two vertebrate and two plant localities. Three of them are Pliocene; one of the plant localities has no indication of age. It is therefore assumed that no significant paleontological resources have been recorded from Pleistocene deposits in Napa Valley. Thus, Pleistocene alluvium in Napa County apparently has an extremely low potential of yielding significant paleontological resources.

Remarks and Recommendations

A paleontological walkover survey and paleontological monitoring are not recommended because the surface of the project site is heavily disturbed and no Pleistocene vertebrate or plant fossils have been recorded from the region. Although highly unlikely, should any vertebrate remains (i.e., bones, teeth, or unusually abundant and well-preserved invertebrates or plants) be unearthed, the construction crew should not attempt to remove them**,** as they could be extremely fragile and therefore prone to crumbling, and to ensure their occurrence is properly recorded; instead, all work in the immediate vicinity of the discovery should be diverted at least 15 feet away from the find until it is assessed by a professional paleontologist assesses and, if deemed significant, salvaged in a timely manner. All recovered fossils should be deposited in an appropriate repository, such as the UCMP, where they will be properly curated and made accessible for future study.

Sincerely,

Reference Cited

Clahan, K.B., Wagner, D.L., Saucedo, G.J., Randolph-Loar, C.E., and Sowers, J.M., 2004. Geologic map of the Napa 7.5' quadrangle, Napa County, California: a digital database, version 1.0. <ftp://ftp.consrv.ca.gov/pub/dmg/rgmp/Prelim_geo_pdf/Calistoga_24k_v1-0.pdf>