

LEMMON DRIVE ESTATES PROPERTY GRADING SPECIAL USE PERMIT

PREPARED FOR

CHUCK BLUTH

PREPARED BY:
CFA, INC.
1150 CORPORATE BOULEVARD
RENO, NV 89502
(775) 856-1150



MAY 15, 2018

PROJECT: 16-013.00

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Project Description

Project Request

This application is a request for an “ex post facto” special use permit for grading on a 33.97+/- acre parcel located on the east side of Lemmon Drive between Buck Drive and Military Road in Lemmon Valley. The Washoe County Assessor's office recognizes the property as APN 552-210-18.

The property owner directed his grading contractor to go to the subject property and retrieve some landscape size rocks and boulders for use at another project site on which he was working (approximately 1 mile away). This occurrence was exposed to both the Washoe County staff and the applicants planning representative at a planning commission hearing for WTM18-004 as both had last been to the site prior to this work being done. At the time of the planning commission hearing, the overall size and scope of the grading and ground disturbance was not known and it appeared that it could to be a rather small area that would need to be addressed. However, upon site visit by the Washoe County Planner (Roger Pelham) and the applicant's planning consultant (Dave Snelgrove), it was recognized that a special use permit for grading would be required, along with a following grading permit for the work that had been done without the knowledge of either individual.

Washoe County Code Article 438 (Grading Standards) identified what permits are required for a variety of levels of grading. It was determined through site visit with County staff and the applicant's planning consultant that the grading threshold had been crossed and would necessitate a special use permit review, in addition to a grading permit. In this case, each would be after-the-fact of the work. The specific threshold that has been crossed is identified under Section 110.438.35(A)(3), which states: Any driveway or road that traverses and slope of 30% or greater (steeper). An access road was graded through the movement of earth to soften the access slope. Images of this area where earth was moved from its original contours can be seen on page 6 of this project description. From visual inspection of the site, other areas that were disturbed are comprised of areas of crushed natural vegetation and exposure of soil where boulders were removed from the base of the rock outcropping.

Property Location

The subject property is located on the west side of Lemmon Drive between Buck Drive and Military Road. The southern property line of the subject parcel is located approximately 1,200 feet north of Buck Drive and the north property line of the subject property is approximately 650 feet south of Military Road. A vicinity map is provided on page 2 of this project description.

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT FOR GRADING

Figure 1 – Vicinity Map



Existing Site Conditions

The site is currently vacant and presents low to moderately sloped land on the western and southern ends of the site and possesses a floodplain and steep slopes that are located approximately in the northeast ¼ to 1/3 third of the property. There are existing dirt access roads across the site that can be seen in the topographic map and vicinity map. The access roads serve utility lines that cross the site from north to south and east to west. Following are site photos showing the existing condition of the property. All of the photos were taken from the areas that are defined by Washoe County to be the most developable portions of the property



View of subject property from Southwest corner, near Lemmon Drive and Silver State Kennels.



View of property from current intersection of gas line and sewer line toward the northeast. Lower rock outcropping is on the subject property and will not be disturbed. Peak of hill is not part of subject property.

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT FOR GRADING

View of property from current northwest corner near Lemmon Drive and north property line. Dirt road to on left side of photo is the existing sewer line easement access road.



Image of rock outcropping prior to any disturbance by property owner to remove some of the rocks at the base.

Images of Areas that were Disturbed

Following are photos of the areas that were either graded (changing the grade of the land) or disturbed by crushing natural vegetation by driving heavy equipment over it or removing rocks that had fallen to the base of the rock outcropping.



Southern portion of rock outcropping on eastern side of drainageway where some rocks were removed from base and lower portion of outcropping. No "regrading" or recontouring of land recognized in these photos as vegetation is only crushed, not removed.

Northern portion of rock outcropping on eastern side of drainageway where some rocks were removed from base and lower portion of outcropping. Again, no "regrading" or recontouring of land recognized in these photos as vegetation is only crushed, not removed.



LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT FOR GRADING



Portion of new access that was "graded" to get across a steep slope on west side of drainageway.



Portion of new access that branches off of existing sewer line road where vegetation was crushed, but earth was not "regraded."

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT FOR GRADING

Development Statistics

Total Site Area	33.97+/- AC (1,479,733.2+/- SF)
(1) Area that was Regraded for Access	1,840+/- SF
(1a) Area of Regrading that Occurred on 30% or Steeper Slopes	300+/- SF
(2) Area of 30% or Steeper Slopes where Boulders were Removed	3,770+/- SF
(3) Area where Sagebrush/Native Vegetation was Crushed by Heavy Equipment	26,802+/- SF
(4) Rock Stockpile Area	2,640+/- SF
Total Surface Level Disturbance (1+2+3+4)	35,052+/- SF (2.4% of the Site)

APPENDIX A

Property Owner Affidavit

Applicant Name: Lakes at Lemmon Valley LLC

The receipt of this application at the time of submittal does not guarantee the application complies with all requirements of the Washoe County Development Code, the Washoe County Master Plan or the applicable area plan, the applicable regulatory zoning, or that the application is deemed complete and will be processed.

STATE OF NEVADA)
)
COUNTY OF WASHOE)

I, Charles P. Bluth, Owner of the Lakes at Lemmon Valley, LLC
(please print name)

being duly sworn, depose and say that I am the owner* of the property or properties involved in this application as listed below and that the foregoing statements and answers herein contained and the information herewith submitted are in all respects complete, true, and correct to the best of my knowledge and belief. I understand that no assurance or guarantee can be given by members of Planning and Building.

(A separate Affidavit must be provided by each property owner named in the title report.)

Assessor Parcel Number(s): 552-210-18

Printed Name CHARLES P. BLUTH
Signed [Signature]

Address 4655 Longley Lane, Suite 107

Reno, Nevada 89502

Subscribed and sworn to before me this
10TH day of MAY, 2018

Kathleen O'Connell
Notary Public in and for said county and state

My commission expires: 12-26-2018

(Notary Stamp)



*Owner refers to the following: (Please mark appropriate box.)

- Owner
- Corporate Officer/Partner (Provide copy of record document indicating authority to sign.)
- Power of Attorney (Provide copy of Power of Attorney.)
- Owner Agent (Provide notarized letter from property owner giving legal authority to agent.)
- Property Agent (Provide copy of record document indicating authority to sign.)
- Letter from Government Agency with Stewardship

Special Use Permit Application for Grading Supplemental Information

(All required information may be separately attached)

Chapter 110 of the Washoe County Code is commonly known as the Development Code. Specific references to special use permits may be found in Article 810, Special Use Permits. Article 438, Grading, and Article 418, Significant Hydrologic Resources, are the ordinances specifically involved in this request.

1. What is the purpose of the grading?

Ground and vegetation disturbance occurred when the property owner had his grading contractor create an access to an area where landscape rocks and boulders exist.

2. How many cubic yards of material are you proposing to excavate on site?

340+/- CY was excavated in the form of boulders that were removed and are now stockpiled on the site.

3. How many square feet of surface of the property are you disturbing?

Approximately 35,052+/- SF s.f. of surface was disturbed.

4. How many cubic yards of material are you exporting or importing? If none, how are you managing to balance the work on-site?

340+/- CY of rock is proposed to be exported to an apartment site located less than 1 mile away on Sky Vista Parkway.

5. Is it possible to develop your property without surpassing the grading thresholds requiring a Special Use Permit? (Explain fully your answer.)

No. The grading was done by the owner with neither consult of Washoe County nor his planning consultant/firm (CFA, Inc.). The extent of grading/ground disturbance that was found after it had already occurred surpassed the threshold for a special use permit upon site visit by the County staff member (Roger Pelham) and the applicant's planning consultant (Dave Snelgrove).

6. Has any portion of the grading shown on the plan been done previously? (If yes, explain the circumstances, the year the work was done, and who completed the work.)

Existing roads were used for access and are not identified as having been graded nor disturbed in this recent work. Only a new road that affected a 30% or greater slope area and crushed vegetation on the property are included as areas of graded areas on the proposed conceptual grading/vegetation disturbance exhibit.

7. Have you shown all areas on your site plan that are proposed to be disturbed by grading? (If no, explain fully your answer.)

All areas that have been disturbed are shown with this application. Another application WTM18-004 (a common open space tentative map application) is currently in appeal and is proposed to provide a 98-lot subdivision on the west side of the existing drainageway. As such, there is proposed to be addition grading on the site if the common open space tentative map request is ultimately approved.

8. Can the disturbed area be seen from off-site? If yes, from which directions, and which properties or roadways?

Only the stacked rock and some newly exposed earth at the base of the rock outcropping from where the rock was removed can be seen from any public right-of-way (Lemmon Drive).

9. Could neighboring properties also be served by the proposed access/grading requested (i.e. if you are creating a driveway, would it be used for access to additional neighboring properties)?

No. the area that was accesses is proposed (per case no. WTM18-004) to be within undisturbed area.

10. What is the slope (Horizontal/Vertical) of the cut and fill areas proposed to be? What methods will be used to prevent erosion until the revegetation is established?

Recontouring of the roadway is proposed and revegetation of the areas where vegetation was crushed is proposed.

11. Are you planning any berms?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes, how tall is the berm at its highest?
------------------------------	--	--

12. If your property slopes and you are leveling a pad for a building, are retaining walls going to be required? If so, how high will the walls be and what is their construction (i.e. rockery, concrete, timber, manufactured block)?

No buildings nor retaining walls are proposed under this application request.

13. What are you proposing for visual mitigation of the work?

removal of the rocks and revegetation of the areas that were disturbed.

14. Will the grading proposed require removal of any trees? If so, what species, how many and of what size?

No. no trees exist on the site, nor were disturbed.

15. What type of revegetation seed mix are you planning to use and how many pounds per acre do you intend to broadcast? Will you use mulch and, if so, what type?

A landscape architect will be consulted for appropriate application method and seed mix with a final grading permit submittal.

16. How are you providing temporary irrigation to the disturbed area?

No water source currently exists to the site. as such, no temporary vegetation is proposed.

17. Have you reviewed the revegetation plan with the Washoe Storey Conservation District? If yes, have you incorporated their suggestions?

No, not at this point. However, this may be a good source for recommendations for revegetation methods that will be the most fruitful.

18. Are there any restrictive covenants, recorded conditions, or deed restrictions (CC&Rs) that may prohibit the requested grading?

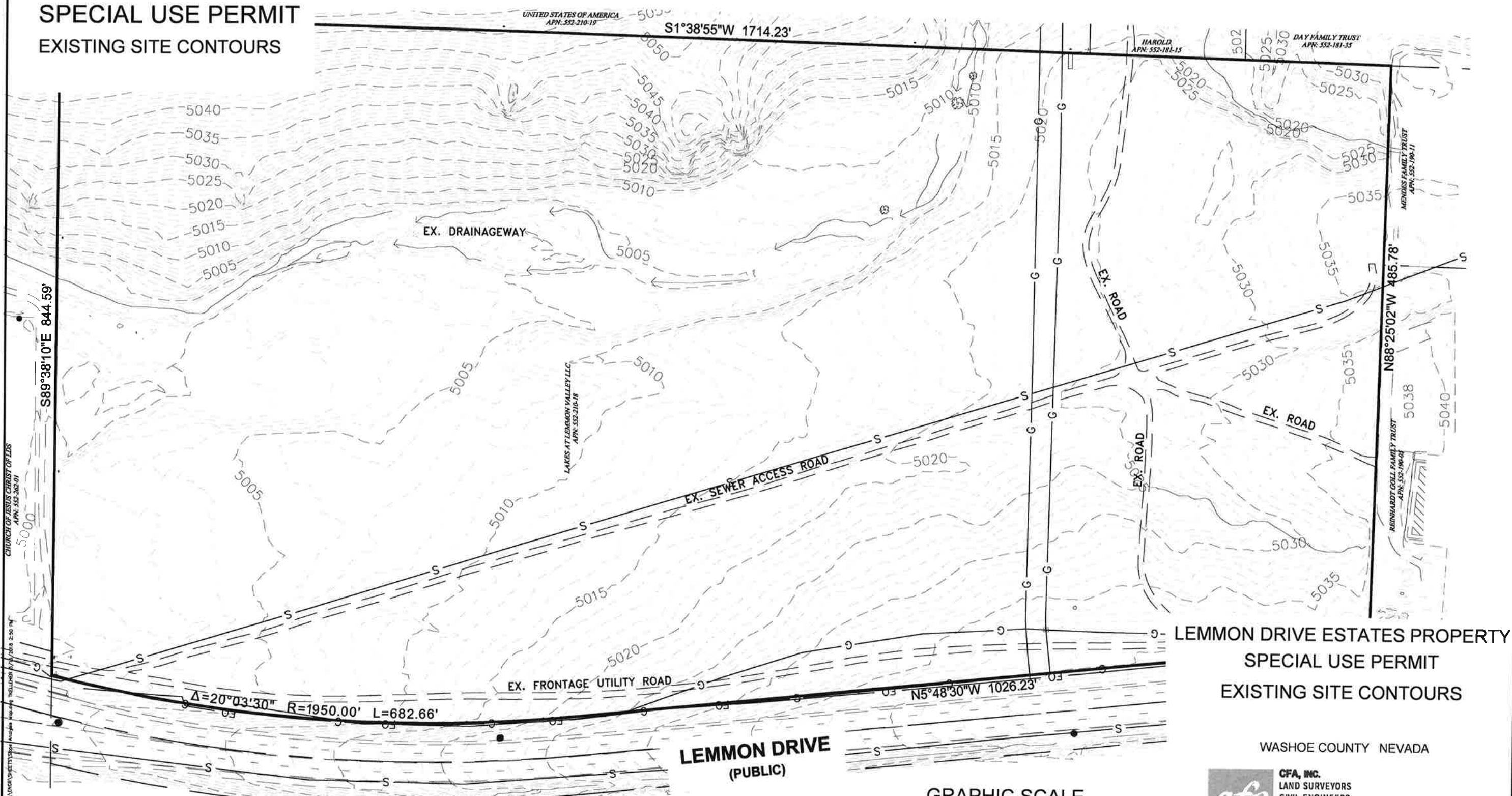
Yes No If yes, please attach a copy.

APPENDIX B

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT

EXISTING SITE CONTOURS



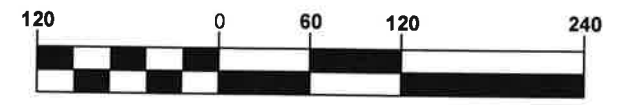
LEMMON DRIVE ESTATES PROPERTY
SPECIAL USE PERMIT
EXISTING SITE CONTOURS

WASHOE COUNTY NEVADA

cfa, INC.
LAND SURVEYORS
CIVIL ENGINEERS
LAND USE PLANNERS
1150 CORPORATE BOULEVARD • RENO, NEVADA 89502
775-856-1150 MAIN • 775-856-1160 FAX • CFARENO.COM

JOB NO: 16013.00 DATE: 05-15-2018

GRAPHIC SCALE



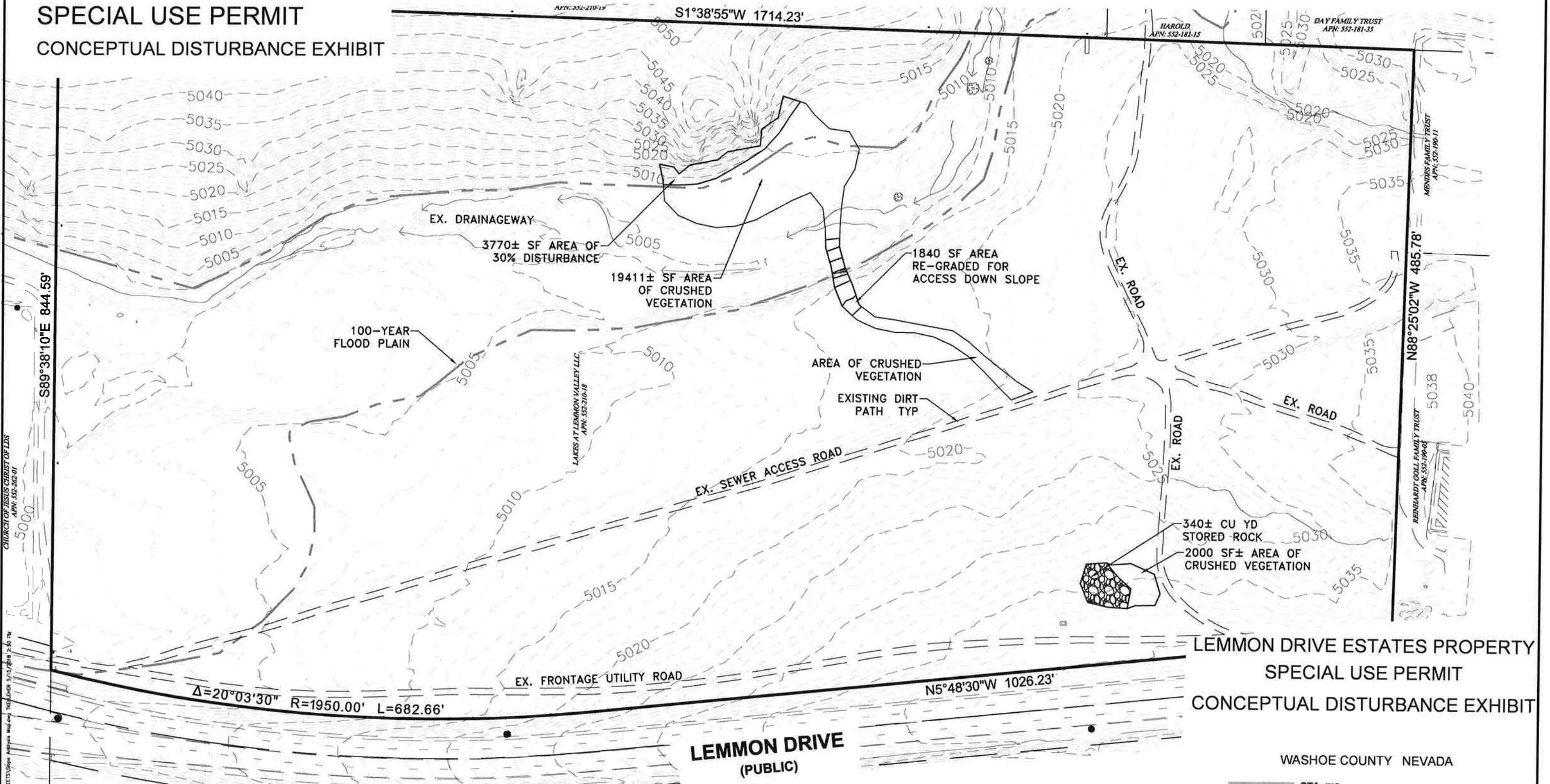
1 inch = 120 ft.

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 APN: 552-202-01

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT

CONCEPTUAL DISTURBANCE EXHIBIT



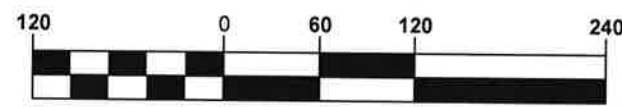
LEMMON DRIVE ESTATES PROPERTY
SPECIAL USE PERMIT
CONCEPTUAL DISTURBANCE EXHIBIT

WASHOE COUNTY NEVADA

cfa CFA, INC.
LAND SURVEYORS
CIVIL ENGINEERS
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775-856-1150 MAIN • 775-856-1160 FAX • CFARENO.COM

JOB NO: 16013.00 DATE: 05-15-2018

GRAPHIC SCALE



1 inch = 120 ft.

Project: 16013.00 Lemmon Estates Special Use Permit
Date: 5/15/2018 2:56 PM
C:\Users\jls\Documents\16013.00 Lemmon Estates Special Use Permit\16013.00 Lemmon Estates Special Use Permit.dwg
Author: jls
Plot Date: 5/15/2018 2:56 PM
Scale: 1/8\"/>

LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT

SLOPE ANALYSIS MAP

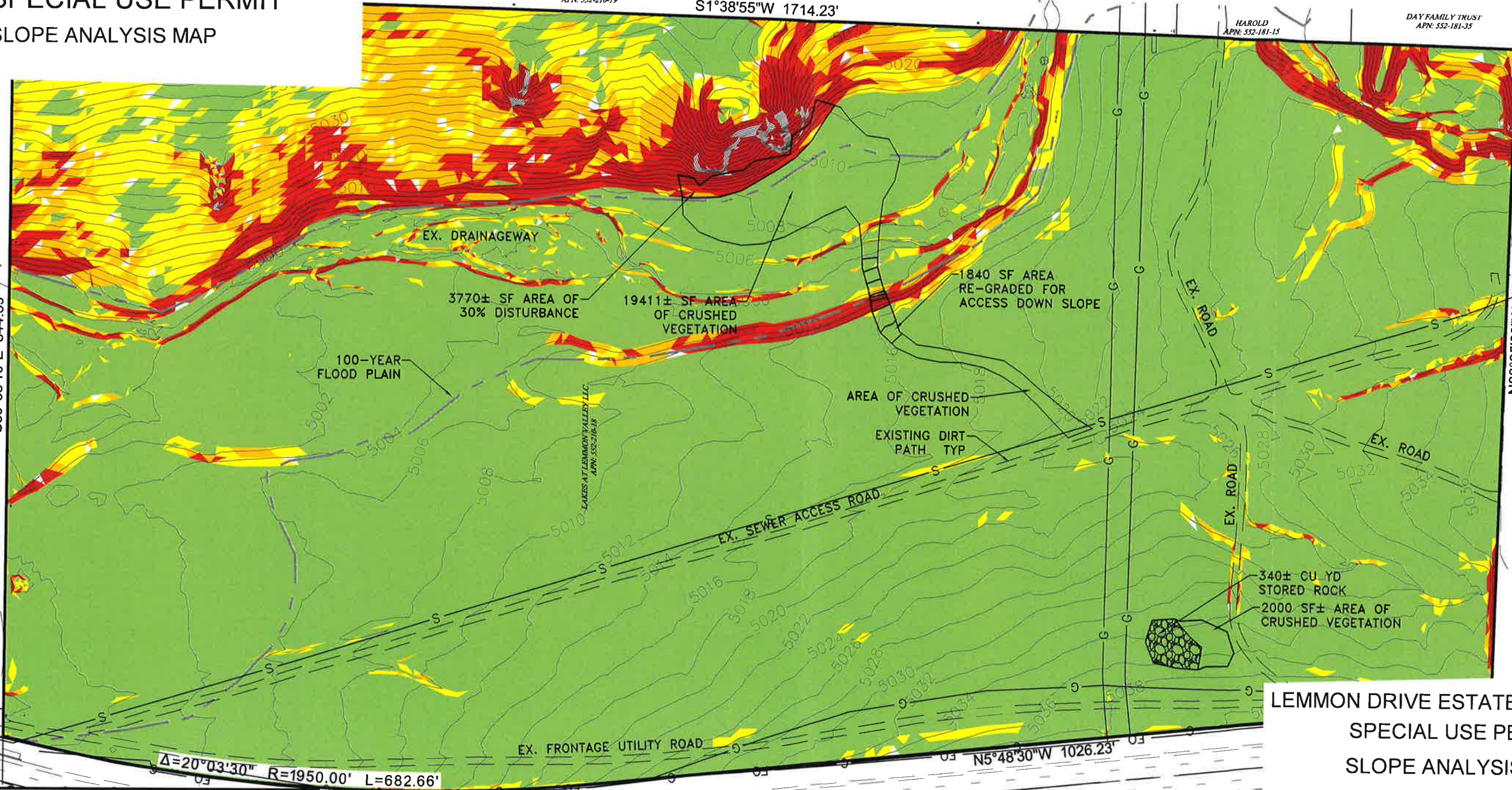


UNITED STATES OF AMERICA
APN: 552-210-19

S1°38'55"W 1714.23'

HAROLD
APN: 552-181-15

DAY FAMILY TRUST
APN: 552-181-35



LEMMON DRIVE ESTATES PROPERTY

SPECIAL USE PERMIT

SLOPE ANALYSIS MAP

WASHOE COUNTY NEVADA



CFA, INC.
LAND SURVEYORS
CIVIL ENGINEERS
LAND USE PLANNERS
1150 CORPORATE BOULEVARD # RENO, NEVADA 89502
775-856-1150 MAIN # 775-856-1160 FAX # CFARENO.COM

JOB NO: 16013.00 DATE: 05-15-2018

Slopes Table					
Number	Min. Slope	Max. Slope	Area	% Area	Color
1	0.00%	15.00%	1187696.73	80.3%	Green
2	15.10%	20.00%	109857.44	7.4%	Yellow
3	20.10%	25.00%	82965.84	5.6%	Orange
4	25.10%	30.00%	40641.72	2.7%	Red-Orange
5	30.10%	100.00%	58571.47	4.0%	Red
Total Area			1479733.2 s.f.		

LEMMON DRIVE
(PUBLIC)

GRAPHIC SCALE



1 inch = 120 ft.

APPENDIX C

Bill Detail

[Back to Account Detail](#) [Change of Address](#) [Print this Page](#)

Washoe County Parcel Information

Parcel ID	Status	Last Update
55221018	Active	3/13/2018 2:06:47 AM
Current Owner:		SITUS:
LAKES AT LEMMON VALLEY LLC 4655 LONGLEY LN STE 107 RENO, NV 89502		0 LEMMON DR WCTY NV
Taxing District	Geo CD:	
Legal Description		
Section 9 Township 20 Range 19 SubdivisionName _UNSPECIFIED		

Pay By Check

Please make checks payable to:
WASHOE COUNTY TREASURER

Mailing Address:
P.O. Box 30039
Reno, NV 89520-3039

Overnight Address:
1001 E. Ninth St., Ste D140
Reno, NV 89512-2845

Installments

Period	Due Date	Tax Year	Tax	Penalty/Fee	Interest	Total Due
INST 1	8/21/2017	2017	\$0.00	\$0.00	\$0.00	\$0.00
INST 2	10/2/2017	2017	\$0.00	\$0.00	\$0.00	\$0.00
INST 3	1/1/2018	2017	\$0.00	\$0.00	\$0.00	\$0.00
INST 4	3/5/2018	2017	\$0.00	\$0.00	\$0.00	\$0.00
Total Due:			\$0.00	\$0.00	\$0.00	\$0.00

Change of Address

All requests for a mailing address change must be submitted in writing, including a signature (unless using the online form).

To submit your address change online [click here](#)

Address change requests may also be faxed to: (775) 328-2500

Address change requests may also be mailed to:
Washoe County
Treasurer
P O Box 30039
Reno, NV 89520-3039

Tax Detail

	Gross Tax	Credit	Net Tax
<u>State of Nevada</u>	\$343.61	(\$258.60)	\$85.01
<u>Truckee Meadows Fire Dist</u>	\$1,091.46	(\$855.80)	\$235.66
<u>Washoe County</u>	\$2,812.93	(\$2,117.05)	\$695.88
<u>Washoe County Sc</u>	\$2,301.16	(\$1,731.87)	\$569.29
Total Tax	\$6,549.16	(\$4,963.32)	\$1,585.84

Payment History

Tax Year	Bill Number	Receipt Number	Amount Paid	Last Paid
2017	2017175096	B17.115237	\$396.46	9/29/2017
2017	2017175096	B17.167131	\$396.46	12/22/2017
2017	2017175096	B17.230091	\$396.46	3/2/2018
2017	2017175096	B17.61449	\$396.46	8/21/2017



PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED

LEMMON DRIVE ESTATES

Washoe County Assessor's Office Parcel Number 555-210-18

Lemmon Valley Area

RENO, NEVADA

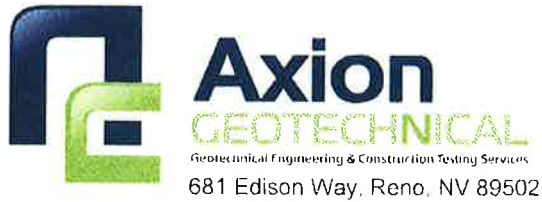
Prepared for:

Bluth Development, LLC
9550 Gateway Drive
Reno, Nevada 89521

Attention: Charles Bluth, President

March 13, 2018

Project No. 18.169.02-G



March 13, 2018
Project No. 18.169.02-G

Bluth Development, LLC
9550 Gateway Drive
Reno, Nevada 89521

Attn: Charles Bluth, President

Re: Preliminary Geotechnical Investigation, Proposed Lemmon Drive Estates,
Washoe County Assessor's Office Parcel Number 555-210-18,
Lemmon Valley Area, Reno, Nevada.

Dear Bluth:

Axion Geotechnical is pleased to present results of a preliminary geotechnical investigation our firm conducted for the project. Based on results of our investigation, experience in the area, and understanding of project development, we conclude that the site is suitable for its intended use. The primary geotechnical concerns are the potential presence of **expansive soil** and **bedrock**, and the presence of **drainages**, **flood zone** and **utility easements**.

We appreciate being selected to perform this preliminary investigation and trust results fulfill your needs at this time. If you or your design consultants have questions, please contact us at (775) 771-2388 or at chris@axionengineering.net.

Respectfully,

AXION GEOTECHNICAL, LLC

Chris D. Betts

Chris D. Betts, P.E.
President



C O N T E N T S

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I INTRODUCTION

Axion Geotechnical is pleased to present results of a preliminary geotechnical investigation our firm conducted for the proposed Lemmon Drive Estates. The 33.97-acre parcel is on the south side of Lemmon Drive, west of its intersection with Military Road and is Washoe County Assessor's Office parcel number 555-210-18 (Property). Proposed development includes construction of isolated pads for single-family residences serviced by community water and sewer system and on-site storm water retention. The structures will have one to two levels, will be wood-framed, and will be supported with shallow conventional spread foundations. Dedicated services streets will be surfaced with asphaltic concrete.

We have not received information concerning foundation loads; however, we anticipate maximum wall loads will be on the order of 1.5 kips per foot (dead plus live plus snow load), and that maximum column loads will be less than 5 kips (dead plus live plus snow load). For frost protection, perimeter foundations will bottom at least 24 inches below lowest adjacent exterior ground surface. Structural design will follow criteria outlined in the 2012 *International Building Code*.

We have not received civil design plans; however, we anticipate earthwork to attain proposed grades and for proper site drainage will include cuts and fill on the order of five feet. New slopes will be constructed at final inclinations of two horizontal to one vertical (2H:1V) or flatter. Site earth retaining walls are not anticipated. Depth of utility trenches should be less than eight feet. We assume underground utilities in proposed structural areas will be abandoned or relocated. Earthwork will be performed in accordance with the 2012 *Standard Specifications for Public Works Construction* by the Regional Transportation Commission (RTC).

The purpose of our preliminary geotechnical investigation was to perform a site reconnaissance and review available literature and maps to provide opinions and discussions concerning the geotechnical suitability of the Property for its intended use. Once design parameters, such as building locations, finish floor elevations, foundation loads and proposed grading are known; a design-level geotechnical investigation report with detailed information of the subsurface soil conditions and recommendations for design and construction must be performed.

This report is preliminary and geotechnical in nature and not intended to identify other potential site constraints such as environmental hazards, wetlands determinations or the potential presence of buried utilities. Opinions and discussions included in this report are specific to development at the Property and are not intended for off-site development.

II SITE, SOIL AND WATER CONDITIONS

The Property is undeveloped, vacant, and bordered by undeveloped land to the east, Lemmon Drive to the west, a church to the north and dog kennels to the south. The surface grades gently downward from the south to the north, and moderately to steeply downward from the east to the west. The Property is covered by medium dense to dense sagebrush and weeds. Trees are present along the eastern drainage. Rock outcrops are present along the steep hillside to the east. Boulders are present in the central portion of the site. Two drainages cross the Property from south to north. Overhead utilities cross along the eastern portion of the Property, and underground utilities (sanitary sewer) crosses the central and eastern portions of the Property. Dirt roads are present.



View of Property from SW corner

Based on the United States Geological Survey 7.5-Minute topographic map of the Reno Quadrangle, the Property is in the NE $\frac{1}{4}$ of Section 9, Township 19 North, Range 19 East and elevation ranges from about 5,040 to 5,060 feet relative to mean sea level.

Based on mapping by H. F. Bonham, Jr. and E. C. Bingler (*Reno Folio, Geologic Map*), the materials underlying the Property are predominantly Quaternary-age alluvial fan deposits of Peavine Mountain (Qpf), with Mesozoic-age granodiorite (Mzgd) along the eastern hillside. These units are described as follows:

Peavine Mountain (Qpf): Poorly sorted, pale yellowish to reddish brown, montmorillonitic, gravelly, to sandy and clayey silt, with white silicified andesite fragments common. In the Black Springs area, the unit contains pale orange brown clayey and gravelly sand.

Granodiorite (Mzgd): Gray hornblende-biotite granodiorite. Deuteric alteration has commonly formed actinolite and chlorite from hornblende and biotite; epidote calcite, and sericite partially replace plagioclase. It is not normally deeply weathered and usually forms numerous outcrops.

According to mapping by the U. S. Department of Agriculture, Soil Conservation Service (*Soil Survey of Washoe County, Nevada, South Part, Sheet No. 22, 1980*), the Property is underlain by the following units:

Haybourne loamy sand, 2 to 4 percent slopes (# 140): This unit is along the larger drainage to the east. This very deep, well-drained soil on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,900 feet. Typically, the surface layer is pale brown loamy sand about 10 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum to a depth of 63 inches or more is brown, stratified fine sandy loam through coarse sand. Permeability is moderately rapid in the subsoil and moderately rapid to rapid in the substratum. Effective rooting depth is 60 inches or more. Runoff is slow, the hazard of water erosion is slight. The hazard for soil blowing is moderate. The soil is subject to flash flooding during storms of unusually high intensity and channeling. Deposition are common along streambanks. Limitations for shallow excavations are severe due to cutbanks caving. Limitations for dwellings with or without basements, small commercial buildings are severe due to flooding. Limitations for local roads and streets are severe due to flooding. Limitations for septic tank absorption fields are severe due to poor filter. The shrink-swell potential is low. The frequency of flooding is rare. Depth to high water table is greater than 6.0 feet. Depth to bedrock is greater than 60 inches. The potential frost action is moderate. The risk of corrosion to uncoated steel is moderate, and to concrete it is low. Limitations associated with the use of this unit for urban development, as defined by the soil survey, are flooding, rapid permeability and the susceptibility to frost heaving.

Northmore sandy loam, 2 to 4 percent slopes (# 201). This unit is along the central portion of the Property. This very deep, well-drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. Typically, the surface layer is grayish brown sandy loam about 15 inches thick. The subsoil is brown sandy clay about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam. Permeability is slow. Effective rooting depth is 60 inches or more. runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. Limitations for shallow excavations are slight. Limitations for dwellings with or without basements are severe due to shrink-swell. Limitations for roadways are severe due to low strength and shrink-swell.

Limitations for septic tank absorption fields are severe due to slow percolation rates. The shrink-swell potential is low to high. The frequency of flooding is none. Depth to high water table is greater than 6.0 feet. Depth to bedrock is greater than 60 inches. The potential frost action is low. The risk of corrosion to steel and concrete is moderate. The main limitations associated with the use of this unit for urban development, as described by the soil survey, are the high clay content, slow permeable subsoil, and low bearing strength.

Northmore sandy loam, 4 to 8 percent slopes (# 202). This unit is along the central and western portions of the Property. This very deep, well-drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is a pale brown sandy loam. Permeability is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. Limitations for shallow excavations are slight. Limitations for dwellings with or without basements and small commercial buildings are severe due to shrink-swell. Limitations for roadways are severe due to low strength and shrink-swell. Limitations for septic tank absorption fields are severe due to slow percolation rates. The shrink-swell potential is low to high. The frequency of flooding is none. Depth to high water table is greater than 6.0 feet. Depth to bedrock is greater than 60 inches. The potential frost action is low. The risk of corrosion to steel and concrete is moderate. The main limitations associated with the use of this unit for urban development, as described by the soil survey, are the high clay content, slow permeability, and low bearing strength.

Northmore sandy loam, 8 to 15 percent slopes (# 203). This unit is at the SE corner of the Property. This very deep, well-drained soil is on side slopes of alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is a pale brown sandy loam. Permeability is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. Limitations for shallow excavations are moderate. Limitations for dwellings with or without basements are severe due to shrink-swell. Limitations for small commercial buildings are severe due to shrink-swell and slopes. Limitations for roadways are severe due to low strength and shrink-swell. Limitations for septic tank absorption fields are severe due to slow percolation rates. The shrink-swell potential is low to high. The frequency of flooding is none. Depth to high water table is greater than 6.0 feet. Depth to bedrock is greater than 60 inches. The potential frost action is low. The risk of corrosion to steel and concrete is moderate. The main limitations associated with the use of this unit for urban development, as described by the soil survey, are the high clay content, slow permeability, and low bearing strength.

Acrelane-Rock outcrop complex, 15 to 50 percent slopes (# 260): This unit is along the far eastern portions of the Property. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. This unit is 65 percent Acrelane very stony sandy loam, 15 to 50 percent slopes, and 25 percent Rock outcrop. The Acrelane soil is on rolling uplands, and the Rock outcrop is on ridgetops and crests. Areas of the components of the unit are so intricately intermingled that it is not practical to map them separately at the scale used. Included in this unit are Verdico Variant soils on slightly concave slopes and in shallow depressions, Graufels soils at higher elevations near Rock outcrop, and Surgem soils on lower colluvial slopes. This unit is about 3 percent Verdico Variant soils, 4 percent Graufels soils, and 3 percent Surgem soils. Descriptions of the two main materials are as follows:

Acrelane soil: This soil is shallow and well-drained. It formed in residuum derived dominantly from granodiorite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 6 inches thick. The subsoil is brown very gravelly sandy clay loam about 4 inches thick. Weathered granodiorite is at a depth of 10 inches. Depth to weathered bedrock ranges from 10 to 20 inches. Permeability is moderate. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight. Limitations for shallow excavations are severe due to depth to rock. Limitations for dwellings with or without basements and for small commercial buildings are severe due to depth to rock and slope. Limitations for local roads and streets are severe due to slope. Limitations for septic tank absorption fields are severe due to depth to rock and slope. Shrink-swell potential is low to moderate. Frequency of flooding is none. Depth to high water table is greater than 6.0 feet. Depth to bedrock is 10 to 20 inches. Hardness of bedrock is soft. Potential frost action is moderate. Risk of corrosion to uncoated steel and concrete is moderate.

Rock outcrop: This material consists of exposed areas of granodioritic rock.

The main limitations associated with the use of this complex for urban development, as defined by the soil survey, are steepness of the slopes, and the shallowness of soil over bedrock.

Acrelane very stony sandy loam, 8 to 15 percent slopes (# 262): This unit is along the far SE portion of the Property. This shallow, well-drained soil is on uplands. It formed in residuum derived dominantly granodiorite. Elevation is 4,500 to 6,000 feet. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 4 inches thick. The subsoil is brown very gravelly sandy clay loam about 6 inches thick. Weathered granodiorite is at a depth of 10 inches. Depth to weathered bedrock ranges from 10 to 20 inches. Permeability is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. Limitations for shallow excavations are severe due to depth to

rock. Limitations for dwellings with or without basements and for small commercial buildings are severe due to depth to rock and slope. Limitations for roadways are moderate due to depth to rock, slope and frost action. Limitations for septic tank absorption fields are severe due to depth to rock. The shrink-swell potential is low to moderate. The frequency of flooding is none. Depth to high water table is greater than 6.0 feet. Depth to bedrock is 10 to 20 inches. The hardness of bedrock is soft. The potential frost action is moderate. The risk of corrosion to steel and concrete is moderate. The main limitations associated with the use of this unit for urban development, as described by the soil survey, are the steepness of slope, depth to bedrock and stones, shallowness of the soil over bedrock, and susceptibility of the soil to frost heaving.

According to the *Reno Folio Hydrologic Map* (Cooley, Span and Scheibach) the top of water table is estimated to be between 20 and 60 feet.

III GEOLOGIC AND SEISMIC CONSIDERATIONS

To evaluate geological hazards at the site, our investigation included a site reconnaissance and review of available geological literature and maps.

A. Geology

The Property is in the northern foothills of the Truckee Meadows a structural basin bounded by Peavine Mountain, Steamboat Hills, the Virginia Range and the Sierra Nevada to the north, south, east and west, respectively. The basin is transitional between the Basin and Range physiographic province to the east and the Sierra Nevada to the West. The geologic structure of the area is characterized by high-angle extensional normal faults trending in a north-northeast direction. The Truckee Meadows is a down-dropped graben with neighboring horsts to the east and west.

B. Faulting and Seismicity

Based on mapping by E. C. Binger (*Earthquake Hazards Map, Reno Folio*) no fault traces cross the Property. According to the United States Geological Survey Earthquakes Hazards Program, *Quaternary Faults in Google Earth*, no faults cross the Property. The website indicates that the nearest Holocene- to latest-Pleistocene-age fault is approximately 1.9 mile southwest of the Property. These faults are those that have moved or shifted in the last 15,000 years.

According to the Nevada Seismological Laboratory website (<http://www.seismo.unr.edu>), the nearest principal Quaternary-age fault is the north Reno fault zone. The Nevada Seismological Laboratory indicates earthquakes of magnitude 6.6 is possible along this fault zone (*Reno/Carson Fault Information*, updated January 31, 2003).

C. Liquefaction

Liquefaction is a loss of soil shear strength associated with loose saturated granular soils subjected to strong earthquake shaking. Liquefaction can result in unacceptable movement of foundations supported by such soils. According to the referenced earthquake hazards map the Property is not in an area of potential liquefaction.

D. Slope Stability

Based on the referenced Earthquake Hazards Map the subject property is in an area potentially underlain by moderately stable, semi-lithified alluvial fan deposits which may be subject to minor slumping and rock falls on vertical or near vertical cuts or natural embankments. Based on our understanding proposed slopes will be constructed at maximum inclinations of two horizontal to one vertical (2:1) or flatter, we do not believe the site is susceptible to slumps or ground disturbances.

E. Radon

Radon, a colorless, odorless, radioactive gas derived from the natural decay of uranium, is found in nearly all rocks and soils. The Environmental Protection Agency (EPA) suggests that remedial action be taken to reduce radon in any structure with average indoor radon of 4.0 picocuries per liter (pCi/L) or more. According to *Radon in Nevada* (Rigby *et al.*, Nevada Bureau of Mines and Geology, Bulletin 108, 1994), the Property is in an area with an average indoor measurement equal to or greater than 2.0 pCi/L and less than 4.0 pCi/L.

F. Flooding

Flood hazard studies were completed by the Federal Emergency Management Agency (FEMA), and are dated March 16, 2009 are published on Community Panel Number 32031C3026G. The map indicates much of the Property is in flood zone X; however, along the eastern drainage system it is in flood zone AE. According to FEMA, zone X are areas of minimal flood hazard, while zone AE are special flood hazard areas.

IV OPINION AND DISCUSSION

Based on results of our preliminary investigation, experience in the area, and understanding of the proposed project, we conclude that the site is suitable for its intended use. The primary geotechnical concerns are the potential presence of **expansive soil** and **bedrock**, and the presence of **drainages**, **flood zone** and **utility easements**.

Expansive soils are subject to substantial volume changes (shrink and swell) with changes in moisture content. Changes in moisture content can occur because of seasonal variations in precipitation, landscape irrigation, broken or leaking water pipes and sewer lines, and/or poor site drainage. These volume changes can cause differential movement such as

settlement or heave of foundations, slabs-on-grade, exterior flatwork such as walkways, stoops and patios, and pavement sections. To reduce potential for movement the expansive soil must be removed (over-excavated) a sufficient depth and replaced with approved compacted granular fill, thereby reducing the thickness of the expansive layer, providing surcharge, and maintaining moisture at a near constant level.

Alternatively, to mitigate potential movement, structures can be supported with pier and grade beams which penetrates the expansive soil and attain support by end-bearing on the lower firm native soils or by surface adhesion with the pier edges and native soil. Structural support may also be attained using post-tensioned slab-on-ground foundations, which mitigates movement by the rigid nature of the system.

Clay or fine-grain soils exhibit a lower Resistance R-Value and Modulus of Subgrade Reaction (k) than granular material. To reduce the thickness of aggregate base and minimize future maintenance in slab-on-grade, exterior flatwork and pavement areas, portions of these soils must be removed and replaced with approved compacted granular fill subbase.

As clayey soil will also inhibit achieving uniform moisture content and impede compaction efforts, consideration should be given to time constraints associated with scarification, moisture conditioning, drying and compacting clayey soils. During periods of inclement weather, water may also become perched above the clayey soil, resulting in a saturated condition for prolonged periods and creating additional limitations on equipment mobility. Consideration should be given to the necessity for maintaining moisture content to prevent wind erosion and for controlling dust during earthwork operations.

Shallow bedrock is present across the Property. Consideration should be given to the difficulty of grading and trenching associated with bedrock. Although we do not believe that blasting will be necessary, as is inherent with bedrock, localized areas of resistant material may be encountered which will require the use of special equipment such as a hydraulic rock hammer.

In addition to potential difficulty of earthwork operations, consideration should be given to the fact that oversize aggregate such as gravel, cobbles and boulders, will be generated during earthwork operations. Consideration should be given to the subsequent reduction of the quantity of material available for use as fill, and that oversize aggregate could require off-hauling or that import material could be required to balance earthwork quantities to attain proposed grades. If oversize aggregate is proposed for use as fill, screening will be required, and sufficiently large equipment will be necessary to properly place and compact rock fills. Compaction approval during the placement of rock fills can only be achieved based on visual performance specifications established by the Geotechnical Engineer, which would increase on-site technician time and thus, in turn, increase the cost of inspection services. The removal of large cobbles or boulders will result in undercutting of excavation sidewalls and the resulting trench widths would be increased. The presence of

resistant bedrock could protrude into foundation areas, thereby requiring the drilling and epoxy of reinforcing steel. Footings may need to be formed and stepped.

Two natural drainages cross portions of the Property. Consideration should be given to potential seepage associated with these drainages and ditch and added construction costs associated with their abandonment, containment or realignment. Consideration should be given to the complete removal of organic material associated with these ditches and that proper benching and fill are provided prior to the construction of site improvements or the placement of new fill material. Consideration should also be given to the possibility that construction set-backs may be required.

According to FEMA, a portion of the Property is in an area of potential flooding. Consideration should be given to local and federal regulations which may impose construction constraints, such as requiring minimum finish floor elevations, or ordinances banning basements. Due to constant revisions associated with flood zoning, the Property delineation with respect to flood zoning should be verified with the most current map at the time of building permit application.

Overhead and underground utility easements cross the Property. Consideration should be given to the possibility that, prior to development, these utilities require relocation or abandonment in proposed structural areas. Consideration should also be given to the possibility that construction set-backs are required, and the subsequent potential reduction of property available for development.

The presence of steep drainages can lead to differential settlement as transition areas will occur where building pads are supported on a combination of in-situ soil and compacted fill material. To mitigate potential differential settlement in transition zones, native soils should be removed a sufficient depth to provide for a minimum section of compacted fill material below foundations, or foundations should be deepened to bottom uniformly on in-situ soil. The presence of slopes will require that construction off-sets be established.

The soil survey suggests that the slow percolation rates, frost action low load-bearing and corrosion to steel and concrete can be an additional constraint associated with the use of the underlying soils for urban development. Based on our understanding that project development will be serviced by community water, sewer and storm drain systems, we do not believe that slow permeability rates will impact the site. Consideration, however, should be given to performing infiltration tests if retention/detention basins are proposed. Based on our anticipation that structural fill will be provided below footing and roadways, we do not believe frost action or low load-bearing strength will impact site development. Based on our experience in the area, we believe adequate mitigation can be attained by using properly prepared and placed Type II portland cement concrete, by maintaining a minimum three-inch concrete cover where reinforcing steel or other metal is in proximity to native soils and, at the direction of the Manufacturer, by using special coating on reinforcing steel and metal. Consideration should also be given to chemical constituents which may inhibit establishment of landscaping, such as lawns, plants and other vegetation growth, not

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indigenous to the area. Laboratory testing to determine the agronomic characteristics of the native soils was not part of the scope of our work; however, it should be considered.

There are no apparent geologic hazards that would place unusual constraints on the project; however, strong ground shaking associated with earthquakes should be expected to occur during the life of the project.

V REFERENCES

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