



February 23, 2015
Revised May 1, 2015
ES-3519.01

Earth Solutions NW LLC

- Geotechnical Engineering
- Construction Monitoring
- Environmental Sciences

Terrene at RH 132nd, LLC
520 – 6th Street South, Suite B
Kirkland, Washington 98033

Attention: Mr. Mike Walsh

**Subject: Geologically Hazardous Areas Report
Rosehill Property
11016 – 132nd Avenue Northeast
Redmond, Washington**

Reference: Earth Solutions NW, LLC
Geotechnical Engineering Study
Project No. ES-3519, updated January 26, 2015

The Blueline Group
Open Space Plan, Sheet OP-01, Job No. 14-171, dated April 8, 2015

The Blueline Group
Tract 999 Plan and Cross Sections, Job No. 14-171, dated April 23, 2015

The Blueline Group
Critical Areas Exhibit, Sheet CA-01, dated April 30, 2015

King County Flood Control District
“Liquefaction Susceptibility” Map 11-5, dated May 2010

City of Redmond, Washington
Zoning Code (RZC) and Geologically Hazardous Area Maps

Dear Mr. Walsh:

In response to comments received from the City of Redmond (City), Earth Solutions NW, LLC (ESNW) has prepared this letter addressing geologically hazardous areas with respect to the subject project. A review of geologically hazardous areas contained within the property boundaries and recommendations for mitigation of hazards, where appropriate, are provided in this letter.

Terrene at RH 132nd, LLC
February 23, 2015
Revised May 1, 2015

Project Description

According to the referenced open space plan sheet, the site will be developed with 22 single-family residential lots and associated infrastructure improvements. The lots will be constructed to the north and south of the proposed access road (Road 'A') providing entry and egress from 132nd Avenue Northeast. One stormwater detention vault and open space tract is shown to the east of Road 'A'. We understand existing residential homes and associated improvements will be removed in accordance with currently proposed development plans. We estimate grade cuts and fills on the order of 5 feet may be necessary to establish finish grades for new residential lots to the north and south of Road 'A'. Grading activities for the stormwater detention vault will likely require temporary excavations on the order of 10 to 12 feet. Retaining walls or rockeries will likely be incorporated into final designs in order to accommodate grade transitions.

Site Conditions

The subject site is located east of 132nd Avenue Northeast between Northeast 111th Court and Northeast 110th Court in the North Rose Hill area of Redmond, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map). The primarily rectangle-shaped property consists of four adjoining tax parcels (King County Parcel Nos. 342605-9087, -9046, -9093, and -9100) totaling approximately 6.56 acres.

Surface

The subject site is bordered to the north and south by single-family residences, to the west by 132nd Avenue Northeast, and to the east by a utility corridor and forested open space. Site topography descends approximately 25 feet from 132nd Avenue Northeast to the existing single-family residence near the center of the site. The eastern site area is comprised generally of easterly descending slopes to the utility corridor along the east property line and ultimately the Sammamish Valley. Vegetation consists generally of dense, mature forest growth within the eastern site area and along the southern property line. To the best of our knowledge, the singular historic use of the site is residential, in association with the existing residences constructed on site.

Subsurface

An ESNW representative observed, logged, and sampled nine test pits excavated within accessible areas of the development envelope using a mini trackhoe and operator retained by our firm on September 11, 2014. The test pits were completed for purposes of assessing soil conditions, classifying site soils, and characterizing subsurface groundwater conditions within the proposed development area and steep slopes within the eastern site area. The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the attached test pit logs for a more detailed description of subsurface conditions. Soil samples collected at the test pit locations were analyzed in accordance with both Unified Soil Classification System (USCS) and United States Department of Agriculture (USDA) methods and procedures. Laboratory test results are attached to this letter for reference. The subsurface conditions outlined in this section are intended as a general overview; detailed discussion of site soils encountered during our fieldwork is provided in the referenced study.

Terrene at RH 132nd, LLC
February 23, 2015
Revised May 1, 2015

Topsoil was encountered generally within the upper three to eight inches of existing grades; however, localized areas of topsoil up to 14 inches in depth were observed within areas of mature, undisturbed forest growth. Fill was encountered at test pit (TP) locations TP-5 and TP-9 to depths of four-and-one-half feet and one foot below existing grades, respectively, and consisted primarily of loose silty sand with gravel (USCS: SM). Underlying topsoil and fill, native soils encountered at the test pit locations consisted primarily of medium dense silty sand with gravel (USCS: SM). Weak to moderate cementation was observed within the native silty sand deposits. In accordance with geologic mapping for the area and our field observations, it is our opinion the site is underlain primarily by Vashon subglacial till (Qvt).

During our subsurface exploration completed on September 11, 2014, groundwater seepage was not encountered at the test pit locations. Iron oxide staining was observed between depths of five to seven feet below existing grades at test pit locations TP-8 and TP-9. In our opinion, perched groundwater is not likely to be encountered within the shallower site excavations that occur during the drier, summer months. Iron oxide staining is typically indicative of fluctuating groundwater elevations, and as such, groundwater seepage may be encountered during excavation activities that occur during periods of extended rainfall or within the deeper site excavations. Seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the wetter, winter months.

Geologically Hazardous Areas

The referenced hazard maps, as adopted by the City, indicate the site is not located within any geologically hazardous critical areas; however, our visual observations during the September 2014 fieldwork and available topographic data for the subject parcel confirm the site contains slopes with gradients in excess of 40 percent. With respect to native Alderwood (glacial till) series soils encountered during our fieldwork, we reviewed the referenced critical areas maps, as well as the referenced Redmond Zoning Code (RZC) section, for applicability of erosion, landslide, and seismic hazard potential to development within the property boundaries.

Erosion Hazard

Pursuant to RZC Section 21.64.060(A)(1)(a), erosion hazard areas are defined as lands or areas underlain by soils indentified by the USDA Soil Conservation Service as having "severe" or "very severe" rill and inter-rill erosion hazards. This includes, but is not limited to, the following soil series when they occur on slopes of 15 percent or greater: Alderwood-Kitsap (AkF), Alderwood gravelly sandy loam (AgD), Kitsap silt loam (KpD), Everett (EvD), and Indianola (InD).

Terrene at RH 132nd, LLC
February 23, 2015
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As outlined in the referenced study, Alderwood gravelly sandy loam is representative of the site soils. In steeper slope settings, these soils are typically associated with high erosion hazard potential, especially during the wetter, winter months. It should be noted that based on our investigation and site reconnaissance, areas of severe erosion are not present. In any case, however, provided appropriate erosion and sediment control (ESC) measures are incorporated into final designs, erosion potential can be adequately mitigated during construction. In our opinion, based on our experience with similar projects in similar settings, permanent landscaping and drainage control measures will adequately mitigate the potential for erosion with respect to the proposed final development. Site-specific ESC measures were prepared by the project civil engineer, The Blueline Group (Blueline), in general accordance with our recommendations and will be indicated on the plan set during the required phase of the submittal process. Based upon our discussions with Blueline, appropriate erosion control elements will be incorporated into the plans.

Landslide Hazard

Pursuant to RZC Section 21.64.060(A)(1)(b), landslide hazard areas are defined as areas potentially subject to significant or severe risk of landslides based on a combination of geologic, topographic, and hydrogeologic factors. Typical indicators or factors associated with landslide areas include the following:

- Areas of historic failures, such as:
 - Areas designated as quaternary slumps or landslides on maps published by the United States Geologic Survey (USGS), or;
 - Those areas designated by the USDA Soil Conservation Service (SCS) as having a “severe” limitation for building site development.
- Areas containing a combination of slopes steeper than 15 percent, springs or groundwater seepage, and hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock;
- Areas that have shown movement during the Holocene epoch or which are underlain or covered by mass wastage debris of that epoch;
- Slopes that are parallel or subparallel to planes of weakness in subsurface materials;
- Slopes having gradients steeper than 80 percent subject to rockfall during seismic shaking;
- Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action, or;
- Any area with a slope 40 percent or steeper with a vertical relief of 10 feet or more.

Terrene at RH 132nd, LLC
February 23, 2015
Revised May 1, 2015

With respect to the subject site, areas meeting the definition of a landslide hazard (40 percent or steeper slopes) are located throughout the easterly portions of the property where significant development activities are not planned. Based on our review and investigation, the proposed stormwater tract and related vault structure will be sufficiently setback from the areas of 40 percent slope. Due to the inherent nature and stability of the glacial till deposits identified onsite, the proposed stormwater vault construction is not expected to adversely impact the descending slope areas east of the development. Additionally, the areas of proposed residential construction are located throughout the westerly half of the site and are substantially far removed from the descending slope areas located on the east side of the property. Minor grading activity within the rear yard areas of Lots 8 and 9 is proposed near the top of the east descending slopes; however, based on our review, sufficient setback and stability will be maintained. Further evaluation of slope stability throughout the easterly portions of the site is provided in the *Slope Stability* section of this letter.

Seismic Hazard

Pursuant to RZC Section 21.64.060(A)(1)(c), seismic hazard areas are defined as lands subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting. The subject site is not located within, or near, a mapped seismic hazard area based on our review of the respective critical areas map endorsed by the City. Additionally, we reviewed the referenced liquefaction susceptibility map, which indicates the site and surrounding areas maintain very low liquefaction susceptibility.

In our opinion, site susceptibility to liquefaction can be characterized as low, and the overall site seismic hazard should be considered negligible. Relatively consistent soil densities and the absence of a uniformly established groundwater table were the primary bases for this characterization. In general, sites underlain by competent glacial till are not susceptible to liquefaction-induced settlements.

Slope Stability

We evaluated slope stability primarily within the eastern site area, as easterly facing slopes descend to a utility corridor along the east property line. Slope stability analyses were completed for both existing and proposed post-construction configurations. Existing and proposed topography, as shown on the referenced plan sheets, were utilized in preparation of the slope stability analyses. The referenced cross sections are attached to this letter for completeness.

Global stability analyses were completed using the 2007 GeoStudio Slope/W (Version 7.23) software modeling program. Our analyses focused primarily on deep-seated rotational failures. Based on the site setting and soil conditions underlying slopes proposed for modification, shallow debris-flow failures, which are a more common occurrence during the normal course of natural weathering processes, can be mitigated through surface protection (existing vegetation) and drainage measures.

Terrene at RH 132nd, LLC
 February 23, 2015
 Revised May 1, 2015

Selected modeling parameters for site soils were based primarily on soils encountered during our September 2014 fieldwork. Our experience with previous projects and similar soil conditions was also considered. The table below summarizes the soil modeling parameters utilized within our slope stability analyses.

Soil Type	USCS Classification	Unit Weight (pcf)	Cohesion (psf)	Coefficient of Friction (degrees)
Existing Fill	SM	120	0	30
Proposed Fill	SM	125	0	32
Weathered Till	SM	125	50	34
Unweathered Till	SM	125	100	34

The results of our analyses, as well as additional modeling parameters, are attached to this letter. In accordance with the 2012 International Building Code and utilizing 2008 United States Geologic Survey hazard data, a peak horizontal ground acceleration (PGA) value of 0.3336 g was used for site-specific modeling. The pseudostatic coefficient used in the stability analyses was equivalent to one-half of the PGA, or 0.1668 g. Analyses yielded minimum FOS values greater than 1.2 for seismic conditions and 1.5 for static conditions in post-construction configurations.

Conclusion

Based upon our review of the referenced plan sheets and the results of our slope stability analyses, proposed development plans are appropriate from a geotechnical standpoint. Provided the recommendations and conclusions found within the referenced report and this letter are adhered to during design and construction, stability within areas disturbed by construction will neither decrease nor create a hazard to the subject site or adjacent properties. Incorporation of site-specific erosion control measures will prevent a significant increase in sedimentation or erosion hazard during construction.

Miscellaneous Reporting Requirements

In accordance with the reporting requirements of the RZC, we have attached the following sheets to this letter:

- The site open space plan sheet (No. OP-01), prepared by Blueline, depicting all mappable critical areas and associated buffers, limits of areas to be disturbed, site boundary property lines and roads, rights-of-way and easements, existing physical improvements, contours at two-foot intervals, and all natural and manmade features within the maximum buffer area of any site critical area on or near the site, and;
- A critical areas exhibit (No. CA-01), prepared by Blueline, containing an aerial photograph of the subject site and an overlay depicting the property boundaries and critical areas.

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It should be noted our Plate 2 is provided for illustrative purposes of the approximate locations of test pits with respect to existing topography, features, and improvements. Specific feature delineations, such as those generally required by the RZC, are found on the civil plan sheets prepared by Blueline.

Site Monitoring and Inspection

ESNW should be retained to observe site earthwork and grading activities on a periodic or full-time basis, as appropriate, in order to provide supplementary recommendations where necessary. Geotechnical monitoring and inspection is fulfilled typically by a field technician, under the supervision of a field manager and/or an engineer from our office, as requested by you, our client. We will observe earthwork and related construction activities and inform the contractor, or your agent, when the required results are not obtained. Geotechnical recommendations for obtaining project objectives may be made by an ESNW representative(s); however, specific work direction should come from the owner or contractor, as appropriate. In order to adequately provide consultation services during construction, we should be provided with all current plans, specifications, and documents relevant to our services.

We appreciate the opportunity to be of service to you, and trust this letter meets your current needs. Should you have questions regarding the content herein, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

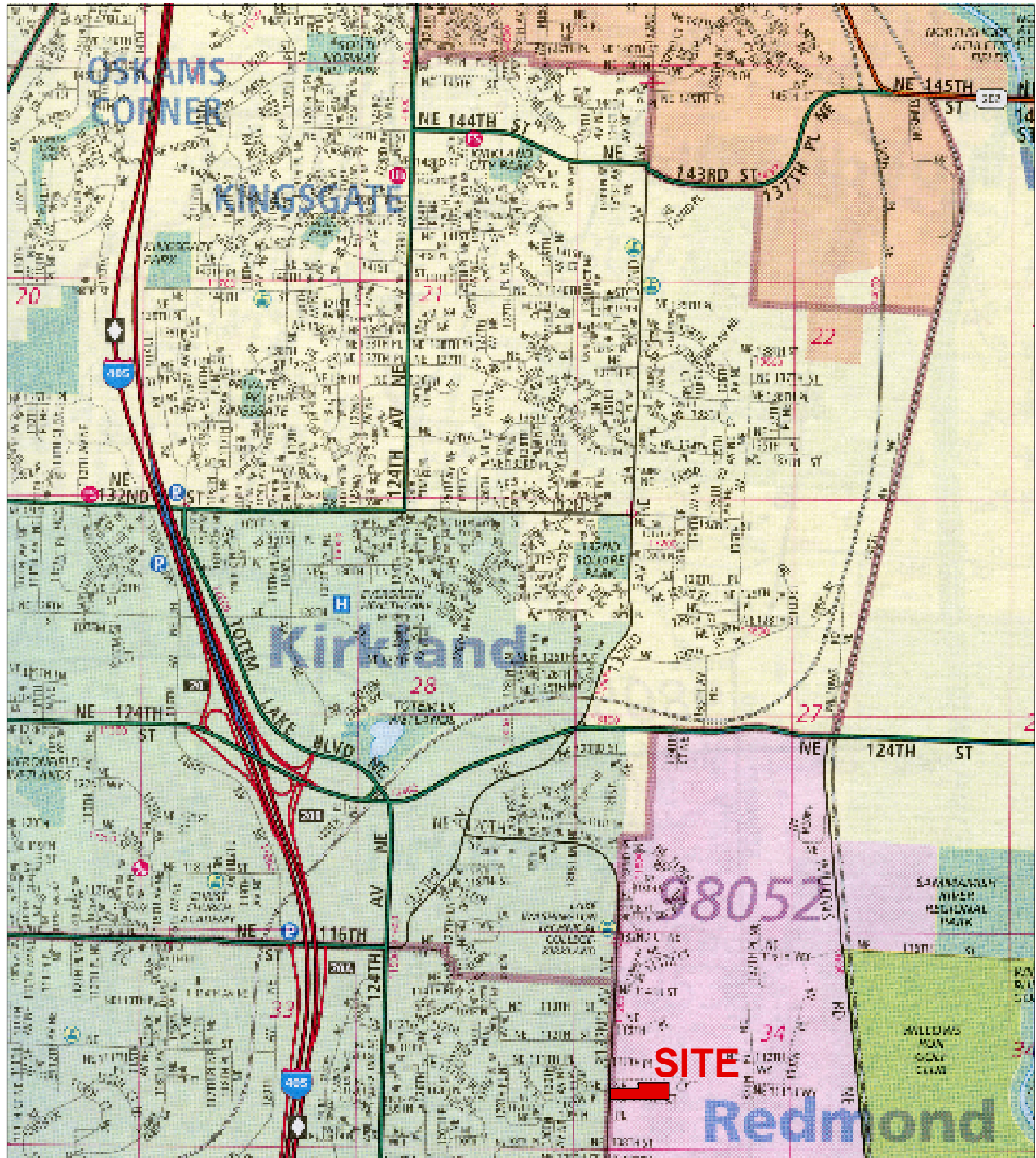
Keven D. Hoffmann, E.I.T.
 Project Engineer



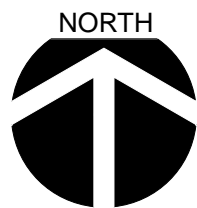
Raymond A. Coglas, P.E.
 Principal

Attachments: Plate 1 – Vicinity Map
 Plate 2 – Test Pit Location Plan
 Blueline Open Space Plan Sheet (No. OP-01)
 Blueline Critical Areas Exhibit (No. CA-01)
 Tract 999 Plan and Cross Sections
 Test Pit Logs
 Laboratory Sieve Analyses
 Slope/W Computer Output

cc: The Blueline Group
 Attention: Ms. Moira Haughian (Email only)



Reference:
King County, Washington
Map 506
By The Thomas Guide
Rand McNally
32nd Edition



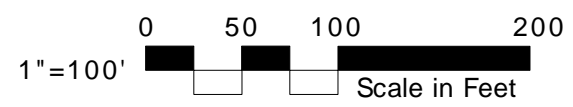
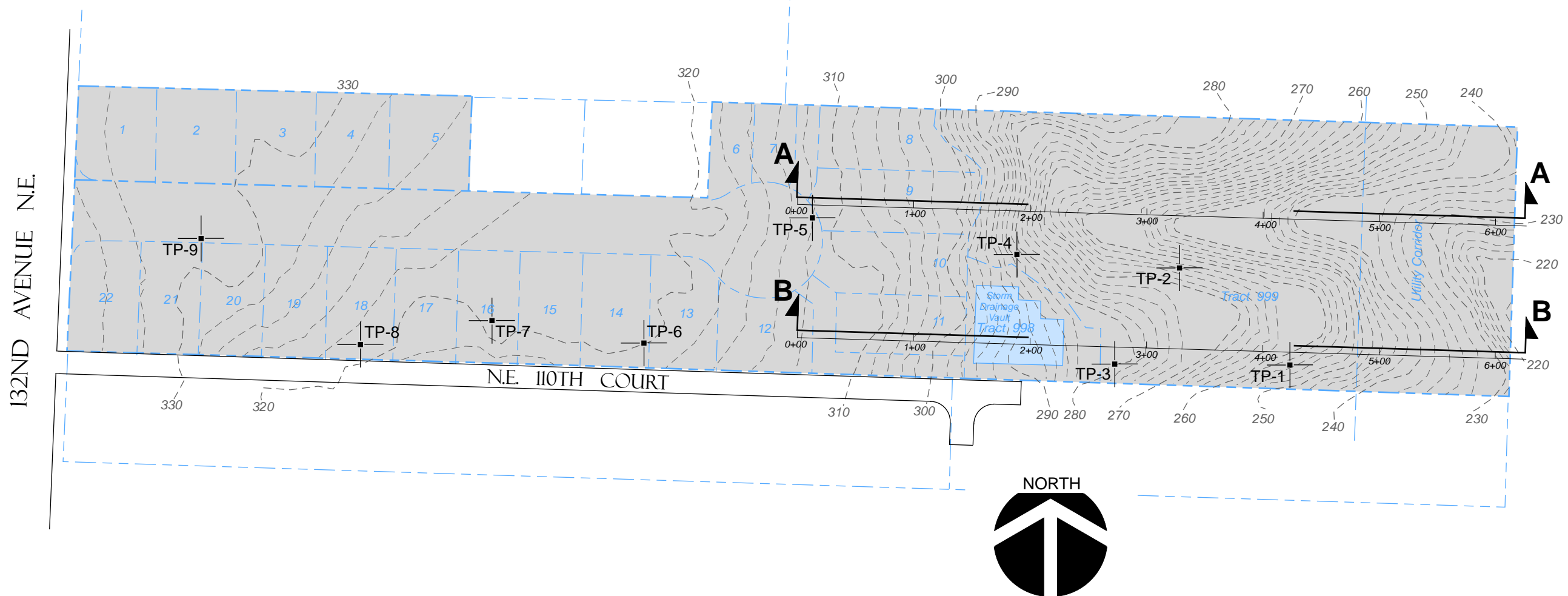


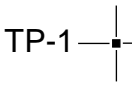
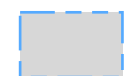


Earth Solutions NW LLC
Geotechnical Engineering, Construction Monitoring
and Environmental Sciences

**Vicinity Map
Rosehill Property
Redmond, Washington**

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Drwn. GLS	Date 02/20/2015	Proj. No. 3519.01	
Checked KDH	Date Feb. 2015	Plate	1



- LEGEND**
- 
 TP-1 Approximate Location of ESNW Test Pit, Proj. No. ES-3519, Sept. 2014
 - 
 Subject Site
 - 
 Proposed Lot Number
 - 
 Cross Section Line (See Tract 999 Sections)

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Site Plan
Rosehill Property
Redmond, Washington

Earth Solutions NW LLC
Geotechnical Engineering, Construction Monitoring
and Environmental Sciences



Drwn. By GLS
Checked By KDH
Date 02/20/2015
Proj. No. 3519.01
Plate 2



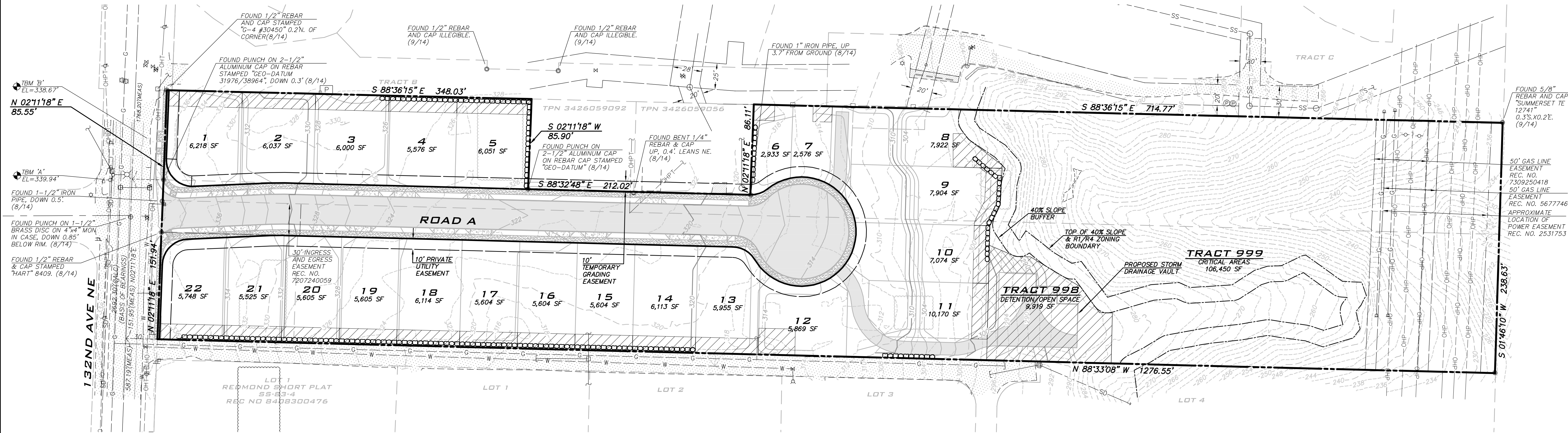
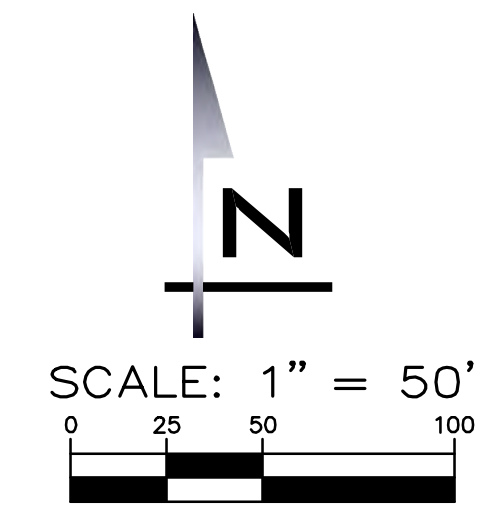
SCALE: AS NOTED
 PROJECT MANAGER: TODD A. OBERG, PE
 PROJECT ENGINEER: TODD A. OBERG, PE
 DESIGNER: CHRISTOPHER WISCOMB
 ISSUE DATE: 4/8/2015

NO	DATE	BY	REVISIONS

OPEN SPACE PLAN
 TERRENE AT 132ND AVE NE
 PRELIMINARY PLAT
 3426059087
 CITY OF REDMOND WASHINGTON



4/8/15
 JOB NUMBER: 14-171
 SHEET NAME: OP-01



LOT #	AREA	REQUIRED MIN OPEN SPACE (10%)	REDUCTION FROM AVERAGE LOT SIZE 5,950 SF *
1	6,218	622 « (1,052) PROVIDED	0
2	6,037	604 « (1,050) PROVIDED	0
3	6,000	600 « (1,050) PROVIDED	0
4	5,576	558 « (975) PROVIDED	374
5	6,051	605 « (1,064) PROVIDED	0
6	2,933	293 « (302) PROVIDED	3,017
7	2,576	258 « (272) PROVIDED	3,374
8	7,922	792 « (938) PROVIDED	0
9	7,904	790 « (870) PROVIDED	0
10	7,074	707 « (825) PROVIDED	0
11	10,170	1017 « (798) PROVIDED	0
12	5,869	587 « (875) PROVIDED	81
13	5,955	596 « (900) PROVIDED	0
14	6,113	611 « (900) PROVIDED	0
15	5,604	560 « (825) PROVIDED	346
16	5,604	560 « (825) PROVIDED	346
17	5,604	560 « (825) PROVIDED	346
18	6,114	611 « (900) PROVIDED	0
19	5,605	561 « (825) PROVIDED	345
20	5,605	561 « (825) PROVIDED	345
21	5,525	553 « (825) PROVIDED	425
22	5,748	575 « (918) PROVIDED	202
TOTAL	131,807	13193 « (18,639) PROVIDED	9,201

* AVERAGE LOT SIZE REDUCED FROM 7,000 SF TO 5,950 SF (BY 15%) USING 2 CREDITS
 PER COR TABLE 21.67.040B, GREEN BUILDING INCENTIVE PROGRAM

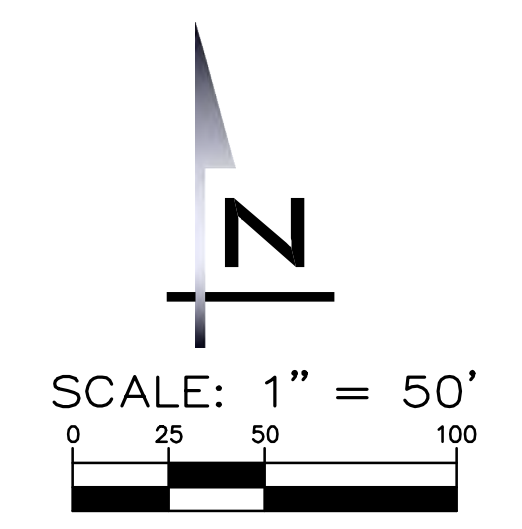
OPEN SPACE CALCULATION

TRACT 998: 9,919 SF (8,455 SF EXCLUDING PAVEMENT)
 TRACT 999: 106,450 SF
 LOT-BY-LOT OPEN SPACE: 19,740 SF
 136,109 SF (TOTAL OPEN SPACE)
 TOTAL SITE AREA: 285,441 SF
 TOTAL LOT AREA: 131,821 SF
 10% OF 131,821: 13,182 SF MIN LOT-BY-LOT OPEN SPACE REQUIRED (RZC 21.08.170.L.2.b)
 20% OF 285,441: 57,088 SF MIN TOTAL OPEN SPACE REQUIRED (RZC 21.08.060.C)
 25% OF 57,088: 14,272 SF MIN OPEN SPACE OUTSIDE STEEP SLOPES, BUFFERS, AND SLOPED AT 10% OR LESS REQUIRED (RZC 21.08.170.L.2.c.ii)
 28,558 SF PROVIDED (50% OF MIN TOTAL OPEN SPACE) (LOT-BY-LOT + TRACT 998)

OPEN SPACE OUTSIDE: CRITICAL AREA/BUFFER

GREEN BUILDING AND GREEN INFRASTRUCTURE INCENTIVE PROGRAM NOTE

THE PROJECT CLAIMS 2 INCENTIVE POINTS FOR PRESERVING 30% OF THE SITE AS NATURAL VEGETATION (99,793 SF OF THE TOTAL 300,102 SF SITE AREA WILL REMAIN UNDISTURBED), AND 1 INCENTIVE POINT FOR DROUGHT TOLERANT LANDSCAPING. THE PROJECT APPLIES 3 INCENTIVE POINTS TO QUALIFY FOR 25% LOT SIZE REDUCTION PER COR TABLE 21.64.040B, REDUCING THE MINIMUM AVERAGE LOT SIZE FROM 7,000 SF (R4) TO 5,250 SF.



SCALE:
AS NOTED
PROJECT MANAGER:
TODD A. OBERG, PE
PROJECT ENGINEER:
TODD A. OBERG, PE
DESIGNER:
JUSTIN H. RODDA
ISSUE DATE:
4/30/2015



NO	DATE	BY	REVISIONS

CRITICAL AREAS EXHIBIT
TERRENE AT 132ND
CITY OF REDMOND WASHINGTON

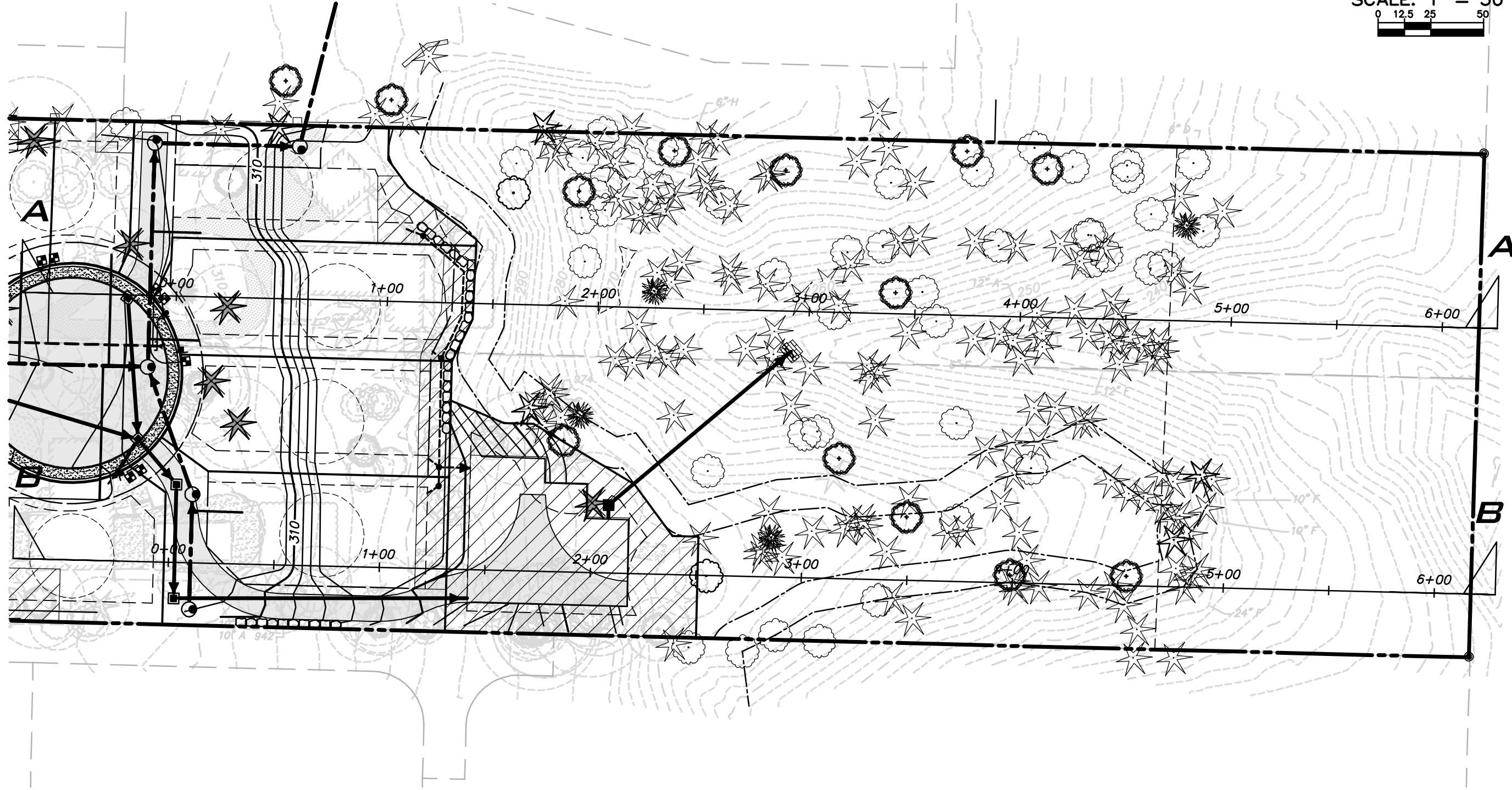
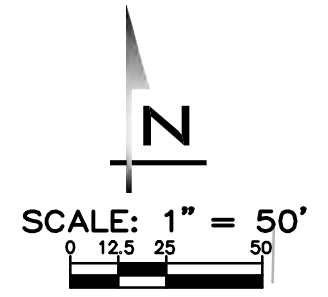
UNDERGROUND UTILITY NOTE
UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION. THERE IS NO GUARANTEE THAT ALL UTILITY LINES ARE SHOWN, OR THAT THE LOCATION, SIZE AND MATERIAL IS ACCURATE. THE CONTRACTOR SHALL UNCOVER ALL INDICATED PIPING WHERE CROSSING, INTERFERENCES, OR CONNECTIONS OCCUR PRIOR TO TRENCHING OR EXCAVATION FOR ANY PIPE OR STRUCTURES, TO DETERMINE ACTUAL LOCATIONS, SIZE AND MATERIAL. THE CONTRACTOR SHALL MAKE THE APPROPRIATE PROVISION FOR PROTECTION OF SAID FACILITIES. THE CONTRACTOR SHALL NOTIFY ONE CALL AT 8-1-1 (WASHINGTON811.COM) AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE CONSTRUCTION.

JOB NUMBER:
14-171
SHEET NAME:
CA-01
SHT **1** OF **1**

TRACT 999 PLAN EXHIBIT



© 2015 THE BLUELINE GROUP



TRACT 999 PLAN
 TERRENE AT 132ND AVE NE PLAT

SCALE	AS NOTED
PROJECT MANAGER	TODD OBERG, PE
DESIGNED BY	DENE KUZARO, EIT
DRAWN BY	EDUARD SHOYMERMAN
PLOT DATE	April 23, 2015
JOB NUMBER: 14-171	
FIGURE: 1 OF 2	

Apr 23, 2015 - 7:59am - User eshoymerman
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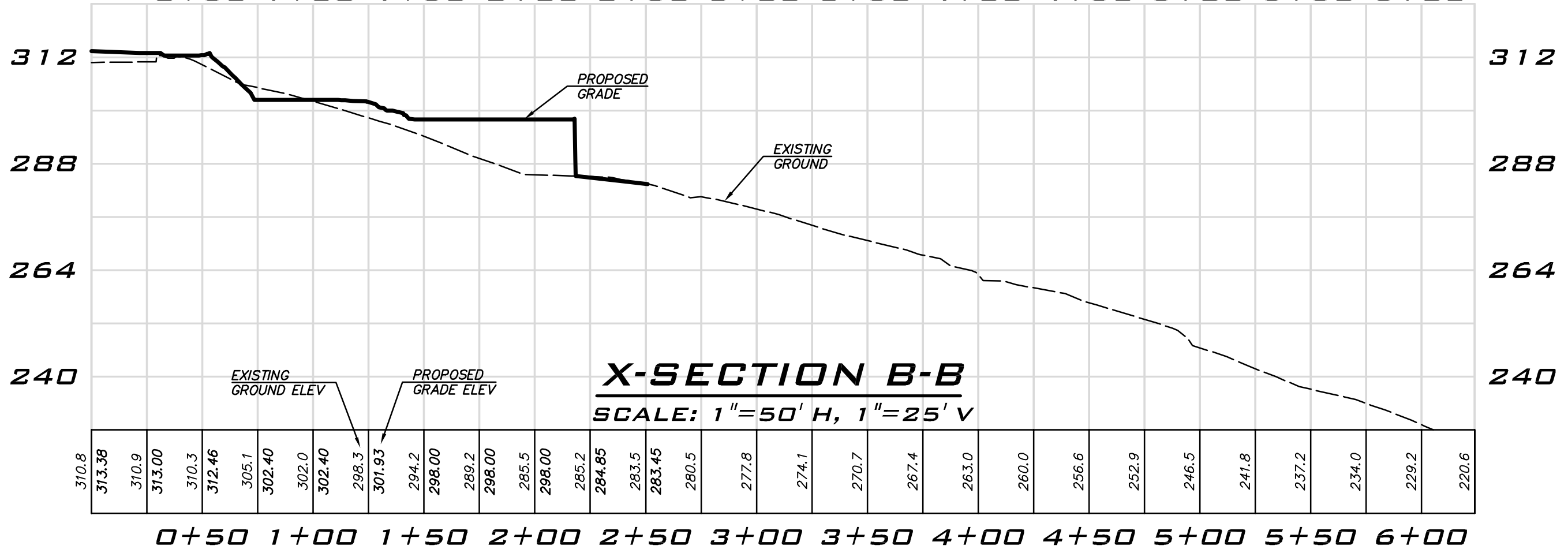
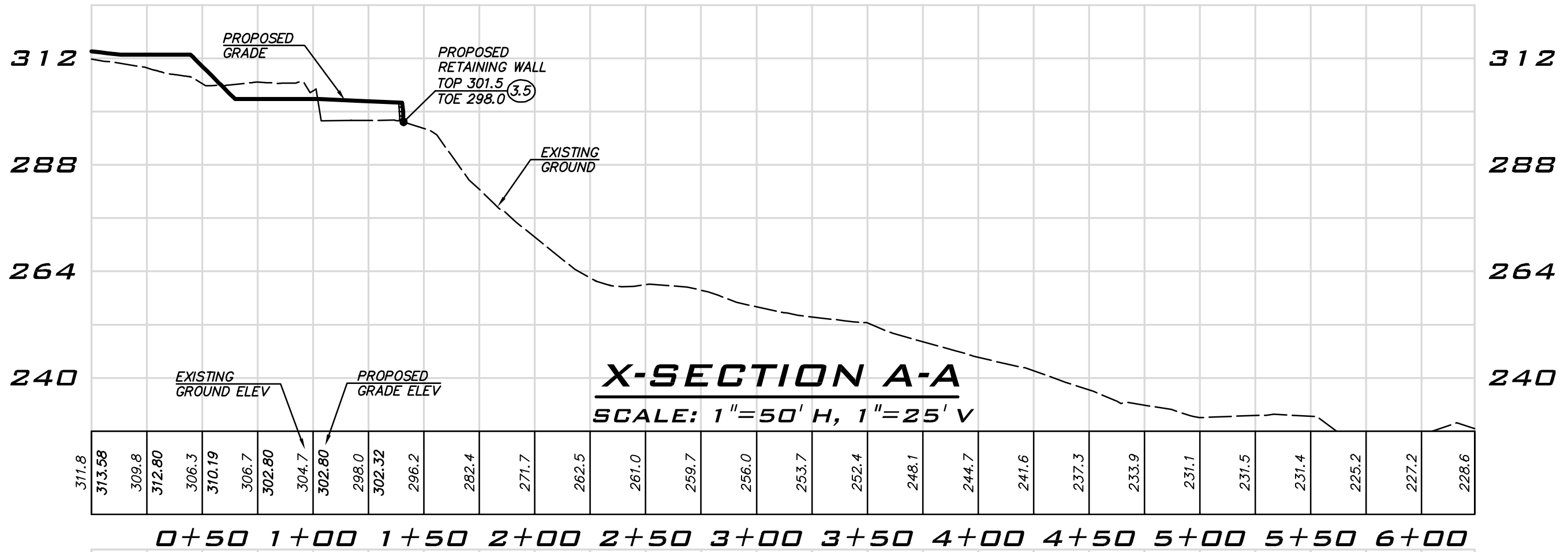
TRACT 999 SECTIONS EXHBIT



BLUELINE

TRACT 999 SECTIONS
TERRENE AT 132ND AVE NE PLAT

© 2015 THE BLUELINE GROUP



Apr 23, 2015 - 7:51am - User estoymerman
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SCALE	AS NOTED
PROJECT MANAGER	TODD OBERG, PE
DESIGNED BY	DENE KUZARO, EIT
DRAWN BY	EDUARD SHOYMERMAN
PLOT DATE	April 23, 2015

JOB NUMBER:
14-171

FIGURE:
2 OF 2

Earth Solutions NW_{LLC}

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		CLEAN SANDS (LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.



Earth Solutions NW
 1805 - 136th Place N.E., Suite 201
 Bellevue, Washington 98005
 Telephone: 425-449-4704
 Fax: 425-449-4711

CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 256 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION --
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION --
 NOTES Depth of Topsoil & Sod 10"- 12": dense brush AFTER EXCAVATION --

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 6'
		MC = 4.20%			Tan silty SAND with gravel, loose, dry to damp
			SM		-becomes medium dense, damp
5		MC = 6.20%			-weak cementation
		MC = 6.20%			-increased moisture content
					249.0
					Test pit terminated at 7.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 7.0 feet.



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 Bellevue, Washington 98005
 Telephone: 425-449-4704
 Fax: 425-449-4711

CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 264 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION —
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION —
 NOTES Depth of Topsoil & Sod 8": dense brush AFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 4' 263.3
		MC = 5.10%			Tan silty SAND with gravel, loose, dry to damp
		MC = 3.20%	SM		-becomes medium dense, damp -cobbles to BOH -weak cementation
5		MC = 5.60%			-becomes damp to moist 257.5
					Test pit terminated at 6.5 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 6.5 feet.



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CLIENT <u>Terrene Ventures</u>	PROJECT NAME <u>Rosehill Property</u>
PROJECT NUMBER <u>3519</u>	PROJECT LOCATION <u>Redmond, Washington</u>
DATE STARTED <u>9/11/14</u> COMPLETED <u>9/11/14</u>	GROUND ELEVATION <u>280 ft</u> TEST PIT SIZE _____
EXCAVATION CONTRACTOR <u>NW Excavating</u>	GROUND WATER LEVELS:
EXCAVATION METHOD _____	AT TIME OF EXCAVATION <u>---</u>
LOGGED BY <u>KDH</u> CHECKED BY <u>KDH</u>	AT END OF EXCAVATION <u>---</u>
NOTES <u>Depth of Topsoil & Sod 8": brush, moss</u>	AFTER EXCAVATION <u>---</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 4'
		MC = 6.70%			Light brown silty SAND with gravel, loose, dry to damp
					-becomes tan silty sand with gravel, medium dense, damp
5		MC = 6.30% Fines = 31.20%	SM		-weak cementation [USDA Classification: fine sandy LOAM] -cobbles to BOH
		MC = 5.80%			-decreased fines content
		MC = 6.20%			
					Test pit terminated at 9.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 9.0 feet.

GENERAL BH / TP / WELL 3519.GPJ GINT US.GDT 9/25/14



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CLIENT <u>Terrene Ventures</u>	PROJECT NAME <u>Rosehill Property</u>
PROJECT NUMBER <u>3519</u>	PROJECT LOCATION <u>Redmond, Washington</u>
DATE STARTED <u>9/11/14</u> COMPLETED <u>9/11/14</u>	GROUND ELEVATION <u>284 ft</u> TEST PIT SIZE _____
EXCAVATION CONTRACTOR <u>NW Excavating</u>	GROUND WATER LEVELS:
EXCAVATION METHOD _____	AT TIME OF EXCAVATION <u>—</u>
LOGGED BY <u>KDH</u> CHECKED BY <u>KDH</u>	AT END OF EXCAVATION <u>—</u>
NOTES <u>Depth of Topsoil & Sod 10"- 14": dense brush</u>	AFTER EXCAVATION <u>—</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 5'
		MC = 5.80%			283.0
			SM		Light brown silty SAND with gravel, loose, dry to damp
		MC = 5.50%			-becomes medium dense, damp
5					-cobbles
		MC = 4.90%			-weak cementation
					-becomes silty fine sand, medium dense, damp to moist
					-no cementation
					Test pit terminated at 6.5 feet below existing grade. No groundwater encountered during excavation.
					277.5
					Bottom of test pit at 6.5 feet.



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CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 312 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION ---
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION ---
 NOTES Depth of Topsoil & Sod 3": duff AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 10.40%	SM		Brown silty SAND with gravel, loose to medium dense, damp (Fill) -root intrusions to 4' -wires
5		MC = 3.80%	SM		Brown silty SAND with gravel, medium dense, damp to moist -cobbles
		MC = 4.60%			Test pit terminated at 7.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 7.0 feet.
					307.5
					305.0

GENERAL BH / TP / WELL 3519.GPJ GINT US.GDT 9/25/14



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CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 320 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION --
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION --
 NOTES Depth of Topsoil & Sod 6": duff AFTER EXCAVATION --

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 5' 319.5
		MC = 6.00%			Light brown silty SAND with gravel, loose to medium dense, dry to damp -becomes medium dense, damp -cobbles to 6.5'
5		MC = 4.10%	SM		
		MC = 5.90%			-becomes silty fine sand, medium dense, damp to moist -weakly cemented pieces
		MC = 4.70% Fines = 17.90%			[USDA Classification: fine loamy SAND] Test pit terminated at 8.5 feet below existing grade. No groundwater encountered during excavation. 311.5
					Bottom of test pit at 8.5 feet.



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CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 320 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION —
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION —
 NOTES Depth of Topsoil & Sod 10": brush, duff AFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		Dark brown TOPSOIL, roots to 4'
		MC = 5.80%			Tan silty SAND with gravel, loose to medium dense, dry to damp
5		MC = 7.10%	SM		-becomes medium dense, damp -cobbles -iron oxide staining -weak to moderate cementation, becomes dense
		MC = 7.80%			Test pit terminated at 7.5 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 7.5 feet.



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CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 321 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION --
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION --
 NOTES Depth of Topsoil & Sod 6"- 8": brambles, duff AFTER EXCAVATION --

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
			TPSL		Dark brown TOPSOIL, roots to 4'	320.5
					Tan silty SAND with gravel, loose, dry to damp	
5		MC = 7.40% Fines = 24.10%	SM		-becomes medium dense, damp [USDA Classification: very gravelly loamy SAND] -cobbles	
		MC = 4.90%			-iron oxide staining	
						314.0
		MC = 4.80% Fines = 11.10%	SP-SM		Brown poorly graded fine SAND with silt, medium dense, damp to moist -weakly cemented pieces [USDA Classification: fine SAND]	
10		MC = 8.00%				311.0
					Test pit terminated at 10.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 10.0 feet.	



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CLIENT Terrene Ventures PROJECT NAME Rosehill Property
 PROJECT NUMBER 3519 PROJECT LOCATION Redmond, Washington
 DATE STARTED 9/11/14 COMPLETED 9/11/14 GROUND ELEVATION 331 ft TEST PIT SIZE _____
 EXCAVATION CONTRACTOR NW Excavating GROUND WATER LEVELS:
 EXCAVATION METHOD _____ AT TIME OF EXCAVATION ---
 LOGGED BY KDH CHECKED BY KDH AT END OF EXCAVATION ---
 NOTES Depth of Topsoil & Sod 3": brambles, duff AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
			SM		Brown silty SAND with gravel and moderate organic content, loose, damp (Fill) -rusty corrugated pipe	330.0
		MC = 8.20%			Light brown silty SAND with gravel, loose to medium dense, dry to damp	
5			SM		-cobbles -becomes medium dense	326.0
		MC = 6.40%			Light brown poorly graded fine SAND with silt, medium dense, damp	
		MC = 8.20%	SP-SM			324.0
		MC = 6.90% Fines = 3.30%	SP		Brown poorly graded fine SAND, medium dense, damp to moist	322.0
					[USDA Classification: SAND] Test pit terminated at 9.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 9.0 feet.	



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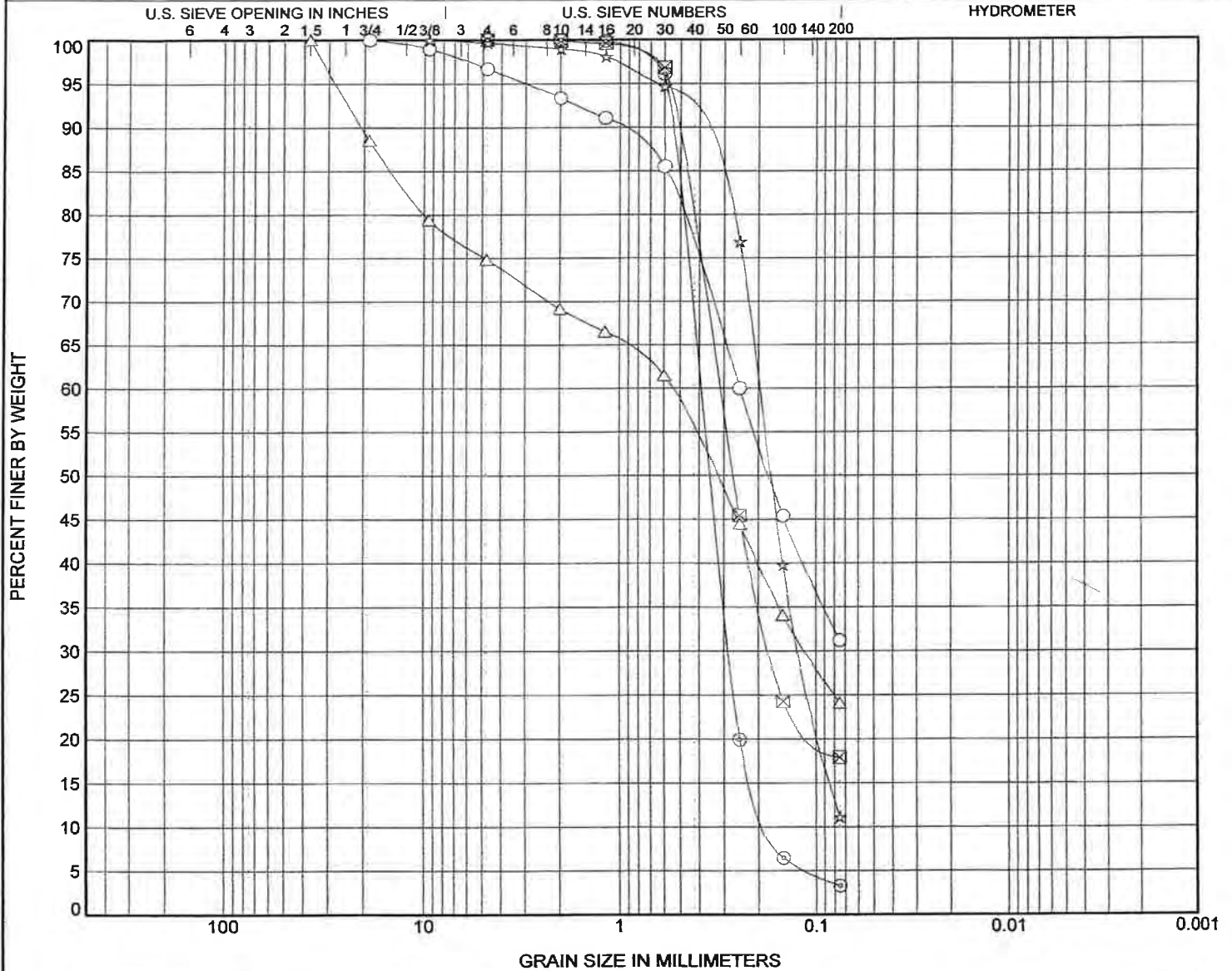
GRAIN SIZE DISTRIBUTION

CLIENT Terrene at RH 132nd, LLC

PROJECT NAME Rose Hill Property

PROJECT NUMBER ES-3519

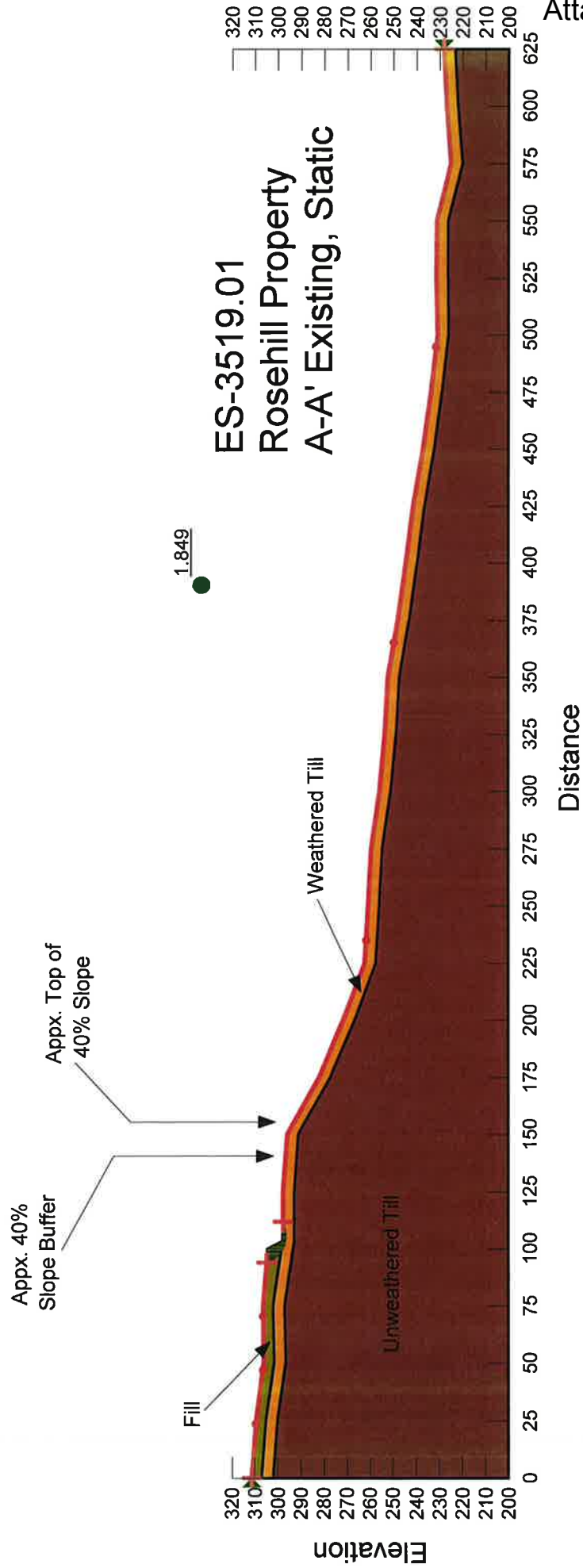
PROJECT LOCATION Redmond



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	Cc	Cu			
○ TP-3 4.5ft.	USDA: Tan Fine Sandy Loam. USCS: Tan SM.					
⊗ TP-6 8.5ft.	USDA: Tan Fine Loamy Sand. USCS: SM w Gravel.					
△ TP-8 3.0ft.	USDA: Brown Gravelly Sandy Loam. USCS: SM w Gravel.					
☆ TP-8 8.5ft.	USDA: Tan Fine Sand. USCS: SP-SM.	0.97	2.71			
⊙ TP-9 9.0ft.	USDA: Brown Sand. USCS: SP	1.16	2.31			
Specimen Identification	D100	D60	D30	D10	%Silt	%Clay
○ TP-3 4.5ft.	19	0.25			31.2	
⊗ TP-6 8.5ft.	4.75	0.32	0.172		17.9	
△ TP-8 3.0ft.	37.5	0.556	0.113		24.1	
☆ TP-8 8.5ft.	9.5	0.198	0.118		11.1	
⊙ TP-9 9.0ft.	4.75	0.396	0.281	0.172	3.3	

GRAIN SIZE ES-3519.GPJ GINT US LAB.GDT 9/12/14



A-A' Existing, Static

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File Information

Title: A-A' Existing
Created By: Keven Hoffmann
Revision Number: 10
Last Edited By: Keven Hoffmann
Date: 4/30/2015
Time: 1:45:07 PM
File Name: 3519.01 A-A' Existing.gsz
Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
Last Solved Date: 4/30/2015
Last Solved Time: 1:45:16 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

A-A' Existing, Static

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
Side Function
Interslice force function option: Half-Sine
PWP Conditions Source: (none)
SlipSurface
Direction of movement: Left to Right
Allow Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 34 °
Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
 Left-Zone Left Coordinate: (0, 311.8) ft
 Left-Zone Right Coordinate: (94.04075, 305.17674) ft
 Left-Zone Increment: 4
 Right Projection: Range
 Right-Zone Left Coordinate: (111.82666, 298) ft
 Right-Zone Right Coordinate: (625, 228.6) ft
 Right-Zone Increment: 4
 Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 311.8) ft
 Right Coordinate: (625, 228.6) ft

Regions

	Material	Points
Region 1	Fill	30,33,31,32,29,7,6,5,4,3
Region 2	Weathered Till	30,33,31,32,29,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,55,59,51
Region 3	Unweathered Till	56,1,2,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,55,59,58,57

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	75	306.7
Point 7	100	304.7
Point 8	125	293
Point 9	150	291.2
Point 10	175	277.4
Point 11	200	266.7
Point 12	225	257.5
Point 13	250	256
Point 14	275	254.7
Point 15	300	251
Point 16	325	248.7
Point 17	350	247.4
Point 18	375	243.1
Point 19	400	239.7
Point 20	425	236.6
Point 21	450	232.3
Point 22	475	228.9
Point 23	500	226.1
Point 24	525	226.5
Point 25	550	226.4
Point 26	575	220.2
Point 27	600	222.2
Point 28	625	223.6
Point 29	103	298
Point 30	0	307.3
Point 31	50	301.8
Point 32	75	302.2
Point 33	25	305.4
Point 34	125	298
Point 35	150	296.2
Point 36	175	282.4
Point 37	200	271.7
Point 38	225	262.5
Point 39	250	261
Point 40	275	259.7
Point 41	300	256
Point 42	325	253.7
Point 43	350	252.4
Point 44	375	248.1

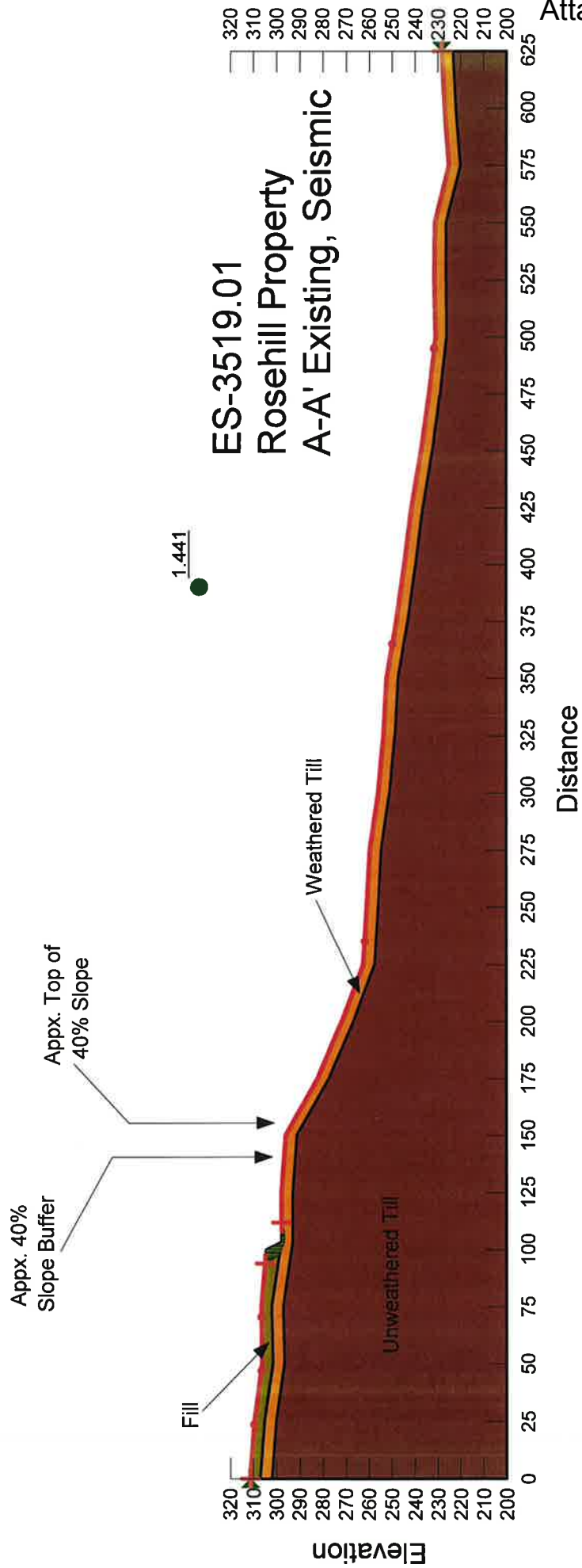
Point 45	400	244.7
Point 46	425	241.6
Point 47	450	237.3
Point 48	475	233.9
Point 49	500	231.1
Point 50	525	231.5
Point 51	550	231.4
Point 52	575	225.2
Point 53	600	227.2
Point 54	625	228.6
Point 55	103	293
Point 56	0	302.3
Point 57	25	300.4
Point 58	50	296.8
Point 59	75	297.2

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	104	1.849	(105.723, 308.501)	12.146	(94.0408, 305.177)	(111.827, 298)

Slices of Slip Surface: 104

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	104	94.326025	304.38655	0	46.631159	26.922512	0
2	104	94.89658	303.0317	0	138.21898	79.800767	0
3	104	95.467135	302.01585	0	211.06509	121.85848	0
4	104	96.03769	301.18695	0	272.96454	157.59615	0
5	104	96.608245	300.48485	0	328.17105	189.46965	0
6	104	97.1788	299.8778	0	379.36083	219.02408	0
7	104	97.749355	299.34665	0	428.38136	247.32609	0
8	104	98.319905	298.8787	0	476.52711	275.12305	0
9	104	98.953885	298.42495	0	517.77579	349.24418	50
10	104	99.651295	297.9893	0	584.8484	394.48523	50
11	104	100.3	297.6381	0	586.24107	395.42459	50
12	104	100.9	297.35845	0	513.6165	346.4387	50
13	104	101.5	297.11735	0	430.84246	290.60691	50
14	104	102.1	296.9123	0	336.34604	226.86827	50
15	104	102.7	296.74135	0	228.55234	154.1605	50
16	104	103.2942	296.60415	0	186.16945	125.57288	50
17	104	103.88265	296.499	0	218.16772	147.15599	50
18	104	104.4711	296.4234	0	246.97556	166.58712	50
19	104	105.05955	296.3768	0	271.53122	183.15012	50
20	104	105.648	296.35885	0	290.67633	196.06366	50
21	104	106.23645	296.36945	0	303.19001	204.50424	50
22	104	106.8249	296.4087	0	307.92971	207.70121	50
23	104	107.41335	296.4769	0	304.00717	205.05543	50
24	104	108.0018	296.5745	0	290.89225	196.2093	50
25	104	108.5902	296.7022	0	268.47517	181.08879	50
26	104	109.17865	296.86105	0	237.24949	160.0268	50
27	104	109.7671	297.0523	0	198.11734	133.63183	50
28	104	110.35555	297.27765	0	152.41658	102.80628	50
29	104	110.944	297.53925	0	101.67898	68.583338	50
30	104	111.53245	297.8397	0	47.450452	32.005734	50



A-A' Existing, Seismic

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File Information

Title: A-A' Existing
 Created By: Keven Hoffmann
 Revision Number: 10
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 1:45:07 PM
 File Name: 3519.01 A-A' Existing.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 1:45:14 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

A-A' Existing, Seismic

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
 Unit Weight: 120 pcf
 Cohesion: 0 psf
 Phi: 30 °
 Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
 Left-Zone Left Coordinate: (0, 311.8) ft
 Left-Zone Right Coordinate: (94.04075, 305.17674) ft
 Left-Zone Increment: 4
 Right Projection: Range
 Right-Zone Left Coordinate: (111.82666, 298) ft
 Right-Zone Right Coordinate: (625, 228.6) ft
 Right-Zone Increment: 4
 Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 311.8) ft
 Right Coordinate: (625, 228.6) ft

Seismic Loads

Horz Seismic Load: 0.1668
 Ignore seismic load in strength: No

Regions

	Material	Points
Region 1	Fill	30,33,31,32,29,7,6,5,4,3
Region 2	Weathered Till	30,33,31,32,29,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,55,59,5
Region 3	Unweathered Till	56,1,2,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,55,59,58,57

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	75	306.7
Point 7	100	304.7
Point 8	125	293
Point 9	150	291.2
Point 10	175	277.4
Point 11	200	266.7
Point 12	225	257.5
Point 13	250	256
Point 14	275	254.7
Point 15	300	251
Point 16	325	248.7
Point 17	350	247.4
Point 18	375	243.1
Point 19	400	239.7
Point 20	425	236.6
Point 21	450	232.3
Point 22	475	228.9
Point 23	500	226.1
Point 24	525	226.5
Point 25	550	226.4
Point 26	575	220.2
Point 27	600	222.2
Point 28	625	223.6
Point 29	103	298
Point 30	0	307.3
Point 31	50	301.8
Point 32	75	302.2
Point 33	25	305.4
Point 34	125	298
Point 35	150	296.2
Point 36	175	282.4
Point 37	200	271.7
Point 38	225	262.5
Point 39	250	261

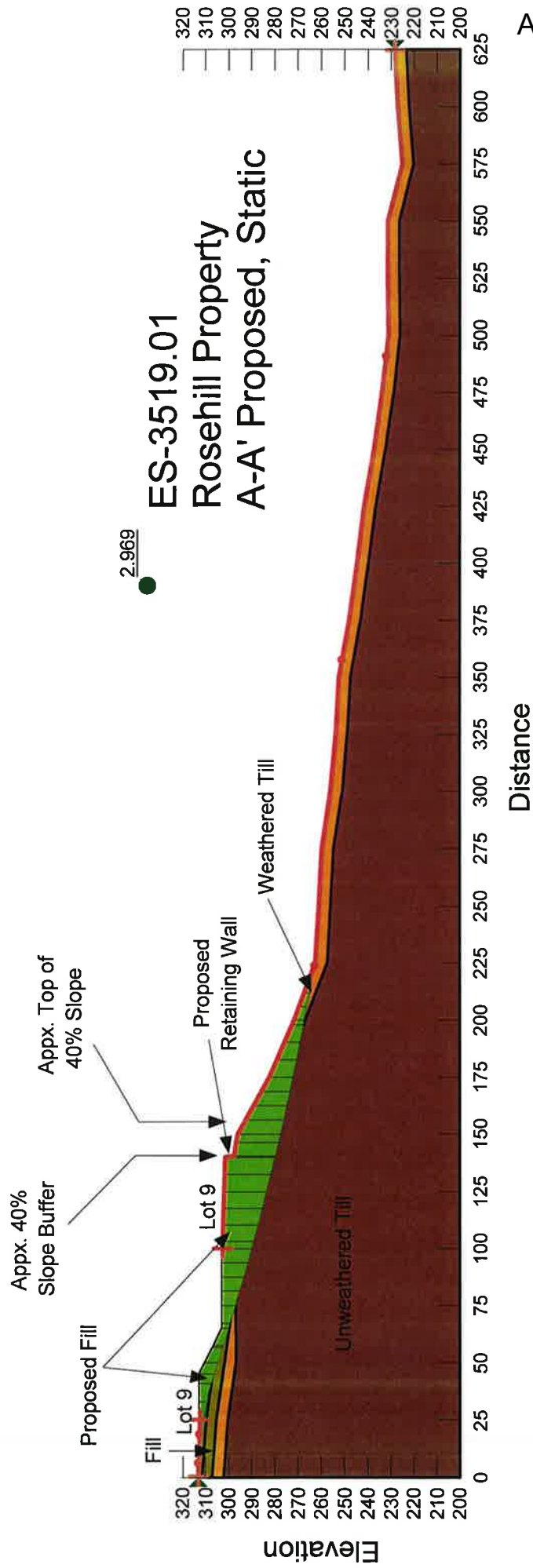
Point 40	275	259.7
Point 41	300	256
Point 42	325	253.7
Point 43	350	252.4
Point 44	375	248.1
Point 45	400	244.7
Point 46	425	241.6
Point 47	450	237.3
Point 48	475	233.9
Point 49	500	231.1
Point 50	525	231.5
Point 51	550	231.4
Point 52	575	225.2
Point 53	600	227.2
Point 54	625	228.6
Point 55	103	293
Point 56	0	302.3
Point 57	25	300.4
Point 58	50	296.8
Point 59	75	297.2

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	104	1.441	(105.723, 308.501)	12.146	(94.0408, 305.177)	(111.827, 298)

Slices of Slip Surface: 104

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	104	94.326025	304.38655	0	40.669989	23.480829	0
2	104	94.89658	303.0317	0	120.99002	69.853619	0
3	104	95.467135	302.01585	0	183.97472	106.21785	0
4	104	96.03769	301.18695	0	236.5242	136.55731	0
5	104	96.608245	300.48485	0	282.70492	163.21976	0
6	104	97.1788	299.8778	0	325.2518	187.78421	0
7	104	97.749355	299.34665	0	366.15881	211.40189	0
8	104	98.319905	298.8787	0	406.97338	234.96619	0
9	104	98.953885	298.42495	0	443.90984	299.42097	50
10	104	99.651295	297.9893	0	507.53165	342.33442	50
11	104	100.3	297.6381	0	514.50057	347.03502	50
12	104	100.9	297.35845	0	455.80023	307.44113	50
13	104	101.5	297.11735	0	388.71453	262.19126	50
14	104	102.1	296.9123	0	310.94192	209.73297	50
15	104	102.7	296.74135	0	219.93259	148.34641	50
16	104	103.2942	296.60415	0	189.91581	128.09983	50
17	104	103.88265	296.499	0	231.75701	156.32208	50
18	104	104.4711	296.4234	0	271.63762	183.22189	50
19	104	105.05955	296.3768	0	307.86095	207.65483	50
20	104	105.648	296.35885	0	338.29253	228.18119	50
21	104	106.23645	296.36945	0	360.61223	243.23602	50
22	104	106.8249	296.4087	0	372.5281	251.27338	50
23	104	107.41335	296.4769	0	372.16267	251.02689	50
24	104	108.0018	296.5745	0	358.42826	241.76292	50
25	104	108.5902	296.7022	0	331.27571	223.44829	50
26	104	109.17865	296.86105	0	291.87405	196.87154	50
27	104	109.7671	297.0523	0	242.27873	163.41907	50
28	104	110.35555	297.27765	0	185.2034	124.92127	50
29	104	110.944	297.53925	0	123.42722	83.252713	50
30	104	111.53245	297.8397	0	59.486912	40.124429	50



A-A' Proposed, Static

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File Information

Title: A-A' Proposed
Created By: Keven Hoffmann
Revision Number: 23
Last Edited By: Keven Hoffmann
Date: 4/30/2015
Time: 2:31:39 PM
File Name: 3519.01 A-A' Proposed.gsz
Directory: Y:\Keven's inbox\Project Folders\3519\SlopeW Files\
Last Solved Date: 4/30/2015
Last Solved Time: 2:31:45 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

A-A' Proposed, Static

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
FOS Distribution
 FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 34 °
Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0.3516, 313.56903) ft
Left-Zone Right Coordinate: (25, 312.8) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (100, 302.8) ft
Right-Zone Right Coordinate: (624.72088, 228.58437) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.58) ft
Right Coordinate: (625, 228.6) ft

Regions

	Material	Points
Region 1	Unweathered Till	54,1,2,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,56,55
Region 2	Proposed Fill	58,59,64,66,5,4,3
Region 3	Fill	3,4,5,66,65,29,31,28
Region 4	Fill	65,62,27,67,29
Region 5	Proposed Fill	62,63,70,68,32,27
Region 6	Weathered Till	28,31,29,67,27,32,68,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,5
Region 7	Proposed Fill	62,69,70,63

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	125	293
Point 7	150	291.2
Point 8	175	277.4
Point 9	200	266.7
Point 10	225	257.5
Point 11	250	256
Point 12	275	254.7
Point 13	300	251
Point 14	325	248.7
Point 15	350	247.4
Point 16	375	243.1
Point 17	400	239.7
Point 18	425	236.6
Point 19	450	232.3
Point 20	475	228.9
Point 21	500	226.1
Point 22	525	226.5
Point 23	550	226.4
Point 24	575	220.2
Point 25	600	222.2
Point 26	625	223.6
Point 27	103	298
Point 28	0	307.3
Point 29	50	301.8
Point 30	75	302.2

Point 31	25	305.4
Point 32	125	298
Point 33	150	296.2
Point 34	175	282.4
Point 35	200	271.7
Point 36	225	262.5
Point 37	250	261
Point 38	275	259.7
Point 39	300	256
Point 40	325	253.7
Point 41	350	252.4
Point 42	375	248.1
Point 43	400	244.7
Point 44	425	241.6
Point 45	450	237.3
Point 46	475	233.9
Point 47	500	231.1
Point 48	525	231.5
Point 49	550	231.4
Point 50	575	225.2
Point 51	600	227.2
Point 52	625	228.6
Point 53	103	293
Point 54	0	302.3
Point 55	25	300.4
Point 56	50	296.8
Point 57	75	297.2
Point 58	0	313.58
Point 59	25	312.8
Point 60	50	310.19
Point 61	75	302.8
Point 62	100	302.8
Point 63	125	299.8
Point 64	45	312.8
Point 65	65	302.8
Point 66	56.76804	306.66996
Point 67	75.19098	298.35389
Point 68	146.57677	296.80842
Point 69	140	301.5
Point 70	140.54174	297.64517

Critical Slip Surfaces

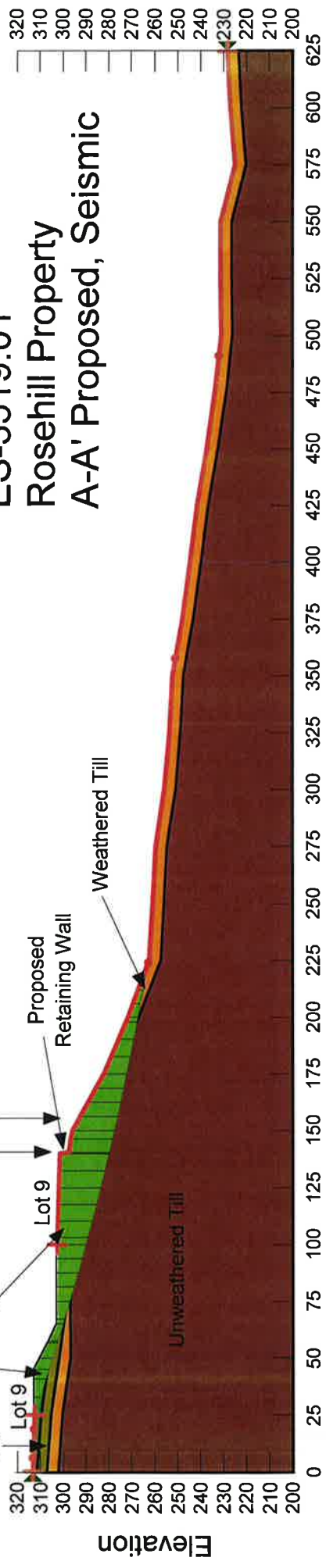
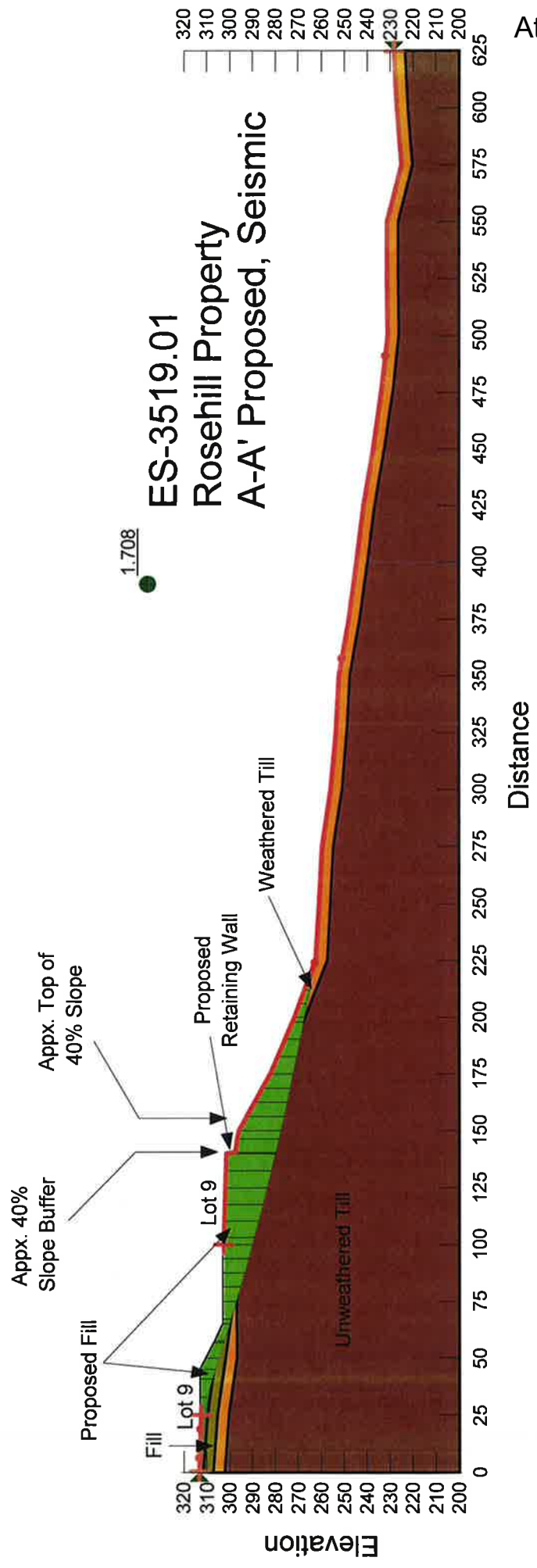
	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	106	2.969	(443.542, 1560.22)	1315.766	(25, 312.8)	(223.831, 262.93)

Slices of Slip Surface: 106

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	106	28.979705	311.4788	0	154.00826	96.235043	0
2	106	36.939115	308.8645	0	458.093	286.24827	0
3	106	42.95941	306.91915	0	684.94573	395.4536	0
4	106	47.5	305.47785	0	696.35593	402.04129	0
5	106	53.38402	303.63805	0	544.15489	314.16797	0
6	106	57.21765	302.44925	0	446.4122	257.7362	0
7	106	61.33363	301.19815	0	369.42878	213.28981	0
8	106	66.03596	299.77485	0	335.57606	193.74493	0
9	106	71.03596	298.29445	0	499.25722	336.75325	50
10	106	78.19662	296.20035	0	738.77606	498.31074	100
11	106	84.494365	294.3968	0	950.42107	641.06711	100
12	106	90.696615	292.65395	0	1155.6264	779.47983	100
13	106	96.89887	290.9438	0	1357.7487	915.81306	100
14	106	101.5	289.69305	0	1511.6787	1019.6402	100
15	106	106.66665	288.31805	0	1667.2399	1124.5675	100
16	106	114	286.39835	0	1869.3664	1260.9036	100
17	106	121.33335	284.5237	0	2067.2622	1394.3859	100
18	106	128.75	282.67355	0	2263.1107	1526.4874	100
19	106	136.25	280.8488	0	2456.5339	1656.953	100
20	106	140.27085	279.88395	0	2331.6375	1572.7093	100
21	106	143.55925	279.1132	0	2147.6961	1448.6393	100
22	106	148.2884	278.0125	0	2196.1595	1481.3283	100
23	106	153.125	276.9112	0	2089.4058	1409.322	100
24	106	159.375	275.51275	0	1848.9105	1247.1059	100
25	106	165.625	274.1462	0	1603.4681	1081.5529	100
26	106	171.875	272.8115	0	1352.9418	912.57079	100
27	106	178.8232	271.36685	0	1125.1401	758.91659	100
28	106	186.46965	269.81995	0	919.10774	619.946	100

Attachment 14.1

29	106	194.1161	268.32015	0	706.37565	476.45639	100
30	106	198.96965	267.38705	0	570.69945	384.94164	50
31	106	202.97885	266.63815	0	475.83615	320.95554	50
32	106	208.93655	265.5444	0	343.38386	231.61534	50
33	106	214.89425	264.47895	0	207.36356	139.86849	50
34	106	220.852	263.44175	0	67.861907	45.773434	50



A-A' Proposed, Seismic

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File Information

Title: A-A' Proposed
 Created By: Keven Hoffmann
 Revision Number: 23
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 2:31:39 PM
 File Name: 3519.01 A-A' Proposed.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 2:31:43 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

A-A' Proposed, Seismic

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
 Unit Weight: 120 pcf
 Cohesion: 0 psf
 Phi: 30 °
 Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0.3516, 313.56903) ft
Left-Zone Right Coordinate: (25, 312.8) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (100, 302.8) ft
Right-Zone Right Coordinate: (624.72088, 228.58437) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.58) ft
Right Coordinate: (625, 228.6) ft

Seismic Loads

Horz Seismic Load: 0.1668
Ignore seismic load in strength: No

Regions

	Material	Points
Region 1	Unweathered Till	54,1,2,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,56,55
Region 2	Proposed Fill	58,59,64,66,5,4,3
Region 3	Fill	3,4,5,66,65,29,31,28
Region 4	Fill	65,62,27,67,29
Region 5	Proposed Fill	62,63,70,68,32,27
Region 6	Weathered Till	28,31,29,67,27,32,68,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,5
Region 7	Proposed Fill	62,69,70,63

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	125	293
Point 7	150	291.2
Point 8	175	277.4
Point 9	200	266.7
Point 10	225	257.5
Point 11	250	256
Point 12	275	254.7
Point 13	300	251
Point 14	325	248.7
Point 15	350	247.4
Point 16	375	243.1
Point 17	400	239.7
Point 18	425	236.6
Point 19	450	232.3
Point 20	475	228.9
Point 21	500	226.1
Point 22	525	226.5
Point 23	550	226.4
Point 24	575	220.2
Point 25	600	222.2

Point 26	625	223.6
Point 27	103	298
Point 28	0	307.3
Point 29	50	301.8
Point 30	75	302.2
Point 31	25	305.4
Point 32	125	298
Point 33	150	296.2
Point 34	175	282.4
Point 35	200	271.7
Point 36	225	262.5
Point 37	250	261
Point 38	275	259.7
Point 39	300	256
Point 40	325	253.7
Point 41	350	252.4
Point 42	375	248.1
Point 43	400	244.7
Point 44	425	241.6
Point 45	450	237.3
Point 46	475	233.9
Point 47	500	231.1
Point 48	525	231.5
Point 49	550	231.4
Point 50	575	225.2
Point 51	600	227.2
Point 52	625	228.6
Point 53	103	293
Point 54	0	302.3
Point 55	25	300.4
Point 56	50	296.8
Point 57	75	297.2
Point 58	0	313.58
Point 59	25	312.8
Point 60	50	310.19
Point 61	75	302.8
Point 62	100	302.8
Point 63	125	299.8
Point 64	45	312.8
Point 65	65	302.8
Point 66	56.76804	306.66996
Point 67	75.19098	298.35389
Point 68	146.57677	296.80842
Point 69	140	301.5
Point 70	140.54174	297.64517

Critical Slip Surfaces

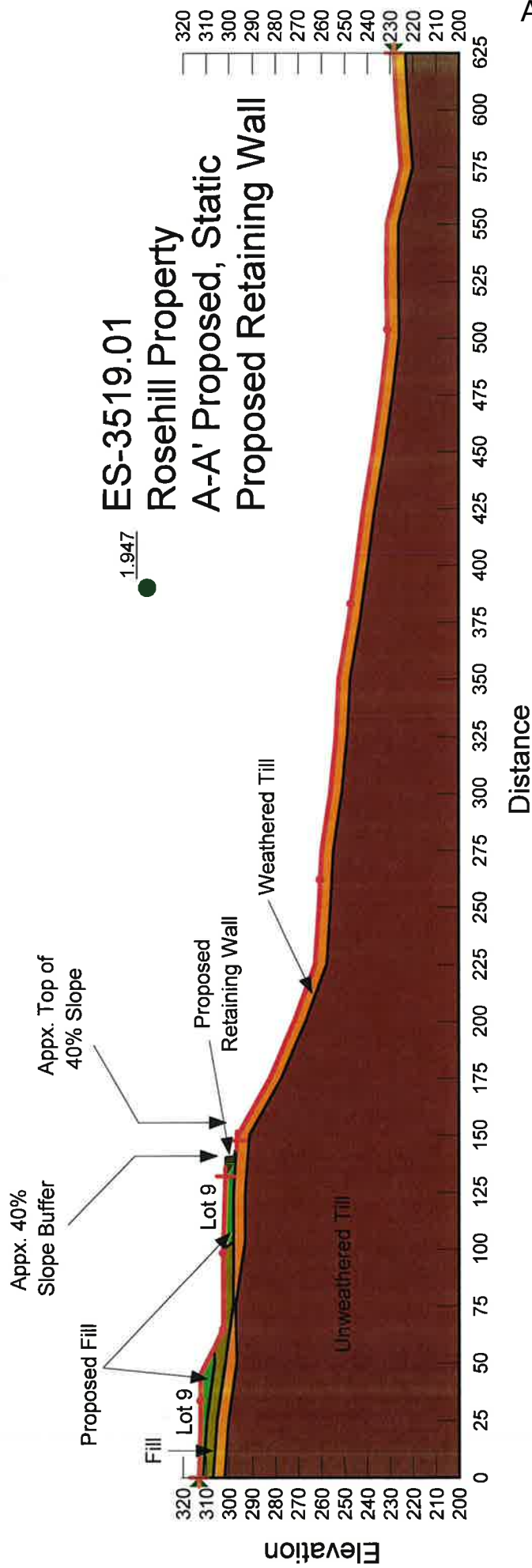
	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	106	1.708	(443.542, 1560.22)	1315.766	(25, 312.8)	(223.831, 262.93)

Slices of Slip Surface: 106

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	106	28.979705	311.4788	0	146.85396	91.76454	0
2	106	36.939115	308.8645	0	436.94363	273.03268	0
3	106	42.95941	306.91915	0	655.18781	378.27286	0
4	106	47.5	305.47785	0	665.95437	384.48894	0
5	106	53.38402	303.63805	0	520.08186	300.2694	0
6	106	57.21765	302.44925	0	426.39472	246.1791	0
7	106	61.33363	301.19815	0	352.64724	203.60098	0
8	106	66.03596	299.77485	0	320.19818	184.86651	0
9	106	71.03596	298.29445	0	473.10277	319.11185	50
10	106	78.19662	296.20035	0	700.59382	472.5565	100
11	106	84.494365	294.3968	0	903.77873	609.60645	100
12	106	90.696615	292.65395	0	1100.9826	742.62217	100
13	106	96.89887	290.9438	0	1295.4878	873.81753	100
14	106	101.5	289.69305	0	1443.7312	973.809	100
15	106	106.66665	288.31805	0	1593.817	1075.0431	100
16	106	114	286.39835	0	1789.2318	1206.8521	100
17	106	121.33335	284.5237	0	1981.0601	1336.2419	100
18	106	128.75	282.67355	0	2171.3227	1464.5757	100
19	106	136.25	280.8488	0	2359.5586	1591.5424	100
20	106	140.27085	279.88395	0	2240.9298	1511.5262	100
21	106	143.55925	279.1132	0	2065.0924	1392.9224	100
22	106	148.2884	278.0125	0	2113.1492	1425.3371	100
23	106	153.125	276.9112	0	2011.6909	1356.9027	100

Attachment 14.1

24	106	159.375	275.51275	0	1781.7342	1201.7949	100
25	106	165.625	274.1462	0	1546.4639	1043.1031	100
26	106	171.875	272.8115	0	1305.7726	880.75473	100
27	106	178.8232	271.36685	0	1086.6059	732.92494	100
28	106	186.46965	269.81995	0	888.01764	598.97546	100
29	106	194.1161	268.32015	0	682.40177	460.28581	100
30	106	198.96965	267.38705	0	552.48513	372.65593	50
31	106	202.97885	266.63815	0	460.63778	310.70411	50
32	106	208.93655	265.5444	0	332.18602	224.0623	50
33	106	214.89425	264.47895	0	200.0079	134.90703	50
34	106	220.852	263.44175	0	64.189403	43.296299	50



A-A' Proposed, Static

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File Information

Title: A-A' Proposed
Created By: Keven Hoffmann
Revision Number: 22
Last Edited By: Keven Hoffmann
Date: 4/30/2015
Time: 1:32:56 PM
File Name: 3519.01 A-A' Proposed.gsz
Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
Last Solved Date: 4/30/2015
Last Solved Time: 1:33:04 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

A-A' Proposed, Static

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
Side Function
Interslice force function option: Half-Sine
PWP Conditions Source: (none)
SlipSurface
Direction of movement: Left to Right
Allow Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 34 °
Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 313.58) ft
Left-Zone Right Coordinate: (131.9932, 301.76022) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (147.70688, 296.60756) ft
Right-Zone Right Coordinate: (625, 228.6) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.58) ft
Right Coordinate: (625, 228.6) ft

Regions

	Material	Points
Region 1	Unweathered Till	54,1,2,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,56,55
Region 2	Proposed Fill	58,59,64,66,5,4,3
Region 3	Fill	3,4,5,66,65,29,31,28
Region 4	Fill	65,62,27,67,29
Region 5	Proposed Fill	62,63,70,68,32,27
Region 6	Weathered Till	28,31,29,67,27,32,68,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,5
Region 7	Proposed Fill	62,69,70,63

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	125	293
Point 7	150	291.2
Point 8	175	277.4
Point 9	200	266.7
Point 10	225	257.5
Point 11	250	256
Point 12	275	254.7
Point 13	300	251
Point 14	325	248.7
Point 15	350	247.4
Point 16	375	243.1
Point 17	400	239.7
Point 18	425	236.6
Point 19	450	232.3
Point 20	475	228.9
Point 21	500	226.1
Point 22	525	226.5
Point 23	550	226.4
Point 24	575	220.2
Point 25	600	222.2
Point 26	625	223.6
Point 27	103	298
Point 28	0	307.3
Point 29	50	301.8
Point 30	75	302.2

Point 31	25	305.4
Point 32	125	298
Point 33	150	296.2
Point 34	175	282.4
Point 35	200	271.7
Point 36	225	262.5
Point 37	250	261
Point 38	275	259.7
Point 39	300	256
Point 40	325	253.7
Point 41	350	252.4
Point 42	375	248.1
Point 43	400	244.7
Point 44	425	241.6
Point 45	450	237.3
Point 46	475	233.9
Point 47	500	231.1
Point 48	525	231.5
Point 49	550	231.4
Point 50	575	225.2
Point 51	600	227.2
Point 52	625	228.6
Point 53	103	293
Point 54	0	302.3
Point 55	25	300.4
Point 56	50	296.8
Point 57	75	297.2
Point 58	0	313.58
Point 59	25	312.8
Point 60	50	310.19
Point 61	75	302.8
Point 62	100	302.8
Point 63	125	299.8
Point 64	45	312.8
Point 65	65	302.8
Point 66	56.76804	306.66996
Point 67	75.19098	298.35389
Point 68	146.57677	296.80842
Point 69	140	301.5
Point 70	140.54174	297.64517

Critical Slip Surfaces

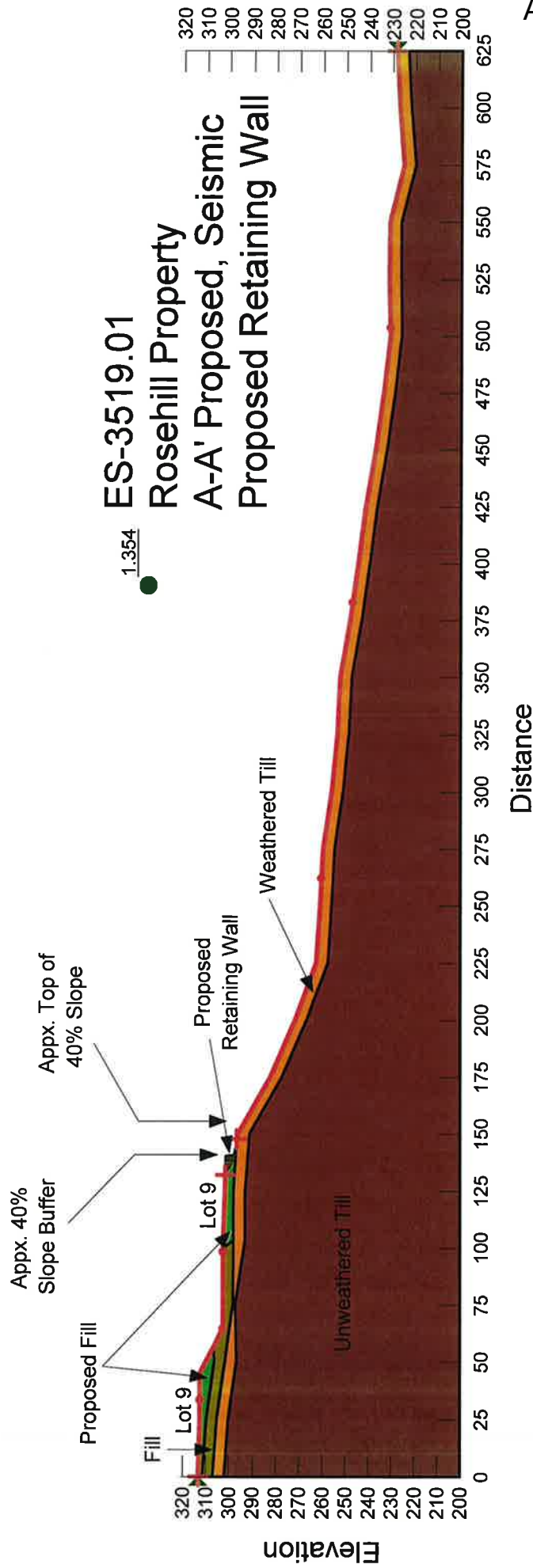
	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	102	1.947	(146.059, 318.119)	21.574	(131.993, 301.76)	(147.707, 296.608)

Slices of Slip Surface: 102

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	102	132.2615	301.537	0	20.818762	13.009007	0
2	102	132.79805	301.1047	0	60.772442	37.974836	0
3	102	133.3346	300.6996	0	97.821427	61.125611	0
4	102	133.8712	300.3199	0	132.58851	82.850499	0
5	102	134.40775	299.964	0	165.6	103.47836	0
6	102	134.9443	299.63055	0	197.31216	123.29432	0
7	102	135.4809	299.31835	0	228.07729	142.51851	0
8	102	136.01745	299.0263	0	258.20907	161.34694	0
9	102	136.554	298.7535	0	287.92991	179.91858	0
10	102	137.0906	298.49915	0	317.37277	198.31652	0
11	102	137.62715	298.2626	0	346.63862	216.60385	0
12	102	138.1637	298.0432	0	375.72136	234.77676	0
13	102	138.69335	297.84275	0	404.18717	252.56418	0
14	102	139.216	297.6604	0	431.84505	269.84674	0
15	102	139.73865	297.4929	0	458.85011	286.72137	0
16	102	140.27085	297.33735	0	261.94801	163.68328	0
17	102	140.85245	297.18465	0	53.447051	33.397424	0
18	102	141.43385	297.048	0	67.008019	45.197479	50
19	102	141.9752	296.9364	0	74.2807	50.102965	50
20	102	142.5166	296.83915	0	79.299063	53.487894	50
21	102	143.05795	296.75605	0	81.924451	55.25874	50
22	102	143.5993	296.68695	0	82.051721	55.344584	50
23	102	144.14065	296.63175	0	79.639471	53.717501	50
24	102	144.682	296.59025	0	74.699764	50.385627	50
25	102	145.2234	296.5624	0	67.315127	45.404627	50
26	102	145.76475	296.54825	0	57.632954	38.873918	50
27	102	146.3061	296.5477	0	45.853834	30.928802	50
28	102	146.8593	296.56125	0	30.460997	20.546202	50

Attachment 14.1

29	102	147.42435	296.58965	0	11.715849	7.9024399	50
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A-A' Proposed, Seismic

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File Information

Title: A-A' Proposed
 Created By: Keven Hoffmann
 Revision Number: 22
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 1:32:56 PM
 File Name: 3519.01 A-A' Proposed.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 1:33:02 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

A-A' Proposed, Seismic

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Fill

Model: Mohr-Coulomb
 Unit Weight: 120 pcf
 Cohesion: 0 psf
 Phi: 30 °
 Phi-B: 0 °

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf

Phi: 34 °
Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 313.58) ft
Left-Zone Right Coordinate: (131.9932, 301.76022) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (147.70688, 296.60756) ft
Right-Zone Right Coordinate: (625, 228.6) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.58) ft
Right Coordinate: (625, 228.6) ft

Seismic Loads

Horz Seismic Load: 0.1668
Ignore seismic load in strength: No

Regions

	Material	Points
Region 1	Unweathered Till	54,1,2,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,56,55
Region 2	Proposed Fill	58,59,64,66,5,4,3
Region 3	Fill	3,4,5,66,65,29,31,28
Region 4	Fill	65,62,27,67,29
Region 5	Proposed Fill	62,63,70,68,32,27
Region 6	Weathered Till	28,31,29,67,27,32,68,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,53,57,5
Region 7	Proposed Fill	62,69,70,63

Points

	X (ft)	Y (ft)
Point 1	0	200
Point 2	625	200
Point 3	0	311.8
Point 4	25	309.8
Point 5	50	306.3
Point 6	125	293
Point 7	150	291.2
Point 8	175	277.4
Point 9	200	266.7
Point 10	225	257.5
Point 11	250	256
Point 12	275	254.7
Point 13	300	251
Point 14	325	248.7
Point 15	350	247.4
Point 16	375	243.1
Point 17	400	239.7
Point 18	425	236.6
Point 19	450	232.3
Point 20	475	228.9
Point 21	500	226.1
Point 22	525	226.5
Point 23	550	226.4
Point 24	575	220.2
Point 25	600	222.2

Point 26	625	223.6
Point 27	103	298
Point 28	0	307.3
Point 29	50	301.8
Point 30	75	302.2
Point 31	25	305.4
Point 32	125	298
Point 33	150	296.2
Point 34	175	282.4
Point 35	200	271.7
Point 36	225	262.5
Point 37	250	261
Point 38	275	259.7
Point 39	300	256
Point 40	325	253.7
Point 41	350	252.4
Point 42	375	248.1
Point 43	400	244.7
Point 44	425	241.6
Point 45	450	237.3
Point 46	475	233.9
Point 47	500	231.1
Point 48	525	231.5
Point 49	550	231.4
Point 50	575	225.2
Point 51	600	227.2
Point 52	625	228.6
Point 53	103	293
Point 54	0	302.3
Point 55	25	300.4
Point 56	50	296.8
Point 57	75	297.2
Point 58	0	313.58
Point 59	25	312.8
Point 60	50	310.19
Point 61	75	302.8
Point 62	100	302.8
Point 63	125	299.8
Point 64	45	312.8
Point 65	65	302.8
Point 66	56.76804	306.66996
Point 67	75.19098	298.35389
Point 68	146.57677	296.80842
Point 69	140	301.5
Point 70	140.54174	297.64517

Critical Slip Surfaces

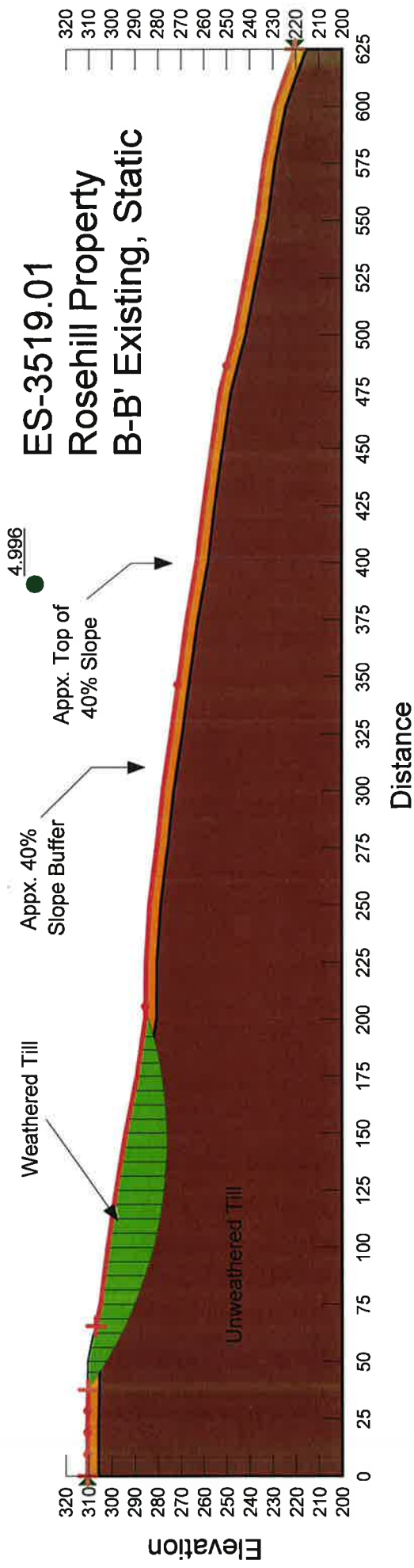
	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	102	1.354	(146.059, 318.119)	21.574	(131.993, 301.76)	(147.707, 296.608)

Slices of Slip Surface: 102

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	102	132.2615	301.537	0	18.793045	11.743198	0
2	102	132.79805	301.1047	0	54.154694	33.839609	0
3	102	133.3346	300.6996	0	86.051252	53.77079	0
4	102	133.8712	300.3199	0	115.37044	72.091455	0
5	102	134.40775	299.964	0	142.88372	89.283656	0
6	102	134.9443	299.63055	0	169.27987	105.7778	0
7	102	135.4809	299.31835	0	195.15372	121.94558	0
8	102	136.01745	299.0263	0	221.04637	138.1251	0
9	102	136.554	298.7535	0	247.42565	154.60871	0
10	102	137.0906	298.49915	0	274.67559	171.63636	0
11	102	137.62715	298.2626	0	303.11795	189.40911	0
12	102	138.1637	298.0432	0	332.95125	208.05103	0
13	102	138.69335	297.84275	0	363.81521	227.33698	0
14	102	139.216	297.6604	0	395.55555	247.17054	0
15	102	139.73865	297.4929	0	428.30035	267.63176	0
16	102	140.27085	297.33735	0	250.67416	156.6386	0
17	102	140.85245	297.18465	0	58.033446	36.263322	0
18	102	141.43385	297.048	0	88.651794	59.79639	50
19	102	141.9752	296.9364	0	99.343838	67.008265	50
20	102	142.5166	296.83915	0	106.83508	72.061171	50
21	102	143.05795	296.75605	0	110.74599	74.699116	50
22	102	143.5993	296.68695	0	110.82332	74.751272	50
23	102	144.14065	296.63175	0	106.99122	72.166488	50

Attachment 14.1

24	102	144.682	296.59025	0	99.366798	67.023751	50
25	102	145.2234	296.5624	0	88.265158	59.535601	50
26	102	145.76475	296.54825	0	74.169436	50.027916	50
27	102	146.3061	296.5477	0	57.680707	38.906128	50
28	102	146.8593	296.56125	0	37.565143	25.338009	50
29	102	147.42435	296.58965	0	14.519853	9.7937646	50



B-B' Existing, Static

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File Information

Title: B-B' Existing
 Created By: Keven Hoffmann
 Revision Number: 15
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 2:22:57 PM
 File Name: 3519.01 B-B' Existing.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 2:23:04 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

B-B' Existing, Static

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf
 Phi: 34 °
 Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
 Left-Zone Left Coordinate: (0, 310.8) ft

Left-Zone Right Coordinate: (37.60653, 310.59744) ft
 Left-Zone Increment: 4
 Right Projection: Range
 Right-Zone Left Coordinate: (65.37424, 307.10216) ft
 Right-Zone Right Coordinate: (625, 220.6) ft
 Right-Zone Increment: 4
 Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 310.8) ft
 Right Coordinate: (625, 220.6) ft

Regions

	Material	Points
Region 1	Weathered Till	29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
Region 2	Unweathered Till	1,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2

Points

	X (ft)	Y (ft)
Point 1	0	305.8
Point 2	25	305.9
Point 3	50	305.3
Point 4	75	300.1
Point 5	100	297
Point 6	125	293.3
Point 7	150	289.2
Point 8	175	284.2
Point 9	200	280.5
Point 10	225	280.2
Point 11	250	278.5
Point 12	275	275.5
Point 13	300	272.8
Point 14	325	269.1
Point 15	350	265.7
Point 16	375	262.4
Point 17	400	258
Point 18	425	255
Point 19	450	251.6
Point 20	475	247.9
Point 21	500	241.5
Point 22	525	236.8
Point 23	550	232.2
Point 24	575	229
Point 25	600	224.2
Point 26	625	215.6
Point 27	625	200
Point 28	0	200
Point 29	0	310.8
Point 30	25	310.9
Point 31	50	310.3
Point 32	75	305.1
Point 33	100	302
Point 34	125	298.3
Point 35	150	294.2
Point 36	175	289.2
Point 37	200	285.5
Point 38	225	285.2
Point 39	250	283.5
Point 40	275	280.5
Point 41	300	277.8
Point 42	325	274.1
Point 43	350	270.7
Point 44	375	267.4
Point 45	400	263
Point 46	425	260
Point 47	450	256.6
Point 48	475	252.9
Point 49	500	246.5
Point 50	525	241.8
Point 51	550	237.2
Point 52	575	234

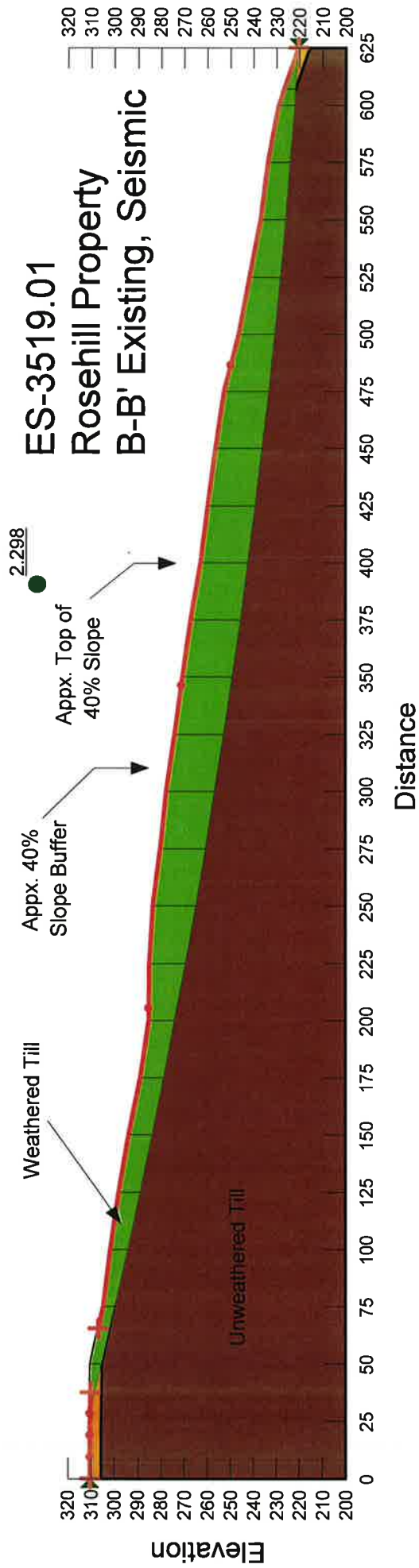
Point 53	600	229.2
Point 54	625	220.6

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	107	4.996	(146.591, 465.231)	189.18	(37.6065, 310.597)	(205.435, 285.435)

Slices of Slip Surface: 107

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	107	41.4855	308.00435	0	277.10657	186.91074	50
2	107	47.682235	303.9895	0	707.6631	477.32478	100
3	107	53.125	300.79145	0	985.98481	665.05515	100
4	107	59.375	297.39135	0	1220.1798	823.02168	100
5	107	65.625	294.28735	0	1423.9079	960.43798	100
6	107	71.875	291.4635	0	1600.2599	1079.3889	100
7	107	78.125	288.9064	0	1781.9011	1201.9075	100
8	107	84.375	286.60455	0	1971.0607	1329.4972	100
9	107	90.625	284.5481	0	2138.6342	1442.527	100
10	107	96.875	282.7288	0	2285.2046	1541.39	100
11	107	103.125	281.13965	0	2401.954	1620.1384	100
12	107	109.375	279.7747	0	2488.1549	1678.2817	100
13	107	115.625	278.629	0	2551.1899	1720.7993	100
14	107	121.875	277.69855	0	2590.081	1747.0317	100
15	107	128.125	276.98015	0	2596.4976	1751.3598	100
16	107	134.375	276.47135	0	2568.5462	1732.5063	100
17	107	140.625	276.1705	0	2510.2705	1693.1988	100
18	107	146.875	276.07655	0	2420.1573	1632.4167	100
19	107	153.125	276.1892	0	2282.1573	1539.3345	100
20	107	159.375	276.5089	0	2095.0388	1413.1215	100
21	107	165.625	277.03665	0	1872.6866	1263.1431	100
22	107	171.875	277.7742	0	1615.6106	1089.7431	100
23	107	177.87665	278.67815	0	1356.9878	915.29983	100
24	107	183.62995	279.73495	0	1100.9592	742.60637	100
25	107	189.38325	280.9774	0	818.7508	552.25439	100
26	107	196.12995	282.6958	0	451.28204	304.39358	50
27	107	202.71745	284.59045	0	118.89983	80.198951	50



B-B' Existing, Seismic

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File Information

Title: B-B' Existing
 Created By: Keven Hoffmann
 Revision Number: 15
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 2:22:57 PM
 File Name: 3519.01 B-B' Existing.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 2:23:02 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

B-B' Existing, Seismic

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf
 Phi: 34 °
 Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
 Left-Zone Left Coordinate: (0, 310.8) ft

Left-Zone Right Coordinate: (37.60653, 310.59744) ft
 Left-Zone Increment: 4
 Right Projection: Range
 Right-Zone Left Coordinate: (65.37424, 307.10216) ft
 Right-Zone Right Coordinate: (625, 220.6) ft
 Right-Zone Increment: 4
 Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 310.8) ft
 Right Coordinate: (625, 220.6) ft

Seismic Loads

Horz Seismic Load: 0.1668
 Ignore seismic load in strength: No

Regions

	Material	Points
Region 1	Weathered Till	29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
Region 2	Unweathered Till	1,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2

Points

	X (ft)	Y (ft)
Point 1	0	305.8
Point 2	25	305.9
Point 3	50	305.3
Point 4	75	300.1
Point 5	100	297
Point 6	125	293.3
Point 7	150	289.2
Point 8	175	284.2
Point 9	200	280.5
Point 10	225	280.2
Point 11	250	278.5
Point 12	275	275.5
Point 13	300	272.8
Point 14	325	269.1
Point 15	350	265.7
Point 16	375	262.4
Point 17	400	258
Point 18	425	255
Point 19	450	251.6
Point 20	475	247.9
Point 21	500	241.5
Point 22	525	236.8
Point 23	550	232.2
Point 24	575	229
Point 25	600	224.2
Point 26	625	215.6
Point 27	625	200
Point 28	0	200
Point 29	0	310.8
Point 30	25	310.9
Point 31	50	310.3
Point 32	75	305.1
Point 33	100	302
Point 34	125	298.3
Point 35	150	294.2
Point 36	175	289.2
Point 37	200	285.5
Point 38	225	285.2
Point 39	250	283.5
Point 40	275	280.5
Point 41	300	277.8
Point 42	325	274.1
Point 43	350	270.7
Point 44	375	267.4
Point 45	400	263
Point 46	425	260
Point 47	450	256.6

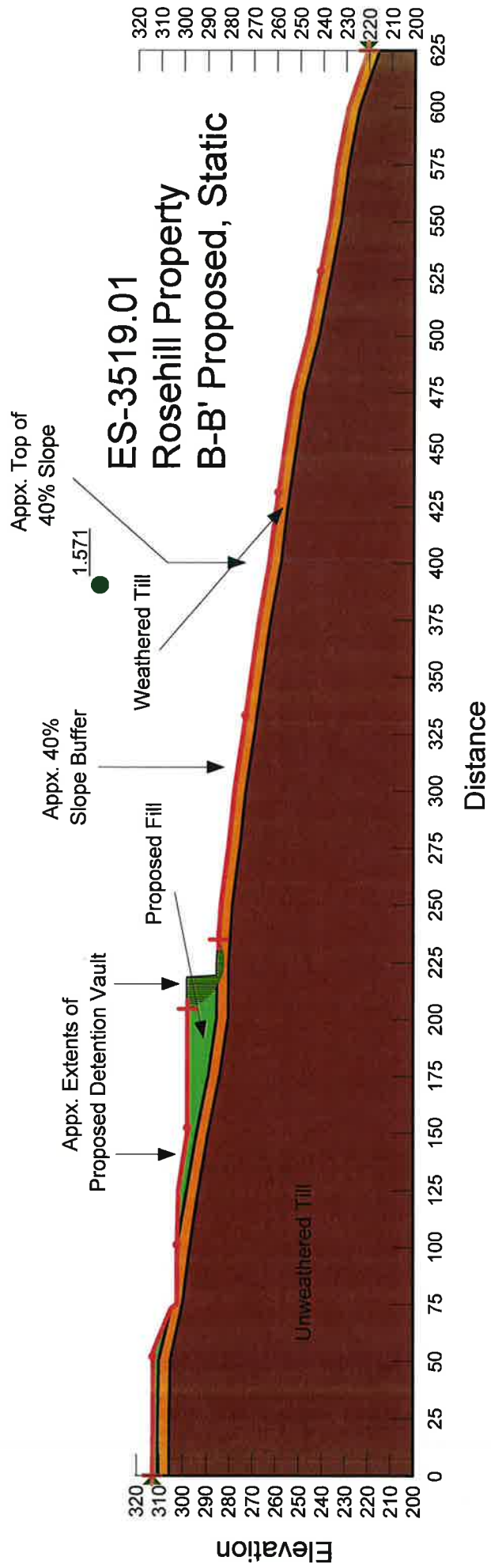
Point 48	475	252.9
Point 49	500	246.5
Point 50	525	241.8
Point 51	550	237.2
Point 52	575	234
Point 53	600	229.2
Point 54	625	220.6

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	96	2.298	(850.074, 3728.28)	3514.897	(28.2067, 310.823)	(625, 220.6)

Slices of Slip Surface: 96

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	96	39.103325	308.23915	0	266.45641	179.72712	50
2	96	57.584465	303.9001	0	558.82398	376.93154	50
3	96	70.084465	301.0262	0	586.88116	395.85634	100
4	96	87.5	297.12935	0	742.52245	500.83772	100
5	96	112.5	291.66845	0	985.12669	664.47635	100
6	96	137.5	286.3978	0	1147.5452	774.02898	100
7	96	162.5	281.3165	0	1212.1992	817.63868	100
8	96	187.5	276.42375	0	1278.8935	862.62459	100
9	96	212.5	271.71875	0	1601.2679	1080.0688	100
10	96	237.5	267.20075	0	2021.5814	1363.5739	100
11	96	262.5	262.86895	0	2262.3114	1525.9483	100
12	96	287.5	258.7227	0	2423.3896	1634.5969	100
13	96	312.5	254.76135	0	2522.0159	1701.1212	100
14	96	337.5	250.98425	0	2557.6025	1725.1247	100
15	96	362.5	247.3908	0	2595.4224	1750.6345	100
16	96	387.5	243.9804	0	2551.2156	1720.8167	100
17	96	412.5	240.75255	0	2502.4597	1687.9304	100
18	96	437.5	237.70675	0	2491.3383	1680.4289	100
19	96	462.5	234.8425	0	2414.9836	1628.927	100
20	96	487.5	232.15935	0	2133.2788	1438.9147	100
21	96	512.5	229.6569	0	1766.5959	1191.584	100
22	96	537.5	227.3348	0	1485.4116	1001.9228	100
23	96	562.5	225.19265	0	1272.2003	858.10995	100
24	96	587.5	223.23005	0	1023.572	690.408	100
25	96	603.48295	222.04865	0	727.51721	490.71656	100
26	96	615.98295	221.20185	0	305.43419	206.01796	50



B-B' Proposed, Static

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File Information

Title: B-B' Proposed
 Created By: Keven Hoffmann
 Revision Number: 19
 Last Edited By: Keven Hoffmann
 Date: 4/30/2015
 Time: 2:11:39 PM
 File Name: 3519.01 B-B' Proposed.gsz
 Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
 Last Solved Date: 4/30/2015
 Last Solved Time: 2:11:45 PM

Project Settings

Length(L) Units: feet
 Time(t) Units: Seconds
 Force(F) Units: lbf
 Pressure(p) Units: psf
 Strength Units: psf
 Unit Weight of Water: 62.4 pcf
 View: 2D

Analysis Settings

B-B' Proposed, Static

Kind: SLOPE/W
 Method: Morgenstern-Price
 Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
 SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
 FOS Distribution
 FOS Calculation Option: Constant
 Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Weathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 50 psf
 Phi: 34 °
 Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 100 psf
 Phi: 34 °
 Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
 Unit Weight: 125 pcf
 Cohesion: 0 psf

Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 313.38) ft
Left-Zone Right Coordinate: (204.5152, 298) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (234.96219, 284.52257) ft
Right-Zone Right Coordinate: (625, 220.6) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.38) ft
Right Coordinate: (625, 220.6) ft

Regions

	Material	Points
Region 1	Proposed Fill	54,55,56,64,65,31,30,29
Region 2	Weathered Till	65,57,58,33,34,35,36,66,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,29,3
Region 3	Proposed Fill	58,59,60,61,62,63,66,36,35,34,33
Region 4	Unweathered Till	1,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2

Points

	X (ft)	Y (ft)
Point 1	0	305.8
Point 2	25	305.9
Point 3	50	305.3
Point 4	75	300.1
Point 5	100	297
Point 6	125	293.3
Point 7	150	289.2
Point 8	175	284.2
Point 9	200	280.5
Point 10	225	280.2
Point 11	250	278.5
Point 12	275	275.5
Point 13	300	272.8
Point 14	325	269.1
Point 15	350	265.7
Point 16	375	262.4
Point 17	400	258
Point 18	425	255
Point 19	450	251.6
Point 20	475	247.9
Point 21	500	241.5
Point 22	525	236.8
Point 23	550	232.2
Point 24	575	229
Point 25	600	224.2
Point 26	625	215.6
Point 27	625	200
Point 28	0	200
Point 29	0	310.8
Point 30	25	310.9
Point 31	50	310.3
Point 32	100	302
Point 33	125	298.3
Point 34	150	294.2
Point 35	175	289.2
Point 36	200	285.5
Point 37	225	285.2
Point 38	250	283.5
Point 39	275	280.5
Point 40	300	277.8
Point 41	325	274.1
Point 42	350	270.7

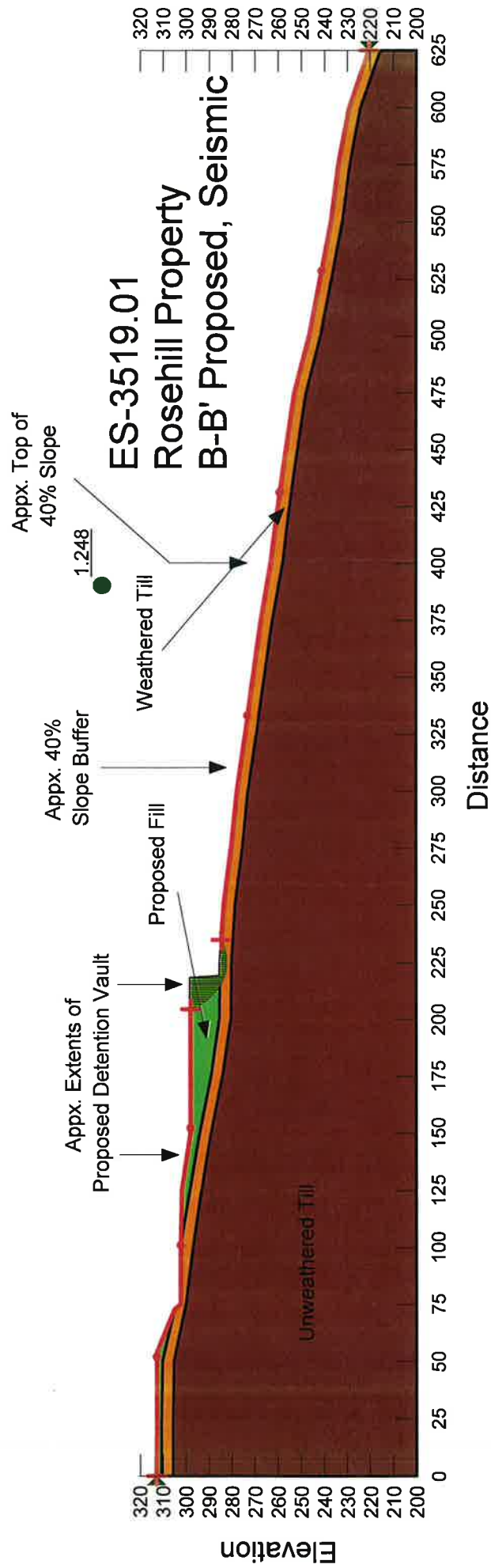
Point 43	375	267.4
Point 44	400	263
Point 45	425	260
Point 46	450	256.6
Point 47	475	252.9
Point 48	500	246.5
Point 49	525	241.8
Point 50	550	237.2
Point 51	575	234
Point 52	600	229.2
Point 53	625	220.6
Point 54	0	313.38
Point 55	25	313
Point 56	50	313
Point 57	75	302.4
Point 58	100	302.4
Point 59	125	301.94
Point 60	150	298
Point 61	175	298
Point 62	200	298
Point 63	218	298
Point 64	54	313
Point 65	73	305
Point 66	218.96896	285.27237

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	104	1.571	(225.288, 303.798)	21.567	(204.515, 298)	(234.962, 284.523)

Slices of Slip Surface: 104

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	104	205.05045	296.5131	0	83.250358	52.020597	0
2	104	206.1209	293.98115	0	253.2521	158.24947	0
3	104	207.19135	292.1076	0	392.74199	245.41243	0
4	104	208.26185	290.58915	0	515.04196	321.83393	0
5	104	209.3323	289.30975	0	627.79847	392.29202	0
6	104	210.40275	288.20925	0	736.02737	459.92095	0
7	104	211.47325	287.2513	0	843.23405	526.91111	0
8	104	212.5437	286.41205	0	952.10828	594.94329	0
9	104	213.61415	285.67495	0	1064.5316	665.19316	0
10	104	214.63075	285.0565	0	1168.6792	788.28406	50
11	104	215.5934	284.5405	0	1284.0652	866.11292	50
12	104	216.55605	284.085	0	1403.9853	947.00007	50
13	104	217.5187	283.68585	0	1528.0379	1030.6746	50
14	104	218.4845	283.3388	0	929.60557	627.02688	50
15	104	219.47155	283.0369	0	267.67496	180.54904	50
16	104	220.4767	282.781	0	329.83668	222.47765	50
17	104	221.4819	282.5758	0	388.68521	262.17148	50
18	104	222.4871	282.41985	0	442.47927	298.45604	50
19	104	223.49225	282.31195	0	489.1452	329.9326	50
20	104	224.4974	282.2515	0	526.32102	355.00801	50
21	104	225.4981	282.23795	0	547.3135	369.16762	50
22	104	226.4943	282.2707	0	549.8097	370.85132	50
23	104	227.49055	282.34975	0	536.65809	361.98045	50
24	104	228.4868	282.4756	0	507.20394	342.11337	50
25	104	229.483	282.6491	0	461.79355	311.48368	50
26	104	230.4792	282.87145	0	401.7681	270.996	50
27	104	231.4754	283.14425	0	329.33927	222.14214	50
28	104	232.47165	283.4695	0	247.32394	166.8221	50
29	104	233.4679	283.84975	0	158.7508	107.07877	50
30	104	234.4641	284.2883	0	66.498926	44.854092	50



B-B' Proposed, Seismic

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File Information

Title: B-B' Proposed
Created By: Keven Hoffmann
Revision Number: 19
Last Edited By: Keven Hoffmann
Date: 4/30/2015
Time: 2:11:39 PM
File Name: 3519.01 B-B' Proposed.gsz
Directory: Y:\Keven's Inbox\Project Folders\3519\SlopeW Files\
Last Solved Date: 4/30/2015
Last Solved Time: 2:11:43 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

B-B' Proposed, Seismic

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
 Side Function
 Interslice force function option: Half-Sine
 PWP Conditions Source: (none)
SlipSurface
 Direction of movement: Left to Right
 Allow Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: No
 Tension Crack
 Tension Crack Option: (none)
FOS Distribution
 FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1

Materials

Weathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 34 °
Phi-B: 0 °

Unweathered Till

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 100 psf
Phi: 34 °
Phi-B: 0 °

Proposed Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf

Phi: 32 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 313.38) ft
Left-Zone Right Coordinate: (204.5152, 298) ft
Left-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (234.96219, 284.52257) ft
Right-Zone Right Coordinate: (625, 220.6) ft
Right-Zone Increment: 4
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 313.38) ft
Right Coordinate: (625, 220.6) ft

Seismic Loads

Horz Seismic Load: 0.1668
Ignore seismic load in strength: No

Regions

	Material	Points
Region 1	Proposed Fill	54,55,56,64,65,31,30,29
Region 2	Weathered Till	65,57,58,33,34,35,36,66,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,29,3
Region 3	Proposed Fill	58,59,60,61,62,63,66,36,35,34,33
Region 4	Unweathered Till	1,28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2

Points

	X (ft)	Y (ft)
Point 1	0	305.8
Point 2	25	305.9
Point 3	50	305.3
Point 4	75	300.1
Point 5	100	297
Point 6	125	293.3
Point 7	150	289.2
Point 8	175	284.2
Point 9	200	280.5
Point 10	225	280.2
Point 11	250	278.5
Point 12	275	275.5
Point 13	300	272.8
Point 14	325	269.1
Point 15	350	265.7
Point 16	375	262.4
Point 17	400	258
Point 18	425	255
Point 19	450	251.6
Point 20	475	247.9
Point 21	500	241.5
Point 22	525	236.8
Point 23	550	232.2
Point 24	575	229
Point 25	600	224.2
Point 26	625	215.6
Point 27	625	200
Point 28	0	200
Point 29	0	310.8
Point 30	25	310.9
Point 31	50	310.3
Point 32	100	302
Point 33	125	298.3
Point 34	150	294.2
Point 35	175	289.2
Point 36	200	285.5
Point 37	225	285.2

Point 38	250	283.5
Point 39	275	280.5
Point 40	300	277.8
Point 41	325	274.1
Point 42	350	270.7
Point 43	375	267.4
Point 44	400	263
Point 45	425	260
Point 46	450	256.6
Point 47	475	252.9
Point 48	500	246.5
Point 49	525	241.8
Point 50	550	237.2
Point 51	575	234
Point 52	600	229.2
Point 53	625	220.6
Point 54	0	313.38
Point 55	25	313
Point 56	50	313
Point 57	75	302.4
Point 58	100	302.4
Point 59	125	301.94
Point 60	150	298
Point 61	175	298
Point 62	200	298
Point 63	218	298
Point 64	54	313
Point 65	73	305
Point 66	218.96896	285.27237

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	104	1.248	(225.288, 303.798)	21.567	(204.515, 298)	(234.962, 284.523)

Slices of Slip Surface: 104

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	104	205.05045	296.5131	0	71.546836	44.707425	0
2	104	206.1209	293.98115	0	216.18199	135.0855	0
3	104	207.19135	292.1076	0	331.00142	206.83264	0
4	104	208.26185	290.58915	0	428.96113	268.04466	0
5	104	209.3323	289.30975	0	518.02008	323.69487	0
6	104	210.40275	288.20925	0	603.78026	377.28378	0
7	104	211.47325	287.2513	0	690.58567	431.52582	0
8	104	212.5437	286.41205	0	782.05935	488.68492	0
9	104	213.61415	285.67495	0	881.46828	550.80251	0
10	104	214.63075	285.0565	0	988.52813	666.77064	50
11	104	215.5934	284.5405	0	1106.6584	746.45053	50
12	104	216.55605	284.085	0	1237.0116	834.37484	50
13	104	217.5187	283.68585	0	1380.7478	931.32617	50
14	104	218.4845	283.3388	0	858.62553	579.15023	50
15	104	219.47155	283.0369	0	261.56313	176.42656	50
16	104	220.4767	282.781	0	348.16525	234.84043	50
17	104	221.4819	282.5758	0	436.15821	294.19243	50
18	104	222.4871	282.41985	0	522.42877	352.38265	50
19	104	223.49225	282.31195	0	602.61055	406.46595	50
20	104	224.4974	282.2515	0	671.16369	452.70563	50
21	104	225.4981	282.23795	0	717.22791	483.77634	50
22	104	226.4943	282.2707	0	734.74997	495.59511	50
23	104	227.49055	282.34975	0	724.53435	488.70459	50
24	104	228.4868	282.4756	0	685.21272	462.18182	50
25	104	229.483	282.6491	0	618.51447	417.19328	50
26	104	230.4792	282.87145	0	529.09501	356.87909	50
27	104	231.4754	283.14425	0	423.67935	285.77533	50
28	104	232.47165	283.4695	0	309.64707	208.85959	50
29	104	233.4679	283.84975	0	193.81101	130.72718	50
30	104	234.4641	284.2883	0	81.336718	54.862309	50