UPDATE TO GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY ANALYSIS FOR BEYER BOULEVARD

SOUTHWEST VILLAGE
VESTING TENTATIVE MAP
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

TRI POINTE HOMES
SAN DIEGO, CALIFORNIA

FEBRUARY 16, 2022
PROJECT NO. 06847-42-05

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 06847-42-05
February 16, 2022

Tri Pointe Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Attention: Ms. April Tornillo

Subject: UPDATE TO GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY ANALYSIS FOR BEYER BOULEVARD SOUTHWEST VILLAGE VESTING TENTATIVE MAP SAN DIEGO, CALIFORNIA

Reference: *Preliminary Geotechnical Investigation, Southwest Village, Vesting Tentative Map, San Diego, California*, prepared by Geocon Incorporated, dated March 28, 2019 (Project No. 06847-42-03).

Dear Ms. Tornillo

In accordance with your authorization, we have prepared this update to the referenced geotechnical investigation and performed additional slope stability analysis for the Beyer Boulevard extension that is planned for the Southwest Village project. To prepare this report we performed additional exploratory borings, geologic analysis, and laboratory testing. Field work on the County of San Diego property was not permitted at this time. The information provided herein updates previous slope stability analysis specific to Beyer Boulevard.

Based on this and previous geotechnical studies, it is our opinion that the proposed roadway can be developed as planned provided the recommendations presented in this report are implemented during design and construction. This opinion should be confirmed for the county portion of the roadway once exploratory work is permitted in this area.

If you have any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

Troy K. Reist
CEG 2408

David B. Evans
CEG 1860

RCM:TKR:DBE:am

(e-mail) Addressee

6960 Flanders Drive ■ San Diego, California 92121-2974 ■ Telephone 858.558.6900 ■ Fax 858.558.6159

TABLE OF CONTENTS

UPDATE TO GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY ANALYSIS

1. PURPOSE AND SCOPE

This report presents an update to the referenced geotechnical investigation for the Southwest Village project located south of Old Otay Mesa Road and Highway 905 in San Diego, California. This update is specific to the proposed Beyer Boulevard alignment which was shifted south from its original proposed location to reduce environmental impacts. To prepare this update we have performed additional field studies consisting of large-diameter and continuous core borings to evaluate the soil and geologic conditions within the new alignment. We have also performed slope stability analysis to provide buttress dimensions to mitigate potential instability.

The additional field study was performed in August 2021 and included excavating eleven large-diameter borings and five continuous core borings. Proposed field work on the County of San Diego property was not permitted at this time. The approximate locations of the borings and cores are shown on the Geologic Map (Figure 1). Geologic cross sections are provided on Figures 2 through 9. Logs of the borings and cores are contained in Appendix A. Photographs of the cores are also provided in Appendix A.

We performed laboratory testing on samples of soils obtained from the borings and cores to evaluate the compaction and shear strength characteristics for use in our slope stability analysis. The results of the laboratory tests are provided in Appendix B.

2. GEOLOGIC CONDITIONS

The geologic units encountered during our investigation were Landslide Debris, Very Old Paralic Deposits and the Otay Formation. A discussion of these units is contained in our March 2019 report. Information from our previous studies was considered during our current investigation, however, the additional subsurface data enabled refinement and in some cases reinterpretation of the geologic conditions. A revised geologic interpretation along the proposed roadway alignment is presented on the Geologic Map and Cross Sections (Figures 1 through 9). Figures 10 through 12 present photographs of the landslide and adjacent bedrock area in the vicinity of proposed Beyer Boulevard Station 15 through 20. The relationship between the geologic units is exposed in an excavation that was made during grading of a presumed “borrow site”.

3. SLOPE STABILITY EVALUATION

3.1 General

Analyses were performed to evaluate the stability of proposed cut slopes along the proposed Beyer Boulevard alignment. The location of the sixteen cross sections that were evaluated are shown on Figure 1 and presented on Figures 2 through 9. The output files and calculated factor of safety for each section analyzed for stability is presented in Appendix C, Figures C-1 through C-49.

The computer program GeoStudio 2018 (SLOPE/W) distributed by Geo-Slope International was utilized to perform the slope stability analyses. This program uses conventional slope stability equations and a two-dimensional limit-equilibrium method to calculate the factor of safety against deep-seated failure. For our analysis, Spencer's Method with a block failure mode was used for failure along landslide basal surfaces and in weak claystone beds and bedding plane shears. Spencer's Method satisfies both moment and force equilibrium. Spencer's Method with a circular failure mode was used for slopes where there was no landslide basal surface or bedding plane shears.

The computer program searches for the critical failure surface based on parameters inputted, including the location of the "left" and "right" sliding blocks. The critical failure surface for each analysis is shown on computer-generated output. The factor of safety is shown on each figure directly above the failure surface.

We have also performed seismic slope stability analyses on the most critical failure surfaces for each cross section. Our seismic analyses were performed in accordance with *Recommended Procedures for Implementation of DMG Special Publication 117A: Guidelines for Analyzing and Mitigating Landslide Hazards in California*, prepared by California Geological Survey (CGS), dated 2008.

The output files and calculated factor of safety for cross sections analyzed for both static and seismic stability analyses are presented in Appendix C and summarized in Table 3.5.

3.2 Shear Strength Parameters

Shear strength parameters used in the analyses are based on direct shear testing on samples obtained from the exploratory excavations performed for this and our previous study. For design, we used the average ultimate values for each geologic unit. A printout of the shear strength points and the average ultimate value for each geologic unit is provided on Figures B-1 and B-2 in Appendix B.

Table 3.2 provides a summary of the shear strength parameters used in the stability analyses. Soil with a minimum shear strength of ϕ = 25 degrees and C = 300 psf will be required for buttress and stability fills.

TABLE 3.2
SHEAR STRENGTH PARAMETERS

Soil Type	Angle of Internal Friction (degrees)	Cohesion (psf)
Qcf (compacted fill for buttress fill)	25	300
Qls (Landslide Debris)	31	300
Bedding Plane Shear and Slide Plane	8	0
To (Otay Formation)	29	400
Qvop (Very Old Paralic Deposits)	31	600

3.3 Static Slope Stability Analyses

Static slope stability analyses were performed using cross sections through proposed cut slopes along the Beyer Boulevard alignment. Our analyses were performed considering landslide basal surfaces, bedding plane shears (BPS) and weak clay beds encountered in the exploratory borings. Our analyses indicate buttresses with widths ranging from 15 to 35 feet wide will be required on most of the sections to provide a factor of safety of at least 1.5. Three of the sections (A, L, and M) required larger buttresses to provide a factor of safety of 1.5. Along Cross Sections A and M, we expect that remedial grading, which will be required to remove undocumented fill and alluvium, will provide an acceptable factor of safety. However, if alluvial removals do not extend to the estimated limits shown on the cross sections, a minimum buttress width of 55 feet (Section A) and 100 feet (Section M) will be required to provide a factor of safety of at least 1.5. Along Cross Section L, a buttress width of 210 feet is required.

Buttress keys should extend to a depth of at least 5 feet below the bedding plane shears or basal slide planes. The location, elevation, and width of the required stability buttresses are shown on the Geologic Map and on each cross section.

Weak claystones are common within the Otay Formation. We recommend all cut slopes that expose the Otay Formation be provided with a stability fill (minimum key width of 20 feet) to mitigate potential surficial instability. The approximate limits of recommended stability fills are shown on the Geologic Cross Sections.

With respect to shallow surficial stability, our analysis indicates the proposed slopes have a factor of safety of at least 1.5. Table 3.3. presents the surficial slope stability analysis.

TABLE 3.3
SURFICIAL SLOPE STABILITY EVALUATION

Parameter	Value
Slope Height, H	∞
Vertical Depth of Saturation, Z	5 Feet
Slope Inclination, I (Horizontal to Vertical)	2:1 (26.6 Degrees)
Soil Unit Weight, γ	130 pcf
Water Unit Weight, γ_W	62.4 pcf
Friction Angle, ϕ	25°
Cohesion, C	300 psf
Factor of Safety = $(C+(\gamma+\gamma_W)Z\cos^2 I \tan\phi)/(\gamma Z \sin I \cos I)$	1.7

Subdrains are recommended at the base of stability fills and buttresses. Chimney drains are also recommended along the temporary backcuts. The subdrain should consist of an 8-inch-diameter perforated PVC pipe placed at the base/heel of the stability fill/buttress backcut. The pipe should be covered by crushed gravel (approximately 6 cubic feet of gravel per lineal foot of pipe) surrounded by a filter fabric. The pipes should drain at a minimum gradient of 1 percent and outlet to a suitable location (storm drain system). A typical buttress drain detail is provided on Figure 14. If possible, we recommend outlet points be provided at horizontal spacing no greater than 300 feet. The drains should be connected to the storm drain system. The project civil engineer should detail the location and elevation of the drainage system on the grading plan.

3.4 Seismic Slope Stability Analyses

The seismic slope stability analysis was performed using an unweighted acceleration of 0.21g, corresponding to a 10 percent probability of exceedance in 50 years. A deaggregation analysis was performed using the *Unified Hazard Tool:* U.S. Geological Survey website, https://earthquake.usgs.gov/hazards/interactive. Based on the deaggregation analysis, a modal magnitude and modal distance of 6.12 and 11.1 kilometers, respectively, was determined for the project. A printout summary of the hazard contribution is shown after the stability figures in Appendix C.

Using the parameters discussed herein, an equivalent site acceleration, k_{EQ}, of 0.101g was calculated to perform the screening analysis, as shown on the seismic slope stability evaluation figures in Appendix C. Using this site acceleration, factors of safety ranging between 0.9 and 2.0 were

calculated on the critical sections. A slope is considered acceptable by the screening analysis if the calculated factor of safety is greater than 1.0 using k_{EQ}, therefore, all of the sections expect Cross Sections J, M, N, and O pass the screening analysis for seismic slope stability.

For Sections J, M, N, and O, we performed a displacement analysis using procedures recommended in Special Publication 117A. The seismic slope displacement analysis computes an estimated horizontal deflection using the seismic yield acceleration determined from the slope stability analysis and the maximum ground acceleration, modal magnitude, and modal distance determined from the deaggregation analysis. The computed yield acceleration (horizontal seismic coefficient corresponding to a factor of safety of 1.0) was 0.08g for each cross section (see Figures C-33B, C-40B, C-41B and 44B). The calculated horizontal deflection for each critical failure surface not passing the screening evaluation is estimated to be between 2 and 10 centimeters, which is considered acceptable. Special Publication 117A indicates that displacements less than 15 centimeters are unlikely to correspond to serious landslide movement and damage.

A summary of the seismic displacement analysis is presented in Table 3.5. The seismic slope displacement calculations are presented in Appendix C, Figures C-33C, C-40C, C-41C, and C-44C.

3.5 Summary

Slope stability analyses were conducted on each cross-section to evaluate the performance of the proposed slopes. The results of our analysis indicate that remedial grading in the form of buttressing will be required to achieve a factor of safety of at least 1.5 against deep seated and shallow instability. The geometry of slope buttressing proposed on the County of San Diego property should be confirmed once exploratory work is permitted in this area. Table 3.5 summarizes the results of the slope stability analyses. The calculated factor-of-safety and recommended stabilization method for each section is included on the table.

TABLE 3.5
SUMMARY OF STABILITY ANALYSES
AND RECOMMENDED STABILIZATION METHOD

Cross Section	Proposed Graded Minimum Factor of Safety		Deformation (cm)	Stabilization Method
	Static	Seismic		
A-A′	1.5	1.0	--	55-foot-wide buttress for landslide
B-B′	3.0	1.75	--	20-foot-wide stability fill
C-C′	1.5	1.1	--	20-foot-wide buttress for BPS and stability fill
D-D′	1.5	1.1	--	30-foot-wide buttress for BPS and 20-foot-wide stability fill
E-E′	1.5	1.2	--	20-foot-wide buttress for BPS and 20-foot-wide stability fill
F-F′	1.5	1.1	--	15 to 20-foot-wide buttress for BPS and 20-foot-wide stability fill
G-G′	1.6	1.2	--	20-foot-wide stability fill
H-H′	1.5	1.2	--	25-foot-wide buttress for BPS
I-I′	2.5	2.0	--	--
J-J′	1.5	0.9	10	--
L-L′	1.5	1.0	--	210-foot-wide buttress for landslide
M-M’	1.5	0.9	2	100-foot-wide buttress for landslide
N-N’	1.6	0.9	10	--
O-O’	1.6	0.9	7	--
P-P’	2.5	1.1	--	--

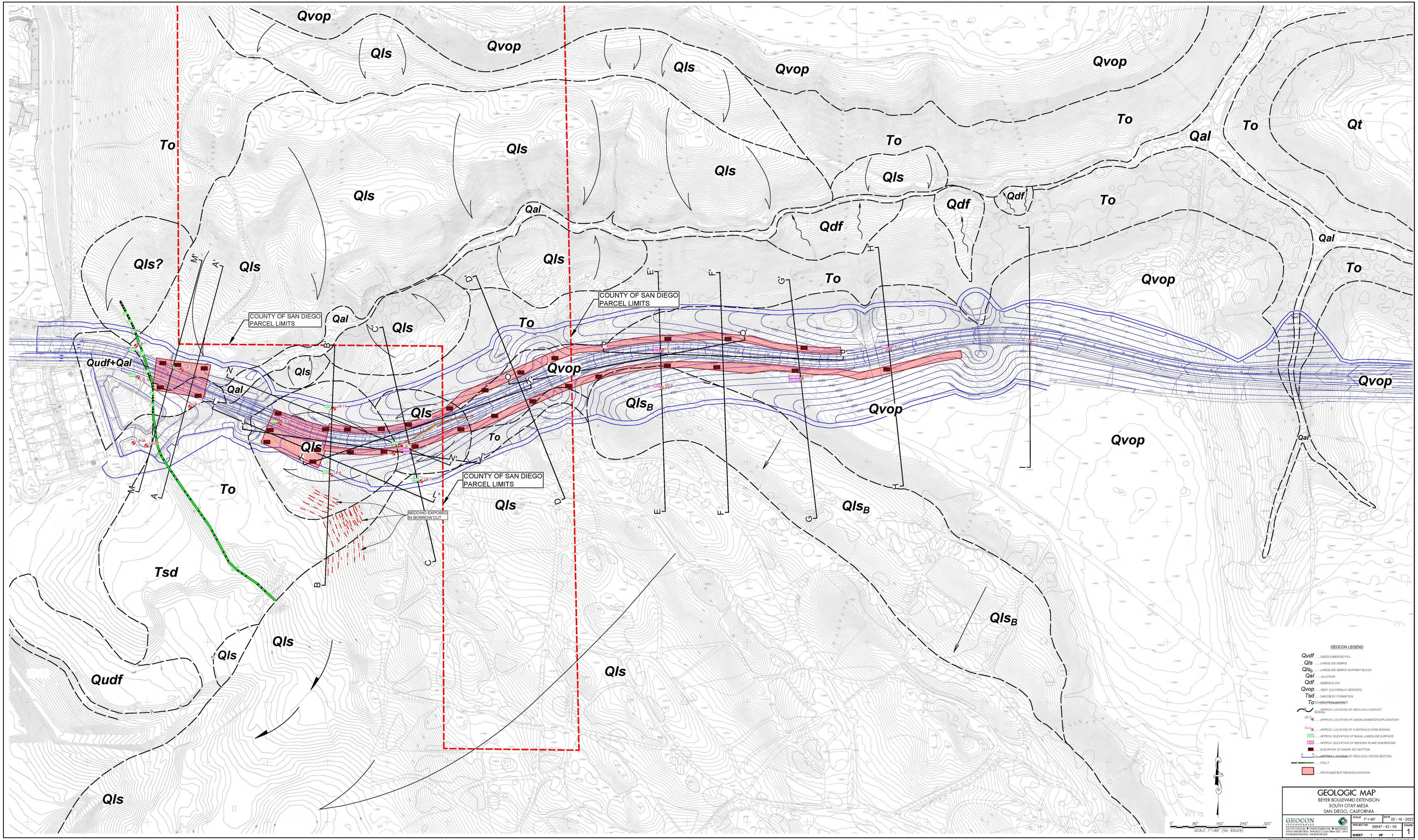
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



GEOCON LEGEND

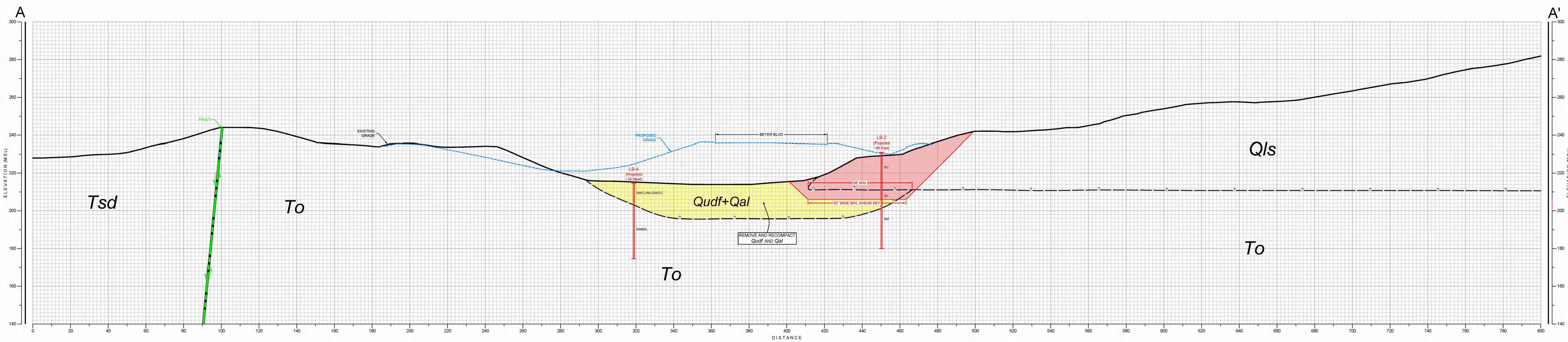
- Qudf — UNDOCUMENTED FILL
- Qls — LANDSLIDE DEBRIS
- Qls$_B$ — LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal — ALLUVIUM
- Qdf — DEBRIS FLOW
- Qvop — VERY OLD PARALIC DEPOSITS
- Tsd — SAN DIEGO FORMATION
- To — OTAY FORMATION
- APPROX. LOCATION OF GEOLOGIC CONTACT
- UB-1 — APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 — APPROX. LOCATION OF CONTINOUS CORE BORING
- BSA — APPROX. ELEVATION OF BASAL LANDSLIDE SURFACE
- BDS — APPROX. ELEVATION OF BEDDING PLANE SHEARZONE
- ELEVATION OF SHEAR KEY BOTTOM
- A — A' — LOCATION OF GEOLOGIC CROSS SECTION
- FAULT
- PROPOSED BUTTRESS EXCAVATION

GEOLOGIC MAP

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

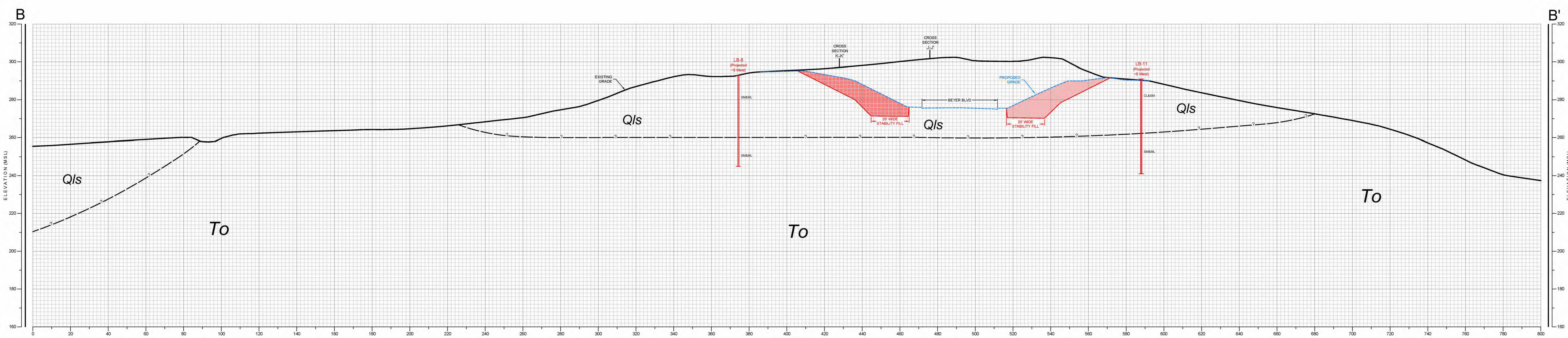
GEOCON INCORPORATED
GEOTECHNICAL ● ENVIRONMENTAL ● MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 80'
DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05
FIGURE	1
SHEET	1 OF 1



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

Qudf ........UNDOCUMENTED FILL

Qls ....LANDSLIDE DEBRIS

Qls_B ....LANDSLIDE DEBRIS INCIPIENT BLOCK

Qal ....ALLUVIUM

Qvop ....VERY OLD PARALIC DEPOSITS

Tsd ....SAN DIEGO FORMATION

To ....OTAY FORMATION

........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

LB-11 ....APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING

CC-4 ....APPROX. LOCATION OF CONTINOUS CORE BORING

........APPROX. LOCATION OF FAULT

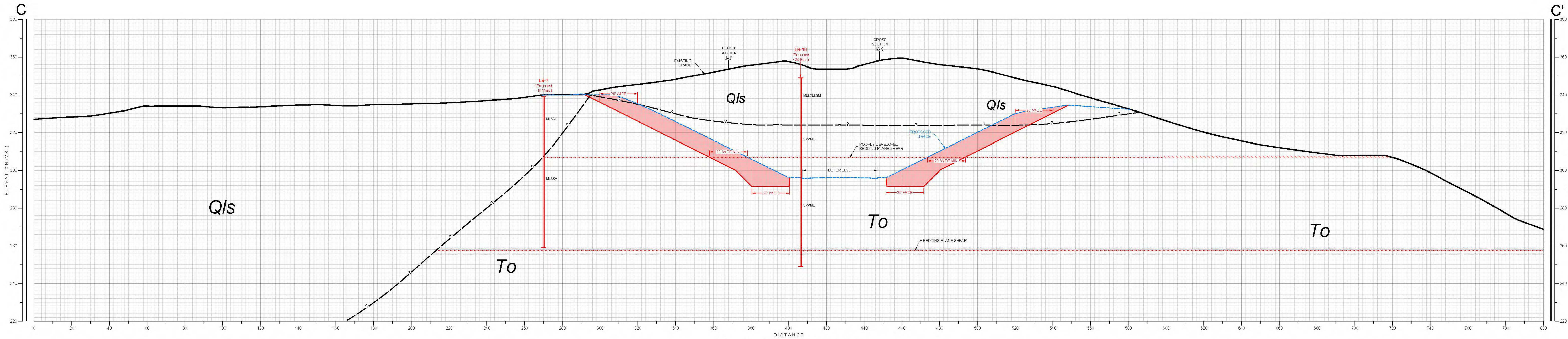
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

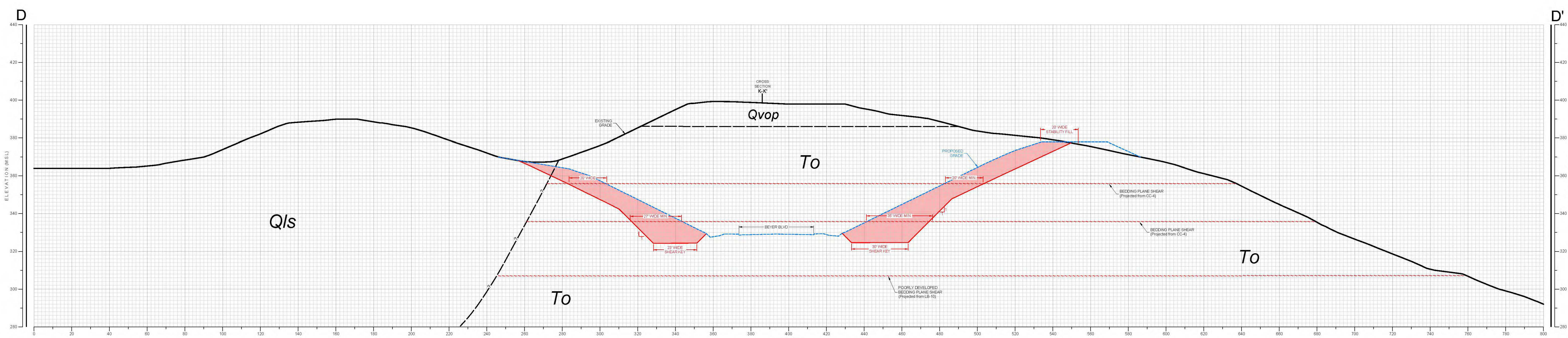
SCALE 1" = 20'	DATE 02 - 16 - 2022	
PROJECT NO. 06847 - 42 - 05		FIGURE 2
SHEET 1 OF 1		

Plotted:02/17/2022 9:30AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\SHEETS\06847-42-05 XSection-SV-BeyerBlvdExt.dwg



GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION D-D'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- *Qudf* .... UNDOCUMENTED FILL
- *Qls* .... LANDSLIDE DEBRIS
- *Qls_B* .... LANDSLIDE DEBRIS INCIPIENT BLOCK
- *Qal* .... ALLUVIUM
- *Qvop* .... VERY OLD PARALIC DEPOSITS
- *Tsd* .... SAN DIEGO FORMATION
- *To* .... OTAY FORMATION
- .... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-11 .... APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 .... APPROX. LOCATION OF CONTINOUS CORE BORING
- .... APPROX. LOCATION OF FAULT

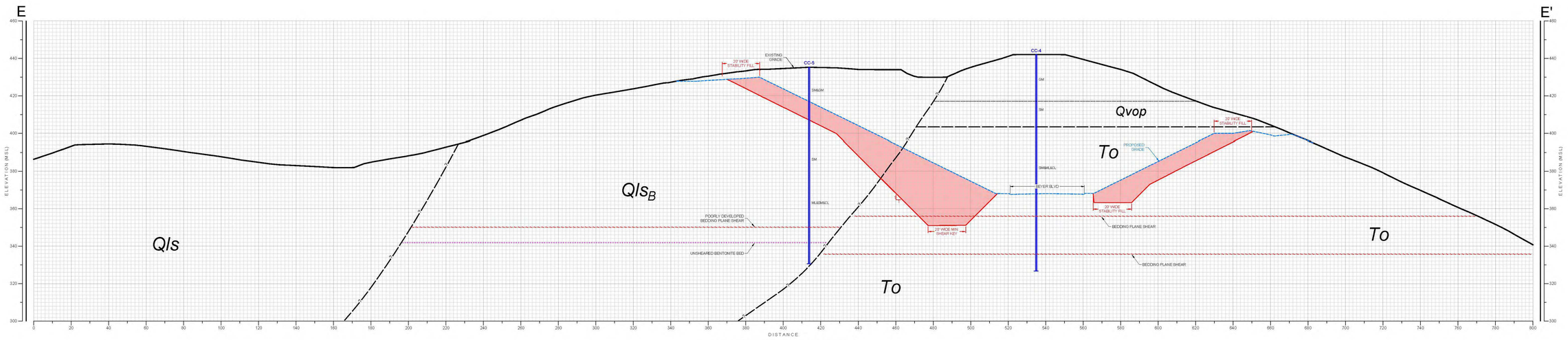
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

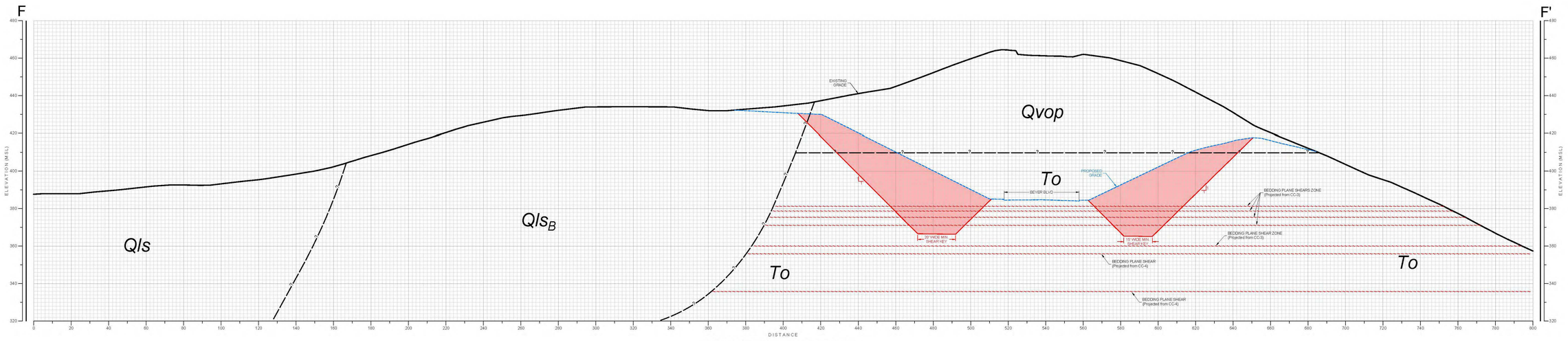
SCALE	1" = 20'
DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05
FIGURE	3
SHEET	1 OF 1

Plotted:02/17/2022 9:30AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\SHEETS\06847-42-05 XSection-SV-BeyerBlvdExt.dwg



GEOLOGIC CROSS-SECTION E-E'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION F-F'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qls ..... LANDSLIDE DEBRIS
- Qls_B ..... LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal ..... ALLUVIUM
- Qvop ..... VERY OLD PARALIC DEPOSITS
- Tsd ..... SAN DIEGO FORMATION
- To ..... OTAY FORMATION
- ?~?~? ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-1 ..... APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 ..... APPROX. LOCATION OF CONTINOUS CORE BORING
- ..... APPROX. LOCATION OF FAULT

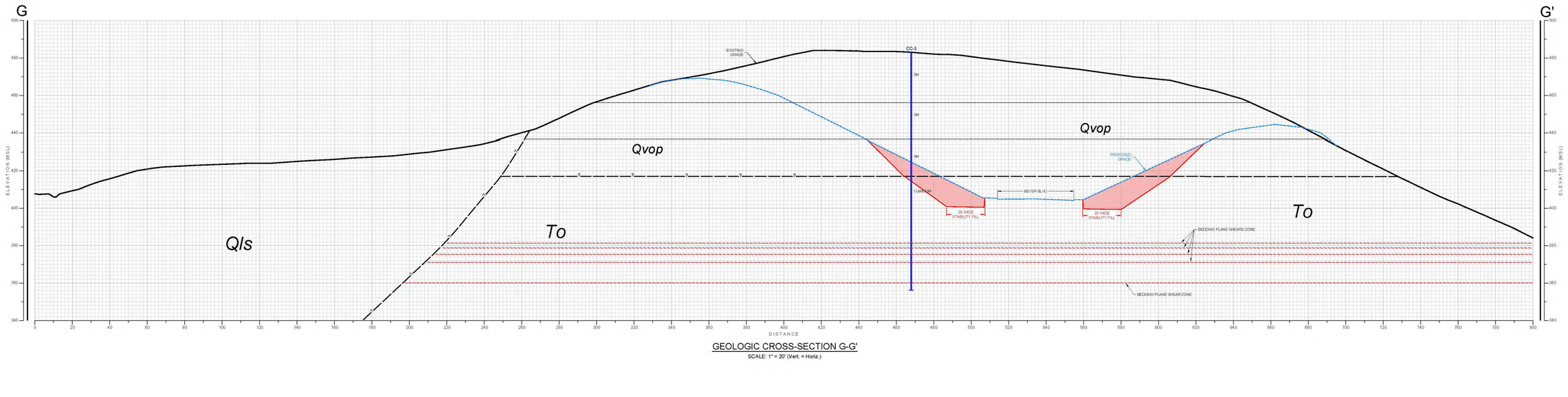
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

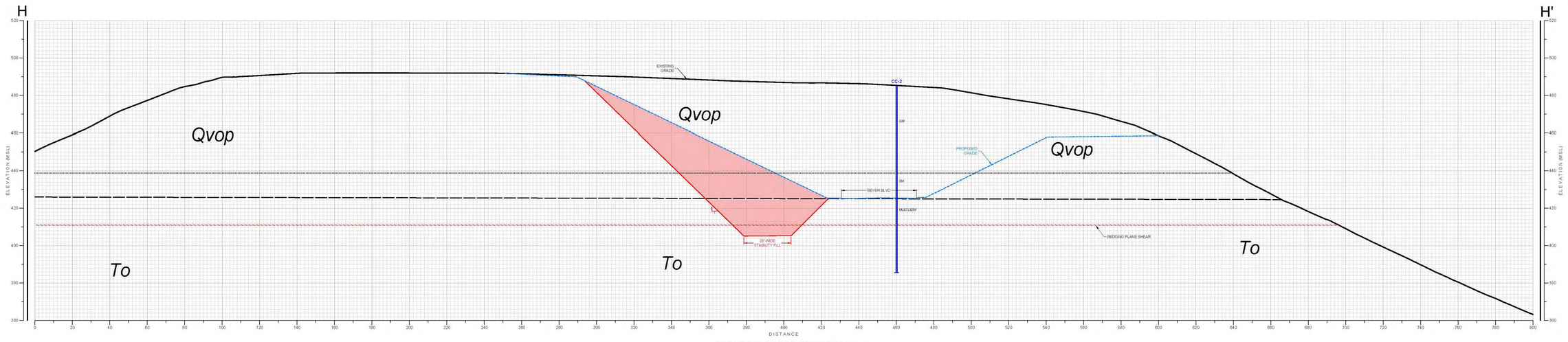
SCALE	1" = 20'	DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05	FIGURE	4
SHEET	1 OF 1		

Plotted:07/15/22 9:51AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southward Ho\gpj-Beyer Blvd Ext\06847-42-05 Southward Ho\gpj-Beyer Blvd Ext.dwg



GEOLOGIC CROSS-SECTION G-G'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION H-H

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf — UNDOCUMENTED FILL
- Qls — LANDSLIDE DEBRIS
- Qls_B — LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal — ALLUVIUM
- Qvop — VERY OLD PARALIC DEPOSITS
- Tsd — SAN DIEGO FORMATION
- To — OTAY FORMATION
- APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-11 — APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 — APPROX. LOCATION OF CONTINOUS CORE BORING
- APPROX. LOCATION OF FAULT

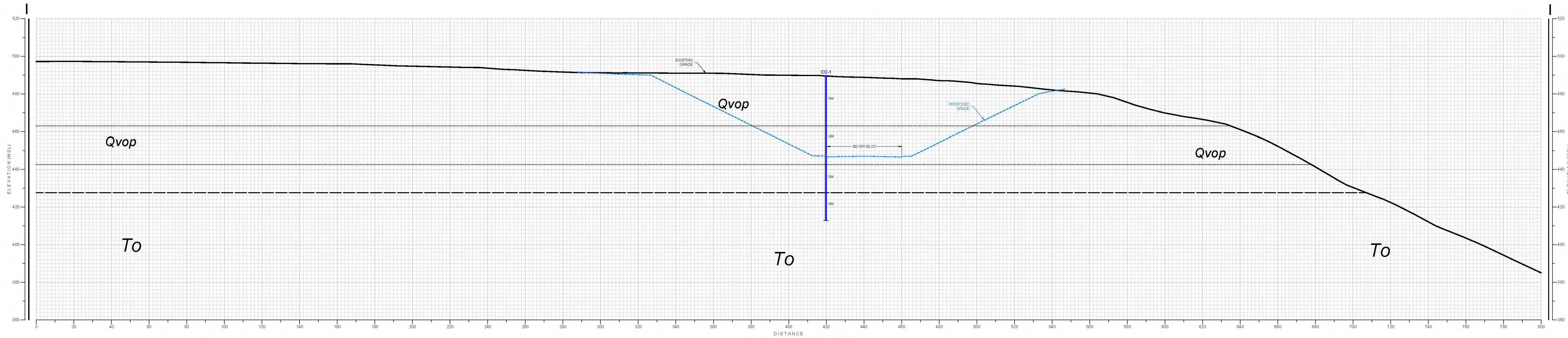
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ● ENVIRONMENTAL ● MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

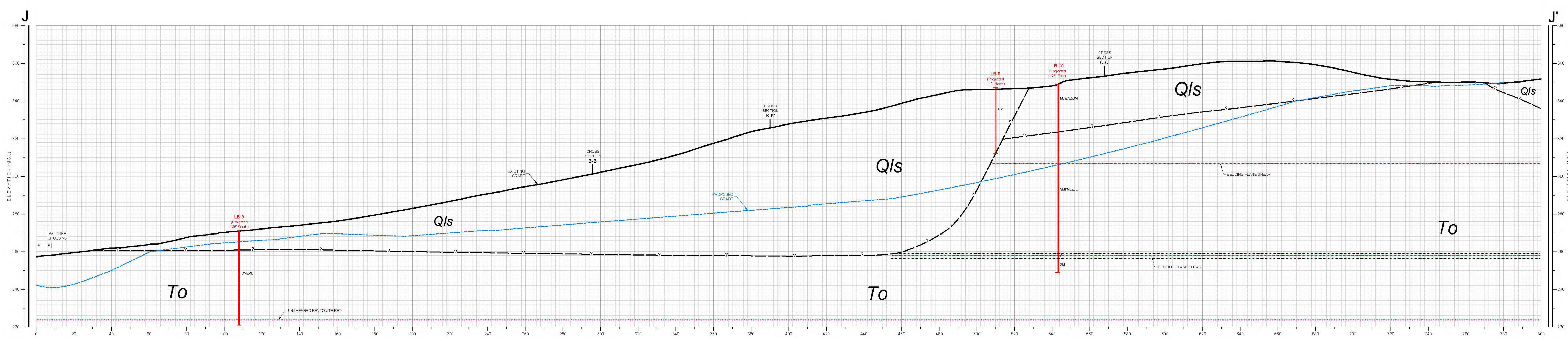
SCALE 1" = 20' | DATE 02 - 16 - 2022
PROJECT NO. 06847 - 42 - 05 | FIGURE 5
SHEET 1 OF 1

Plotted:02/17/2022 8:02AM | By:RUBEN AGUILAR | File Location:\\10FILE\GEOTECH\06847-42-05 Southward Ho\Agis Beyer Blvd Ext\GEOTECH\06847-42-05 G Section SV Beyer Blvd Ext.dwg



GEOLOGIC CROSS-SECTION I-I'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION J-J'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

Qudf	UNDOCUMENTED FILL
Qls	LANDSLIDE DEBRIS
Qls_B	LANDSLIDE DEBRIS INCIPIENT BLOCK
Qal	ALLUVIUM
Qvop	VERY OLD PARALIC DEPOSITS
Tsd	SAN DIEGO FORMATION
To	OTAY FORMATION
?	APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
LB-11	APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
CC-4	APPROX. LOCATION OF CONTINOUS CORE BORING
	APPROX. LOCATION OF FAULT

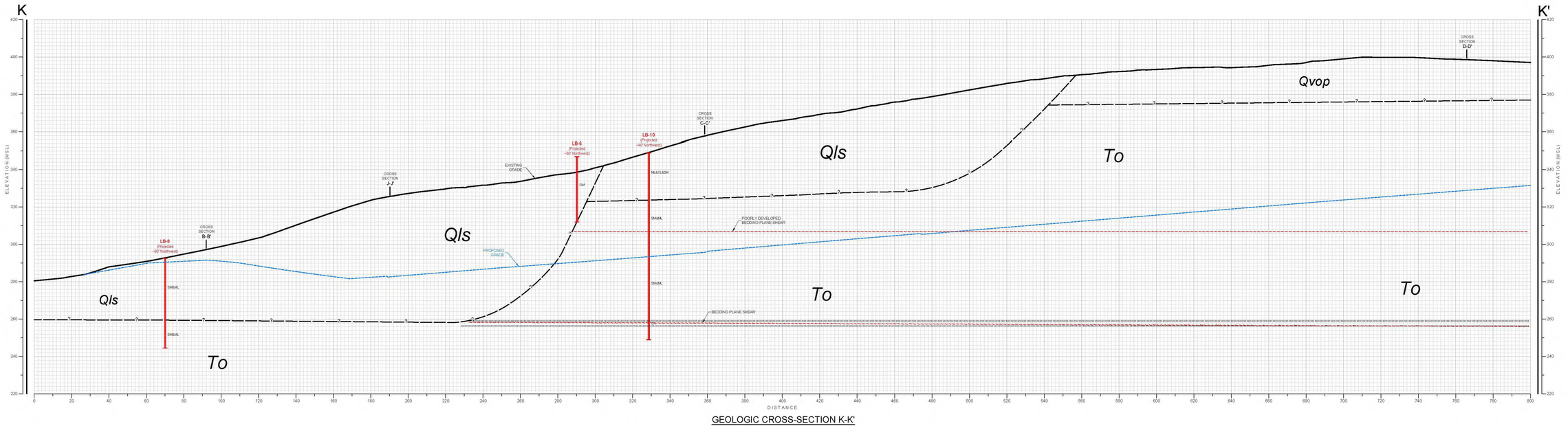
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

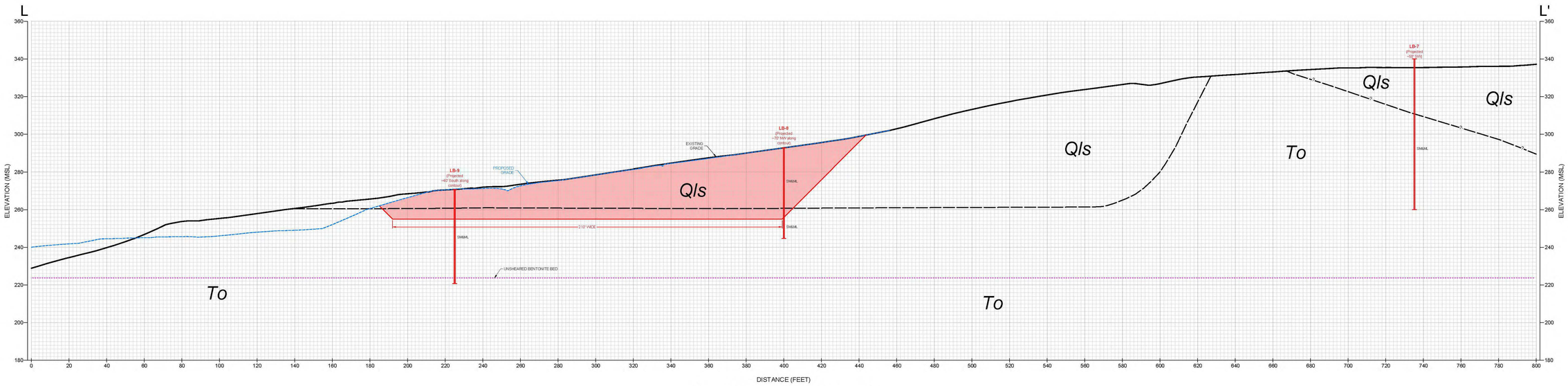
SCALE 1" = 20'	DATE 02 - 16 - 2022	
PROJECT NO. 06847 - 42 - 05		FIGURE 6
SHEET 1 OF 1		

Plotted:02/17/2022 9:39AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\SHEETS\06847-42-05 XSection-SV-BeyerBlvdExt.dwg



GEOLOGIC CROSS-SECTION K-K'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION L-L'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qls ..... LANDSLIDE DEBRIS
- Qls_B ..... LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal ..... ALLUVIUM
- Qvop ..... VERY OLD PARALIC DEPOSITS
- Tsd ..... SAN DIEGO FORMATION
- To ..... OTAY FORMATION
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-V1 ..... APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-1 ..... APPROX. LOCATION OF CONTINOUS CORE BORING
- ..... APPROX. LOCATION OF FAULT

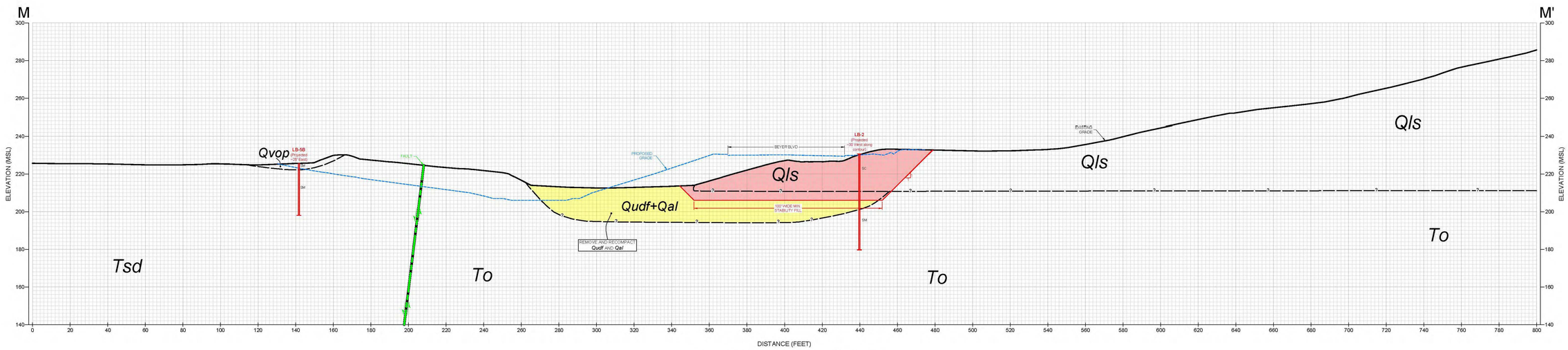
GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ● ENVIRONMENTAL ● MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

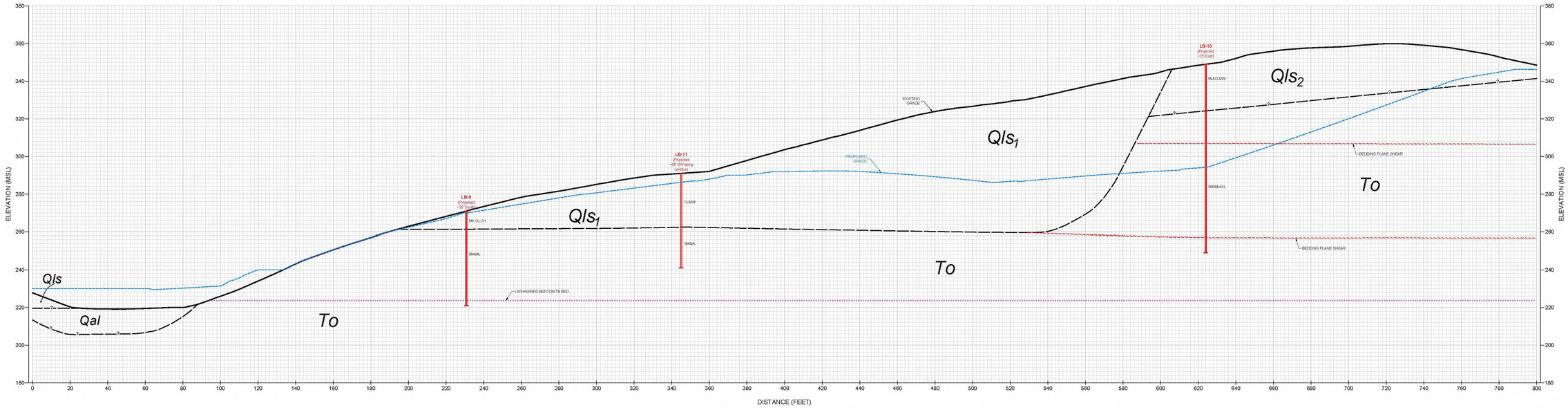
SCALE	1" = 20'	DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05	FIGURE	7
SHEET	1 OF 1		

Plotted:02/17/2022 3:03PM | By:ROBIN AGUILAR | File Location:*\PROJECTS\06847-42-05 Southwest Village Beyer Blvd EA\ASE\TS\06847-42-05 7 Section D-D' Beyer Blvd EA.dwg



GEOLOGIC CROSS-SECTION M-M'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION N-N'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

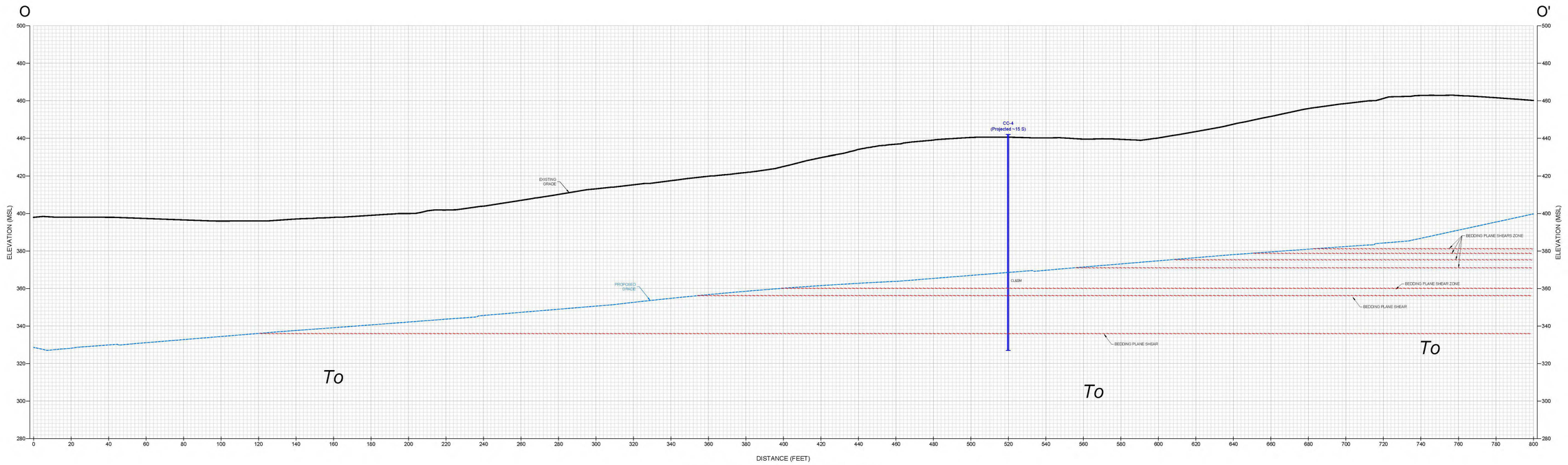
- Qudf ..... UNDOCUMENTED FILL
- Qls ..... LANDSLIDE DEBRIS
- Qls_B ..... LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal ..... ALLUVIUM
- Qvop ..... VERY OLD PARALIC DEPOSITS
- Tsd ..... SAN DIEGO FORMATION
- To ..... OTAY FORMATION
- ~?~ ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-11 ..... APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 ..... APPROX. LOCATION OF CONTINOUS CORE BORING
- ..... APPROX. LOCATION OF FAULT

GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

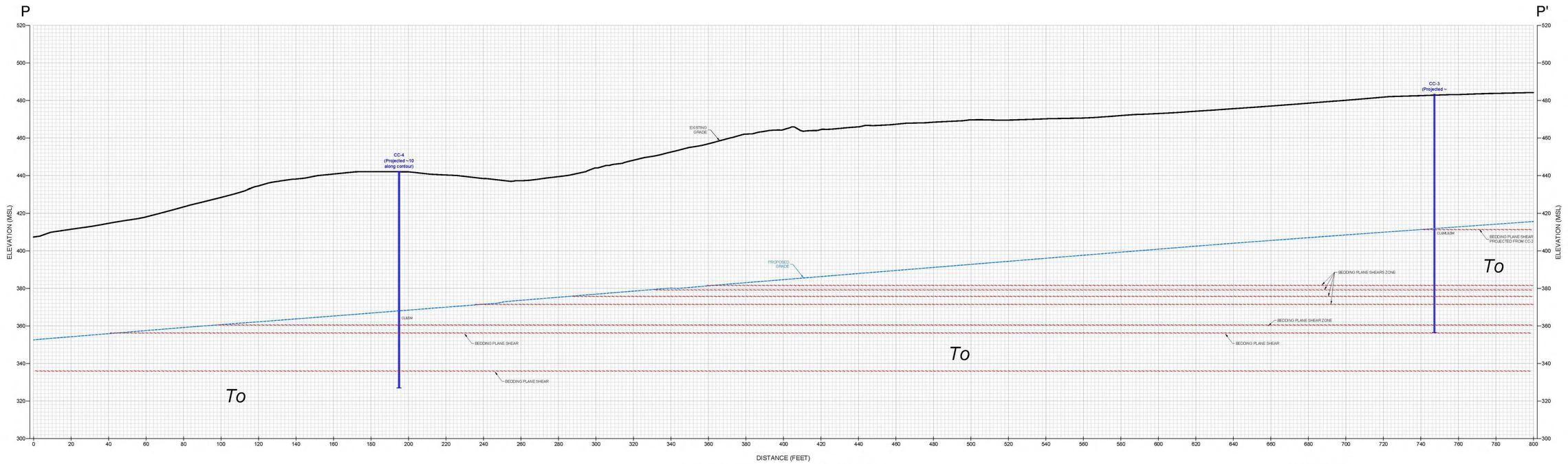
GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 20'	DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05	FIGURE	8
SHEET	1 OF 1		



GEOLOGIC CROSS-SECTION O-O'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION P-P'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qls ..... LANDSLIDE DEBRIS
- Qls_{ip} ..... LANDSLIDE DEBRIS INCIPIENT BLOCK
- Qal ..... ALLUVIUM
- Qvop ..... VERY OLD PARALIC DEPOSITS
- Tsd ..... SAN DIEGO FORMATION
- To ..... OTAY FORMATION
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-11 ..... APPROX. LOCATION OF LARGE-DIAMETER EXPLORATORY BORING
- CC-4 ..... APPROX. LOCATION OF CONTINOUS CORE BORING
- ..... APPROX. LOCATION OF FAULT

GEOLOGIC CROSS - SECTIONS

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 20'	DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05	FIGURE	9
SHEET	1 OF 1		

Plotted:02/17/2022 8:41AM | By:RUBEN AGUILAR | File Location:\\YPRG\GEOTECH\06847-42-05 Southwest Village Beyer Blvd Ext\GEOTECH\06847-42-05 Section-S1 Beyer Blvd Ext.dwg

LANDSLIDE EXPOSED IN BORROW SITE CUT
BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858.558.6900 - FAX 858.558.6159

SCALE	NOT TO SCALE
DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05
FIGURE	10
SHEET	1 OF 1

Plotted:02/16/2022 1:39PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd EIR\DIEST\06847-42-05 LandslideExhibits.dwg

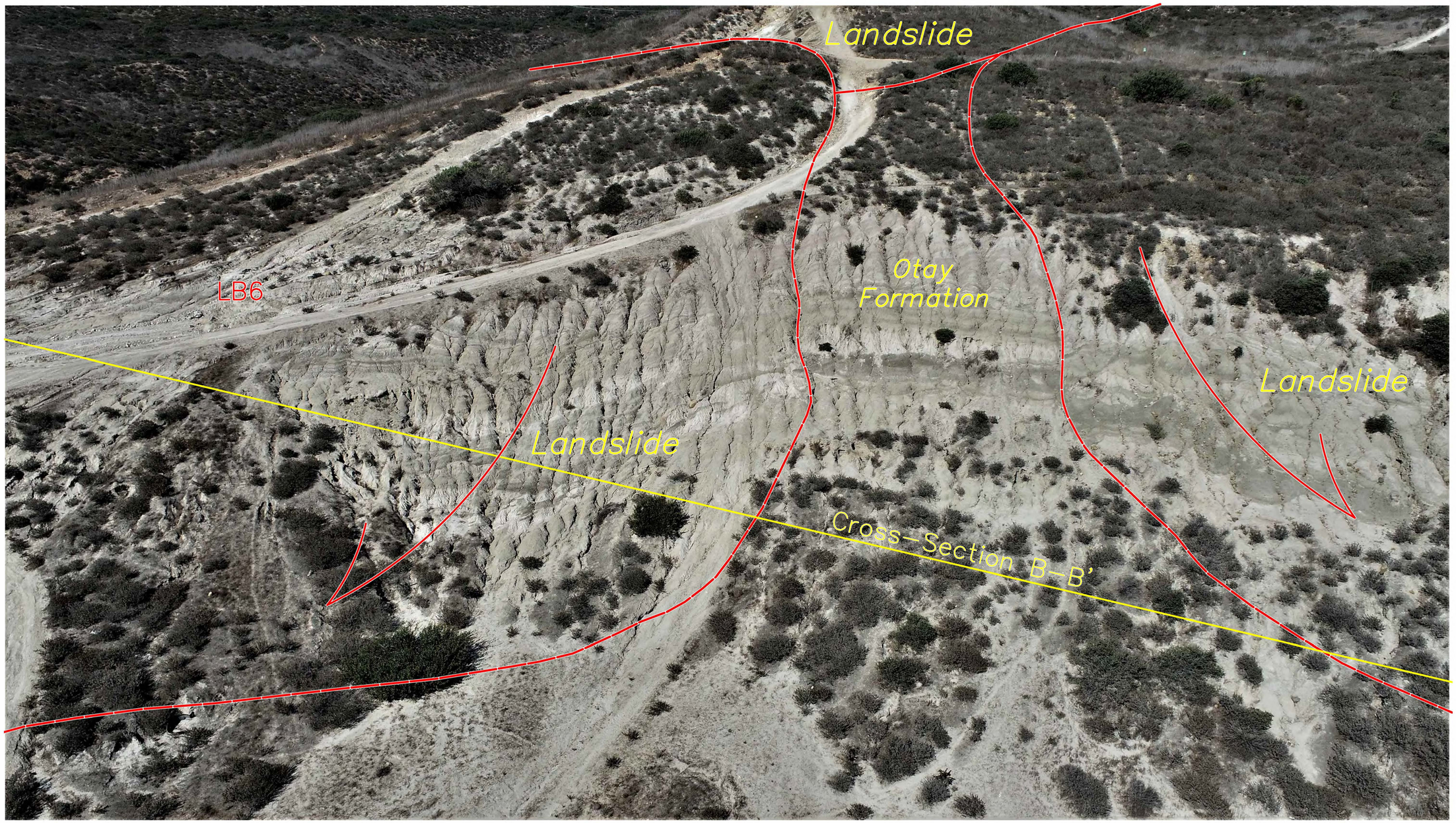
BEDDING EXPOSED IN BORROW SITE CUT

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	NOT TO SCALE	DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05	FIGURE	11
SHEET	1 OF 1		

Plotted:02/16/2022 1:37PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\SHEETS\06847-42-05 LandslideExhibits.dwg

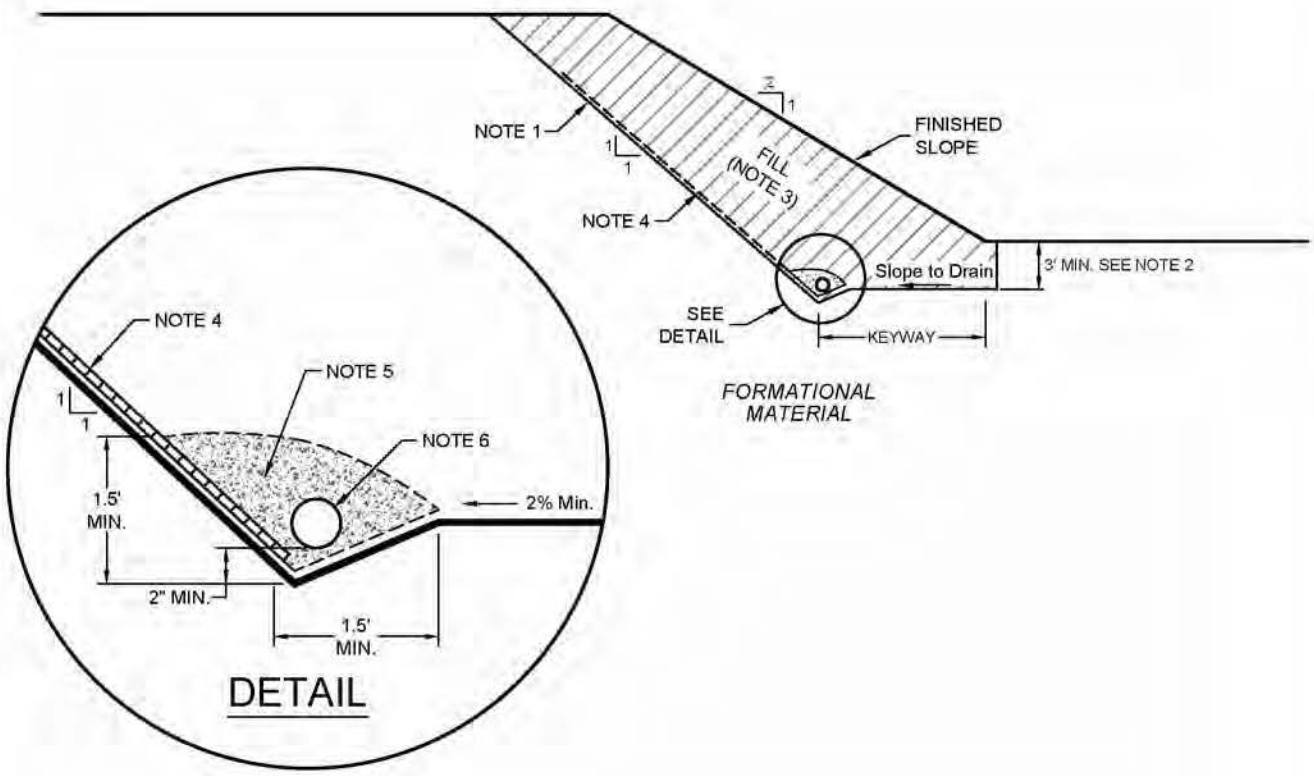


BEDDING EXPOSED IN BORROW SITE CUT
BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	NOT TO SCALE
DATE	02 - 16 - 2022
PROJECT NO.	06847 - 42 - 05
FIGURE	12
SHEET	1 OF 1

Plotted:02/16/2022 1:38PM | By:RUBEN AVILA | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\06847\06847-42-05 LandslideExhibit.dwg



NOTES:

1. EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).
2. BASE OF EXCAVATION TO BE 5 FEET INTO COMPETENT MATERIAL, SLOPING A MINIMUM 2% INTO SLOPE.
3. SLOPE FILL TO BE COMPOSED OF PROPERLY COMPACTED SOIL.
4. CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 30 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED. CHIMNEY DRAINS SHOULD EXTEND TO 10 FEET OF PROPOSED GRADE.
5. FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).
6. COLLECTOR PIPE TO BE 8-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

TYPICAL BUTTRESS/STABILITY FILL DETAIL

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

BEYER BOULEVARD EXTENSION
SOUTH OTAY MESA
SAN DIEGO, CALIFORNIA

PM / DRAFTER		DSK/GTYPD

DATE 02 - 16 - 2022	PROJECT NO. 06847 - 42 - 05	FIG. 13

Plotted:02/16/2022 1:42PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06847-42-05 Southwest Village-Beyer Blvd Ext\DETAILS\Typical Slope Fill.dwg