DO NOT REMOVE FROM BID PACKET

ADDENDUM NO. 1

TO: All Plan holders and Prospective Bidders

FROM: City of Capitola Public Works

DATE: March 27, 2020

RE: **ADDENDUM NO. 1**
BROMMER STREET COMPLETE STREET IMPROVEMENT PROJECT

ADDENDUM NO. 1

City of Capitola, California

This Addendum shall be considered as a part of the bid documents for the subject project as though it had been issued at the same time and shall be incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original documents, this Addendum shall govern and take precedence.

Contractors are hereby notified that they shall make any necessary adjustments in their proposals on account of this Addendum. It will be construed that each proposal is submitted with full knowledge of all modifications and supplemental data specified herein.

Receipt of this Addendum must be acknowledged on the Addendum Acknowledgement form. Signature on said Bid Form indicates acknowledgement of receipt of Addendum No. 1, and that said Addendum No. 1 was properly evaluated in bidder's proposal. Any proposal not in compliance with this requirement may be rejected.

Steven E. Jesberg, Public Works Director

The following is hereby added and/or amended:

The attached Geotechnical Investigation – Design Phase, prepared by Butano Geotechnical Engineers, Inc. is provided as specified in Section 10-2.17 Full Depth Reclamation.

GEOTECHNICAL INVESTIGATION
DESIGN PHASE

FOR
BROMMER COMPLETE STREET IMPROVEMENT
CAPITOLA, CALIFORNIA

PREPARED FOR
KIMLEY-HORN AND ASSOCIATES, INC.

PREPARED BY
BUTANO GEOTECHNICAL ENGINEERING, INC.

PROJECT NO. 18-232-SC
JANUARY 2019

BUTANO GEOTECHNICAL ENGINEERING, INC.
231 GREEN VALLEY ROAD, SUITE E, FREEDOM, CALIFORNIA 95019
PHONE: 831.724.2612
WWW.BUTANOGEOTECH.COM

January 24, 2019
Project No. 18-232-SC

Kimley-Horn and Associates, Inc.
100 West San Fernando Street, Suite 250
San Jose, California 95113

ATTENTION: Derek Wu

SUBJECT: **GEOTECHNICAL INVESTIGATION - DESIGN PHASE**
Brommer Complete Street Improvement
Capitola, California

Dear Mr. Wu:

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

BUTANO GEOTECHNICAL ENGINEERING, INC.

Greg Bloom, PE, GE
Principal Engineer
R.C.E. 58819

Philip Edwards, PE
Senior Engineer
R.C.E. 86451

Appendices
- Appendix A Field Exploration Program
- Appendix B Laboratory Testing Program
- Appendix C Photo Documentation

Distribution: (4) Addressee

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed Brommer Complete Street Improvement Project located in Capitola, California.

The purpose of our investigation is to provide geotechnical information regarding the surface and subsurface, soil and pavement conditions, for the complete street improvement project. Conclusions and recommendations related to site grading, pavement, and drainage are presented herein.

This work included site reconnaissance, pavement coring, subsurface exploration, soil sampling, laboratory testing, engineering analyses, and preparation of this report. The scope of services for this investigation is outlined in our agreement dated December 5, 2018.

The recommendations contained in this report are subject to the limitations presented in Section 8.0 of this report. The Association of Engineering Firms Practicing the Geosciences has produced a pamphlet for your information titled *Important Information About Your Geotechnical Report*. This pamphlet has been included with the copies of your report.

2.0 PROJECT DESCRIPTION

Based on our discussions with the client the project will consist of upgrading the Brommer Street corridor to complete streets design standards. The corridor extends from the City of Capitola boundary to 41st Avenue.

As part of the project the pavement will be rehabilitated.

We were provided with a digital copy of the following documents for use in design by Kimley-Horn and Associates:

> Kimley-Horn and Associates, *Brommer Complete Street Improvement Between City Limits, 38th, and 41st Avenue,* Alternative 1 – Conceptual Layout, Dated: 9/20/17, Job No.: 097763XXX

3.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field investigation was conducted on December 18, 2018. Our exploration consisted of advancing four cores through the existing asphalt, and hand auguring through any aggregate base to the underlying in-situ subgrade soil. The pavement cores were advanced using a 4-inch diameter hole saw. The aggregate base and subgrade soil were drilled using a 3-inch diameter hand auger. Exploration depths ranged between 20 and 32 inches below existing grade. Details of the field exploration program, including the coring locations, are presented in Appendix A.

Representative samples obtained during the field investigation were taken to the laboratory for testing to determine physical and engineering properties. Details of the laboratory testing program including the test results are presented in Appendix B.

4.0 SITE DESCRIPTION

4.1 Location

The project is located south of Highway 1 on Brommer Street in Capitola, California. The site location is shown on the Site Location Plan; Appendix A, Figure A-1.

4.2 Surface Conditions

Brommer Street is a busy residential street that runs between the upper Santa Cruz Harbor at 7th Avenue and 41st Avenue. Brommer Street crosses the City of Capitola border approximately 350 feet west of 38th Avenue. The total project length is approximately 1000 feet.

This segment of Brommer Street is relatively level with a slight uphill grade as the road approaches 41st Avenue.

The pavement from the city boundary through the 38th avenue intersection has recently been rehabilitated. The intersection repair appears to have been completed more recently as part of rehabilitating a segment of 38th Avenue. The pavement surface in this area is in fair to good condition with some longitudinal cracking west of the intersection.

East of the 38th Avenue intersection the pavement has severe distress and is in poor to failed condition. There is alligator cracking, potholes, utility repairs, longitudinal cracking, and block cracking.

There is an existing sidewalk for the entire length on the south side of the project. The existing sidewalk on the north side ends approximately 300 feet from 41st Avenue. There is an unpaved shoulder in the area without sidewalk.

4.3 Subsurface Conditions

A total of 4 cores were advanced within the project limits. This segment of Brommer Street is geologically mapped as being underlain by the lowest emergent coastal terrace deposit (Qcl).

Subgrade Soil

The subgrade encountered was fairly uniform throughout the project length and consisted of dark brown silty and clayey sand.

Existing Pavement Sections

Asphaltic concrete section thicknesses varied from 2 ¾ to 5 ¾ inches. Overlays were present in cores C1 and C2 which were advanced west of 38th Avenue and in the 38th Avenue intersection. No overlay was present east of 38th Avenue. A summary of the existing pavement sections, including base rock thickness and subgrade soil type, has been provided in Table 1. Representative photographs of the pavement have been provided in Appendix C.

Table 1. Existing Pavement Sections Summary

		Core Number			
		C1	C2	C3	C4
AC Thickness (in)	Overlay 1	2	2	0	0
	Base Course	2.5	3.75	2.75	3.0
	Total AC	4.5	5.75	2.75	3.0
Aggregate Baserock Thickness (in)		13	7.25	11.25	9
Total Section Thickness (in)		17.5	13.0	14.0	12.0
Subgrade Soil Type (USCS)		SM	SM	SC	SC

SC = Clayey Sand, SM = Silty Sand

Groundwater was not encountered in any of the borings. The depth to groundwater will vary seasonally.

5.0 GEOTECHNICAL HAZARDS

5.1 General

In our opinion the geotechnical hazards that could potentially affect the proposed project are:

- Intense seismic shaking
- Collateral seismic hazards

5.1.1 Intense Seismic Shaking

The hazard of intense seismic shaking is present throughout central California. Intense seismic shaking may occur at the site during the design lifetime of the proposed structure from an earthquake along one of the regions many faults. Generally, the intensity of shaking will increase the closer the site is to the epicenter of an earthquake; however, seismic shaking is a complex phenomenon and may be modified by local topography and soil conditions. The transmission of earthquake vibrations from the ground into the structure may cause structural damage.

5.1.2 Collateral Seismic Hazards

In addition to intense seismic shaking and fault surface rupture, other seismic hazards that may have an adverse effect to the site and/or the structures are: coseismic ground cracking, seismically induced liquefaction (and associated hazards), seismically induced landsliding, and seismically induced inundation (tsunami and seiche). It is our opinion that the potential for collateral seismic hazards to affect the site and to damage the proposed structure is low.

6.0 DISCUSSIONS AND CONCLUSIONS

Three options for pavement rehabilitation have been recommended. These options are: full depth replacement, full depth reclamation, and maintenance options. These options are discussed in detail in the recommendations section.

A formal pavement condition survey was outside our scope of services. A cursory visual assessment shows the area east of 38th Avenue and the intersection of 38th Avenue and Brommer Street is in fair to good condition. The area west of 38th Avenue to 41st Avenue is in poor to failed condition. The failed area has alligator cracking, potholes, utility repairs, longitudinal cracking, and block cracking.

Alligator cracking is generally caused by subgrade failure. The stress in the subgrade becomes too high and the soil begins to breakdown causing cracking in the overlying pavement. The subgrade failure can be due to lack of poor subgrade strength and/or inadequate pavement section. Because alligator cracking is a failure of the subgrade repair options should include pavement rehabilitation methods that improve the subgrade such as full depth replacement and full depth reclamation.

Block cracking is generally a top down failure in the asphalt. Block cracking is caused by aging asphalt binder resulting in an inability of the asphalt binder to expand and contract with cycling temperature changes. Because block cracking is a top down failure rehabilitation options may include milling and resurfacing. If the block cracking is severe, improving the underlying aggregate base should be considered.

Potholes are caused by complete failure of the pavement section due to age, lack of maintenance, and/or an inadequate pavement section. Rehabilitation methods that repair the entire pavement section should be used such as full depth replacement and full depth reclamation.

Longitudinal cracking is generally caused by poor placement of construction joints. Construction joints are the least dense area of the pavement and should be placed outside the wheelpath. Joints in the wheelpath commonly develop longitudinal cracking. Less frequently longitudinal cracking can be the result of joint reflection cracking from the underlying soil.

Pavement in the poor to fair range requires major rehabilitation which at a minimum includes milling and overlay. Pavement in the failed range requires rehabilitating the entire pavement section including the subgrade.

The pavement west of 38th Avenue was maintained using an overlay prior to serious degradation of the pavement section. Maintaining the pavement in this area has increased the pavement life and reduced or stopped continued failure of the subgrade. The pavement in this area is suitable for maintenance options.

The pavement east of 38th Avenue was not maintained which caused subgrade failure as indicated by the severe alligator cracking and potholes. The pavement section has degraded into the subgrade and reached the point where maintenance options will not be effective.

The design life of the pavement using full depth replacement or full depth reclamation is 20 years. These sections were designed using the Caltrans method. The maintenance options are not designed for a specific life cycle but will significantly increase the overall life of the pavement.

A range of traffic indexes were provided by Kimley-Horn and Associates, pavement sections based on this range have been provided. If a more accurate traffic index is available that should be given to us to re-evaluate the pavement section. A detailed traffic study to calculate the exact traffic index can significantly reduce long term cost. If the actual traffic index is not used in the pavement design the pavement section can be overbuilt or underbuilt. An overbuilt section has direct unrequired cost, an underbuilt section will not achieve the intended design life leading to costly repairs and/or replacement.

Exact pavement performance is difficult to quantify considering the many factors that influence the life of the pavement. Some of these factors include; subgrade soil type and compaction, pavement mix design, QA/QC during construction, maintenance, and traffic growth. It is important that Butano Geotechnical Engineering be involved throughout the design process, and during construction for QA/QC to ensure proper implementation of our recommendations and the best chance for the pavement to achieve its intended design life.

There are a high number of underground utilities located under the project area. The depth of these utilities should be evaluated by the project civil engineer.

A composite R-value from cores C1 through C4 yielded a value of 16, which was used for design.

One expansion index test was conducted on a composite sample of the subgrade soil and yielded an EI = 0 (very low). One atterberg limits test was conducted on the clayey fines in the soil and yielded a lean clay. These tests indicate that the clayey soil has a very low potential for expansion within the project limits.

7.0 RECOMMENDATIONS

7.1 General

Based on the results of our field investigation, laboratory testing, and engineering analysis it is our opinion that from the geotechnical standpoint, the subject site will be suitable for the proposed construction.

7.2 Site Grading

7.2.1 Site Clearing

The site should be cleared of loose soil, organics, and debris within the project limits.

7.2.2 Preparation of On-Site Soils

Site Grading-General

The on-site soil may be re-used as engineered fill once it is processed accordingly. Processing should include removal of any cobbles and deleterious material, thorough mixing, and moisture conditioning.

Areas to receive engineered fill (subgrade) should be scarified, processed as above, and compacted to a minimum of 95 percent relative compaction per ASTM1557.

Imported fill material should be approved by a representative of Butano Geotechnical Engineering, Inc. prior to importing. Imported fill should be primarily granular with no material greater than 2½ inches in diameter and no more than 20 percent of the material passing the #200 sieve. The fines fraction of the fill should not consist of expansive material. The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

All engineered fill weather on-site or imported should be compacted to a minimum of 95 percent relative compaction in paved areas, and 90 percent relative compaction under sidewalks and other structures. Roadway gutters should be considered part of the paved area. Compaction should be based on ASTM 1557.

Subgrade and aggregate baserock compaction should extend a minimum of 1 foot laterally of the pavement in unconstrained areas (no curb present), and 1 foot laterally of new curbs, sidewalk or other structures.

Any surface or subsurface obstruction, or questionable material encountered during grading, should be brought immediately to the attention of the Geotechnical Engineer for proper processing as required.

7.2.3 Cut and Fill Slopes

No cut or fill slopes are anticipated for this project.

7.2.4 Excavating Conditions

The on-site soil may be excavated with standard earthwork equipment.

7.2.5 Surface Drainage

Surface drainage should be controlled to minimize concentrated water. Collected water should be released and dispersed at an approved location. Approved drainage patterns should be maintained throughout the life of the project.

7.2.6 Utility Trenches

Utility trenches should be backfilled based on the City of Capitola standard details. At a minimum this should consist of 4 inches of bedding sand below the utility and 12 inches of bedding sand above the utility. Bedding material should consist of sand with SE not less than 30.

Backfill of all trenches should be placed in thin lifts not to exceed 8 inches and mechanically compacted to achieve a relative compaction of not less than 95 percent in paved areas and 90 percent in other areas. Care should be taken not to damage utility lines.

The on-site native soil may be utilized for trench backfill above the bedding sand.

Trenches must be shored as required by the local regulatory agency, the State of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

7.3 Pavement Sections

7.3.1 General

Three options for pavement rehabilitation have been provided. Based on the pavement condition the following rehabilitation options should be considered for each area:

- Option 1: Full Depth Replacement (Entire Corridor)
- Option 2: Full Depth Reclamation (Entire Corridor)
- Option 3: Maintenance Options (38th Avenue Intersection and West)

Hot Mix Asphalt (HMA) should correspond to Caltrans Type A specification.

All HMA should be compacted to a minimum of 95 percent compaction based on bulk density.

All Aggregate Base (AB) shall consist of ¾” Class 2 based on Caltrans Section 26-1.

Pavement sections for a range of traffic indexes have been provided. The traffic index should be chosen by the civil engineer and the corresponding pavement section used in design.

7.3.2 Design Pavement Sections

Option 1 – Full Reconstruction

Complete reconstruction using an aggregate base with HMA may be used throughout the project.

Full reconstruction requires that all of the existing asphalt and AB be completely removed and the pavement section rebuilt.

The underlying subgrade should be processed and compacted to 95 percent relative compactions according to section 7.2.2.

Table 2 describes the minimum HMA sections required.

Table 2. Full Depth Replacement Sections

TI	AB (in)	HMA (in)
7	11	5
8	13	6
9	17	6
10	17	8
11	20	8

Option 2 – Full Depth Reclamation

Complete reconstruction using a pulverized and treated base with HMA may be used throughout the project.

Full depth reclamation (FDR) consists of pulverizing the full thickness of the asphalt pavement and AB, and a portion of the underlying subgrade. The layers are blended to form a homogenous and stable layer. Once the layers have set and cured sufficiently an HMA surface layer is placed and compacted over the stabilized layer. A portion of the existing asphalt may need to be cold-milled to make grades.

The pulverized layer can be stabilized with calcium oxide (lime), cement, or a combination. It is recommended that 3 percent lime and 3 percent cement mix be used for bidding purposes. The exact lime/cement ratios should be designed by our firm prior to construction.

Table 3 describes the minimum FDR sections required.

Table 3. FDR Sections

TI	FDR (in)	HMA (in)
7	12	4
8	12	6
9	15	6
10	18	6
11	18	8.5

Option 3 – Maintenance Options

A maintenance option may be chosen for the intersection of 38th Avenue and west to the city boundary. Maintenance options are not designed for a 20-year life cycle. Maintenance will significantly increase performance extending the life of the existing pavement in fair to good condition. Maintenance options will also improve the frictional properties of the pavement and the aesthetics. In general maintenance should be done every 3 to 5 years and can extend the life of the pavement to over 20 years if done at regular intervals.

Mill and Overlay

Milling and overlay may be used as a maintenance option.

All or a portion of the existing pavement should be off-hauled. The overlay should have a minimum thickness equal to the pavement removed and three times the maximum aggregate size of the HMA used in the overlay. Prior to placing the overlay, areas of high distress should be repaired, and cracks greater than ¼ inch should be filled. Areas of high distress should be repaired using the pavement sections of option 1.

Milling and overlay is the most expensive maintenance option and it will have the longest life cycle increase of the maintenance options.

Seal Coats

Seal coats such as a micro-surfacing agent, slurry seals, or fog coats may be used as a maintenance option. Seal coats are typically asphalt emulsion products designed to reduced degradation of the existing asphalt extending its life. The application product chosen should be based on cost, life cycle, surface texture, setting time, and aesthetics.

Prior to placing the seal coat, areas of high distress should be repaired, and cracks greater than ¼ inch should be filled. Areas of high distress should be repaired using the design sections in option 1.

Seal coats are relatively inexpensive. The cost and life cycle increase of the pavement section from a seal coat application will depend on the seal coat method chosen.

7.3.3 Long Term Preventative Maintenance

The recommendations for option 1 and option 2 have been designed for a 20-year life cycle, however, to achieve the design life, long-term preventative maintenance should be performed. Preventative maintenance will extend the life of the pavement, and usually at a much lower life cycle cost. Preventative maintenance should be performed at 3 to 5-year intervals (for asphalt-based pavement alternatives) depending on the deterioration rate of the pavement. Typical preventative maintenance techniques include crack sealing, asphalt patching, and micro-surfacing agents.

7.4 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans, Foundation Plans, job mix formula, and design loads should be reviewed by Butano Geotechnical Engineering, Inc. prior to submitting the plans and contract bidding. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

7.5 Observation and Testing

Field observation and testing must be provided by a representative of Butano Geotechnical Engineering, Inc. to enable them to form an opinion regarding the adequacy of the site preparation, the adequacy of fill materials, and the extent to which the earthwork and pavement surface preparation is performed in accordance with the geotechnical conditions present, the requirements of the regulating agencies, the project specifications, and the recommendations presented in this report. Any earthwork performed in connection with the subject project without the full knowledge of, and not under the direct observation of Butano Geotechnical Engineering, Inc., will render the recommendations of this report invalid.

Butano Geotechnical Engineering, Inc. should be notified at least 5 working days prior to any site clearing or other earthwork operations on the subject project to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction meeting should be held on the site to discuss project specifications, observation and testing requirements and responsibilities, and scheduling.

8.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and revised recommendations will be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of 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 that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The scope of our services mutually agreed upon did not include any environmental assessment or study for the presence of hazardous to toxic materials in the soil, surface water, or air, on or below or around the site. Butano Geotechnical Engineering, Inc. is not a mold prevention consultant; none of our services performed in connection with the proposed project are for the purpose of mold prevention. Proper implementation of the recommendations conveyed in our reports will not itself be sufficient to prevent mold from growing in or on the structures involved.

REFERENCES

ASTM International (2016). *Annual Book of ASTM Standards, Section Four, Construction*.Volume 4.08, Soil and Rock (I): D 430 - D 5611.

ASTM International (2016). *Annual Book of ASTM Standards, Section Four, Construction*.Volume 4.09, Soil and Rock (II): D 5714 - Latest.

Brabb, E.E., 1997, Geologic map of Santa Cruz County, California: a digital database: U.S. Geological Survey, Open-File Report OF-97-489, scale 1:62,500

California Code of Regulations-Title 24, Part 2, California Building Code (2016).

California Department of Transportation, 2012, Division of Design, Highway Design Manual Sixth Edition – Change 11/02/2012.

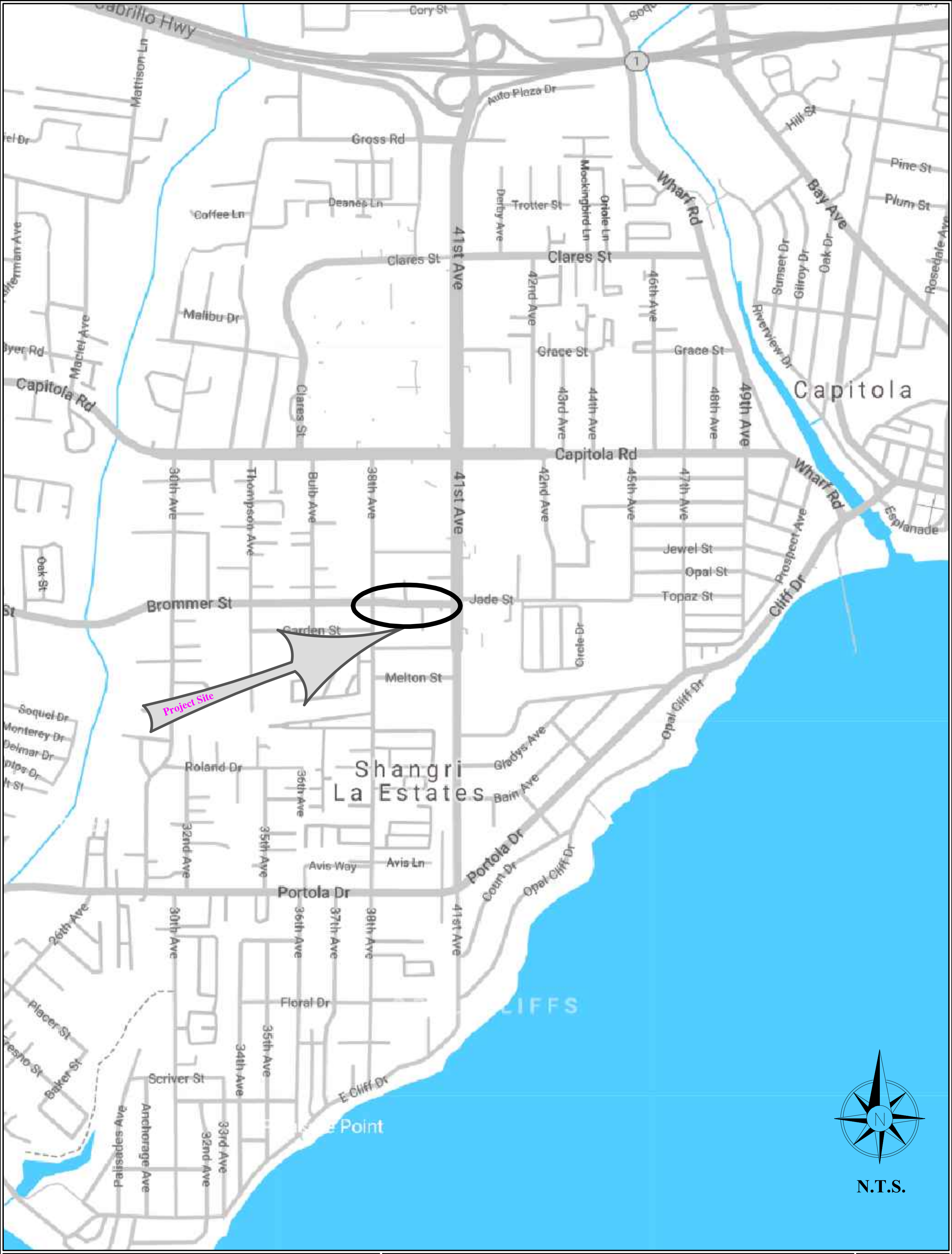
APPENDIX A

FIELD EXPLORATION PROGRAM

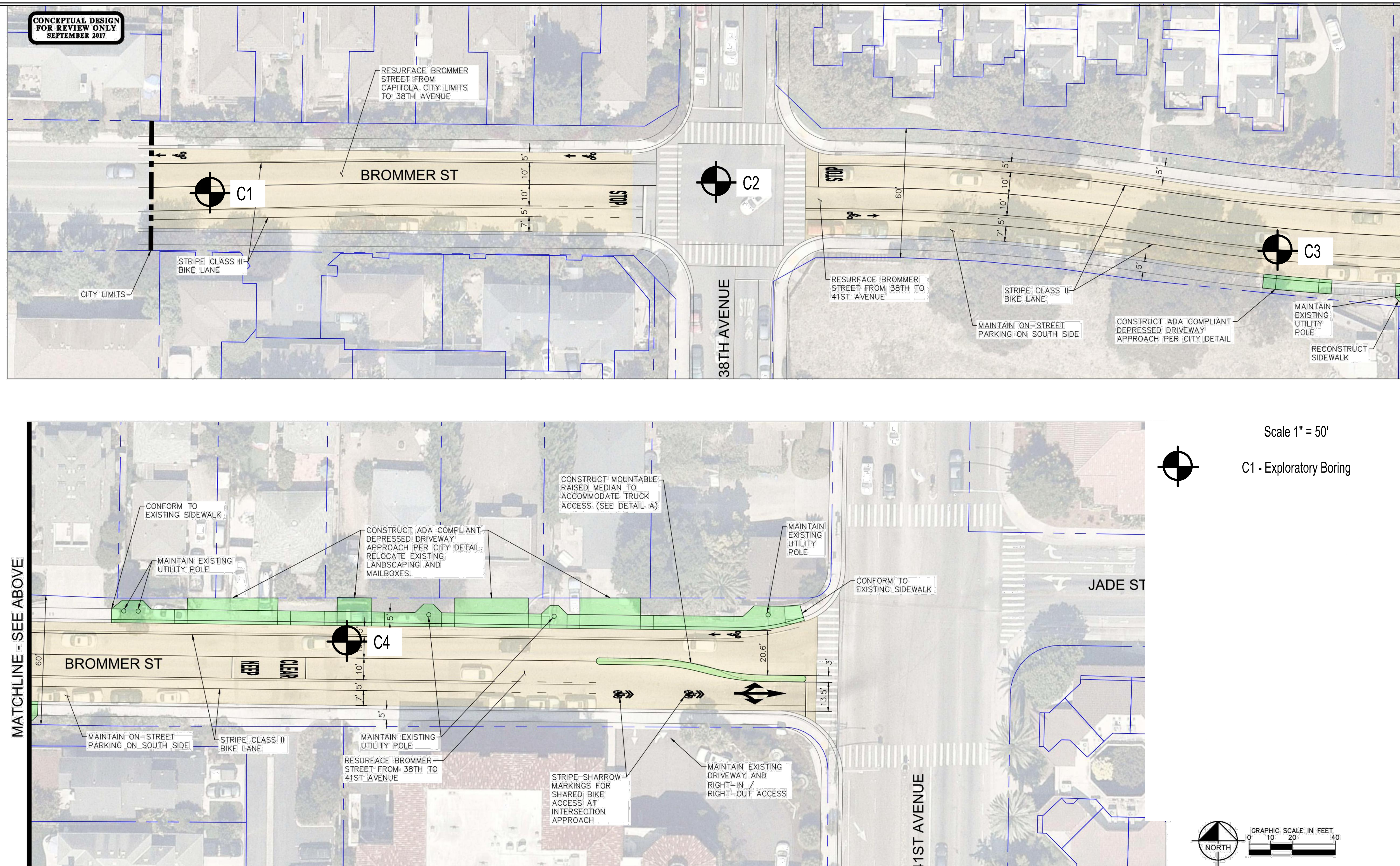
FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by drilling 7 pavement cores. The pavement cores were advanced using a 4-inch diameter hole saw. The underlying aggregate base and subgrade soils were drilled using a 3-inch diameter hand auger. A summary of conditions encountered is presented in Table 1. The approximate locations of the cores are shown on the Coring Site Plan, Figure A-2. The core holes were located in the field by tape measurements from known landmarks. Their locations as shown are therefore within the accuracy of such measurement

The soils encountered in the borings were continuously logged in the field by a representative of Butano Geotechnical Engineering, Inc. Bulk and relatively undisturbed soil samples for identification and laboratory testing were obtained in the field. These soils were classified based on field observations and laboratory tests. The classifications are accordance with the Unified Soil Classification System (USCS).



BUTANO	SITE LOCATION PLAN	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Brommer Complete Street Improvement	A-1



K:\SJC_TPTO\City of Capitola\097763120.3 – Capitola On-Call 2017\08_Brommer Complete Street\CAD\References\xBM-Brommer.dwg 10/13/2017 1:34 PM

No.	REVISIONS	DATE	BY

Kimley»Horn
100 W SAN FERNANDO ST, STE 250 SAN JOSE, CA 95113
PHONE: 669-800-4130
WWW.KIMLEY-HORN.COM

KHA PROJECT 097763XXX
DATE 09-20-17
SCALE: AS SHOWN
DESIGNED BY: DW
DRAWN BY: DW
CHECKED BY: XX

BROMMER COMPLETE STREET IMPROVEMENTS BETWEEN CITY LIMITS, 38TH, AND 41ST AVENUE
PREPARED FOR
CITY OF CAPITOLA
CITY OF CAPITOLA CALIFORNIA

ALTERNATIVE 1 - CONCEPTUAL LAYOUT

SHEET NO. ____
OF ____ SHEETS

BUTANO GEOTECHNICAL ENGINEERING, INC.	CORING SITE PLAN Brommer Complete Street Improvement	FIGURE A-2

APPENDIX B

LABORATORY TESTING PROGRAM

LABORATORY TESTING PROCEDURES

Classification

Soils were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488.

Particle Size Analysis

One sieve was performed on a representative sample in accordance with ASTM C117 and C 136. The grain size distribution from the result of the particle size analysis is presented in Figure B-1.

Atterberg Limits

One Atterberg limit test was performed in accordance with ASTM D-4318. The result is presented in Figure B-2 and summarized in Figure B-3.

Moisture Content

Moisture contents were made for representative samples in accordance with ASTM D 2216. Results of moisture determinations are presented in Figure B-4.

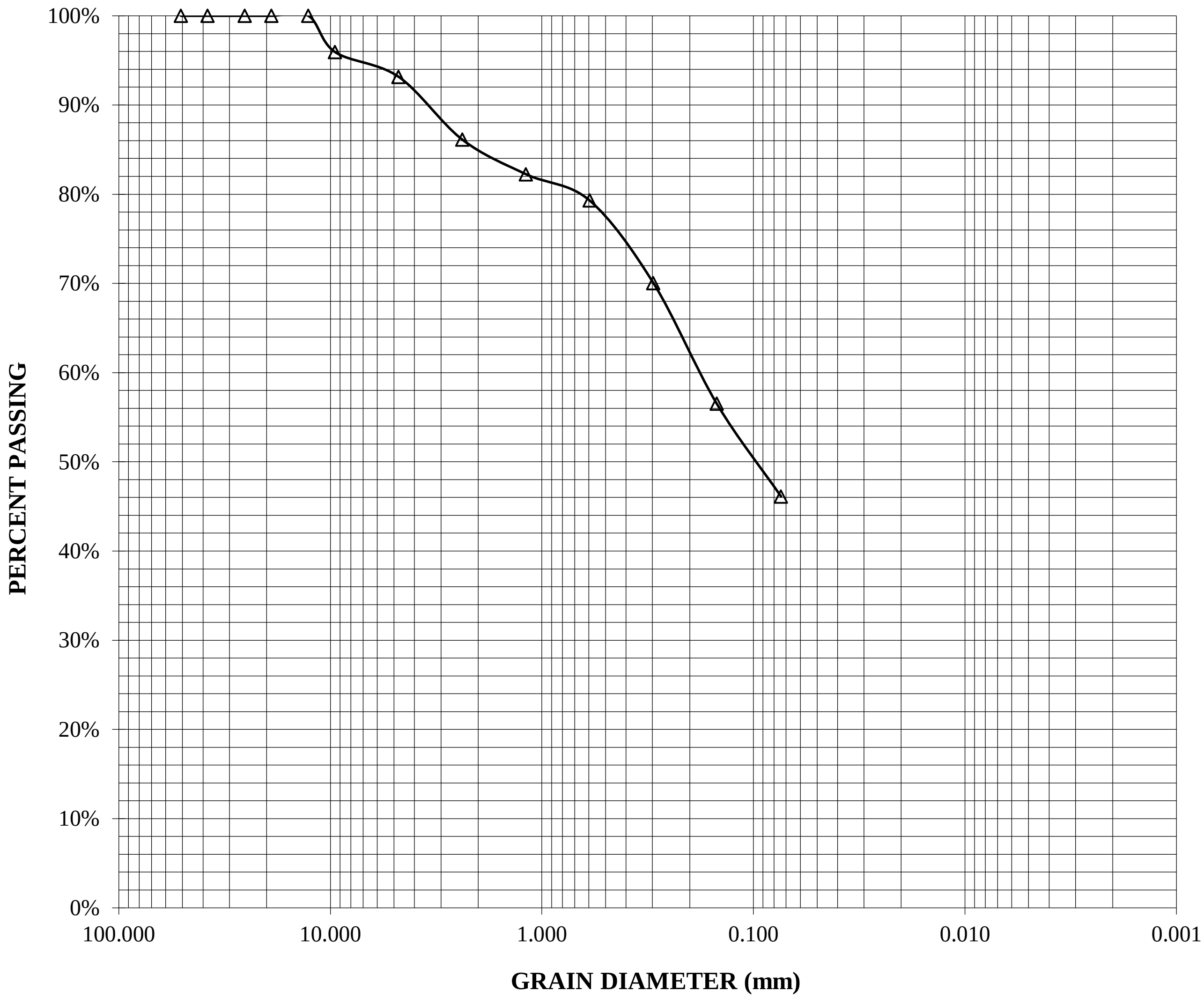
Expansion Index

One expansion index test was performed on a representative bulk sample of the pavement zone soil in accordance with ASTM D 4829-03. The result is presented in Figure B-5.

R-Value Test

One R-Value test was conducted on a representative sample of the pavement zone soil using Caltrans test method 301. The results are presented in Figure B-6

BORING:	C3	PERCENT PASSING No. 4	PERCENT PASSING No. 200
DEPTH (ft):	1.5		
SOIL TYPE (USCS):	SC	93.2%	46.1%



BUTANO GEOTECHNICAL ENGINEERING, INC.	**GRAIN SIZE DISTRIBUTION**	FIGURE
	Brommer Complete Street Improvement	B-1

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX

ASTM D 4318

Project No.:	18-232-SC
Project Name:	Brommer Complete Street Improvement
Sample:	C1,C2,C3,C4 Composite 3 ft
Date:	January 2, 2019
Tested By:	KS

Description: Lean clay

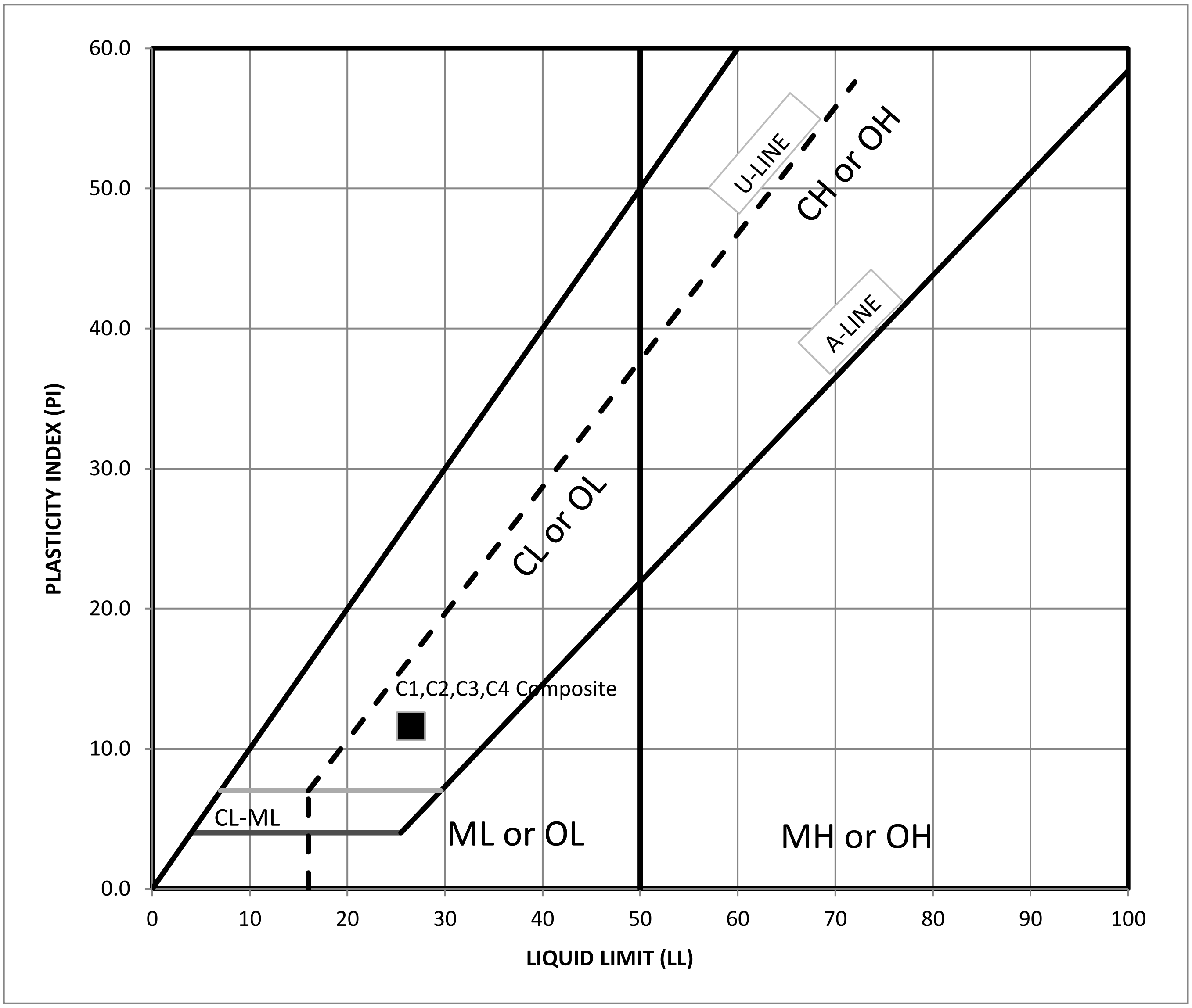
LIQUID LIMIT DETERMINATION

Tare No.:		X	2	4		
Number of Blows:		29	25	15		
Wet Wt. + Tare:		18.75	21.05	21.92		
Dry Wt. + Tare:		17.76	19.53	20.12		
Tare Wt.:		13.64	13.75	13.64		
Wet Wt.:		5.11	7.30	8.28		
Dry Wt.:		4.12	5.78	6.48		
Wt. of Water:		0.99	1.52	1.80		
Water Content (%):		**24.0%**	**26.3%**	**27.8%**		

PLASTIC LIMIT DETERMINATION

Tare No.:	E	W	V
Wet Wt. + Tare:	18.32	18.28	18.90
Dry Wt. + Tare:	17.74	17.69	18.21
Tare Wt.:	13.86	13.69	13.60
Wet Wt.:	4.46	4.59	5.30
Dry Wt.:	3.88	4.00	4.61
Wt. of Water:	0.58	0.59	0.69
Water Content (%):	**14.9%**	**14.8%**	**15.0%**

LIQUID LIMIT:	**26.5**
PLASTIC LIMIT:	**14.9**
PLASTICITY INDEX:	**11.6**



Sample	Depth	Description	LL	PL	PI
C1,C2,C3,C4 Composite		Lean clay	26.5	14.9	11.6

BUTANO GEOTECHNICAL ENGINEERING, INC.	**ATTERBERG SUMMARY**	FIGURE
	Brommer Complete Street Improvement	B-3

MOISTURE
ASTM D 2216

Project No.:	18-232-SC
Project Name:	Brommer Complete Street Improvement
Date:	January 2, 2019
Tested By:	KS

Boring:	C1	C2	C3	C4		
Depth:	1.5	1.5	1.5	3.0		
Number of Rings or L/T:						
Wt. of Soil + Rings/L/T:						
Wt. of Rings/L/T:						
Wt. of Soil:						
Wet Density (pcf):						
Wet Wt. of Soil+Tare Wt.:	270.0	278.8	574.5	283.5		
Dry Wt. of Soil+Tare Wt.:	253.9	263.5	538.3	268.3		
Tare Wt.:	116.2	132.5	249.9	132.3		
Moisture Content (%):	**11.7%**	**11.7%**	**12.6%**	**11.2%**		
Dry Density (pcf):						
Tare No.:	301	307	21	303		

Boring:						
Depth:						
Number of Rings or L/T:						
Wt. of Soil + Rings/L/T:						
Wt. of Rings/L/T:						
Wt. of Soil:						
Wet Density (pcf):						
Wet Wt. of Soil+Tare Wt.:						
Dry Wt. of Soil+Tare Wt.:						
Tare Wt.:						
Moisture Content (%):						
Dry Density (pcf):						
Tare No.:						

BUTANO	**MOISTURE DENSITY**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Brommer Complete Street Improvement	B-4

EXPANSION INDEX
ASTM D 4829

Project No.:	18-232-SC
Project Name:	Brommer Complete Street Improvement
Date:	January 2, 2019
Tested By:	KS

Sample: Composite C1, C2, C3,C4

Description: Sandy Fat CLAY

Trial No.:	1	2
Wet Wt. of Soil:	51.5	
Dry Wt. of Soil:	47.1	
Wt. of Water:	4.4	
Initial Moisture:	9.3%	
Wet Wt of Soil and Ring:	617.5	
Wt. of Ring:	200.6	
Wet Wt. of Ring Soil:	416.9	
Dry Wt. of Ring Soil:	381.3	
Wet Density:	125.9	
Dry Density:	115.2	
Wt. of Moisture:	10.8	
Volume of Solids:	0.683	
Volume of Voids:	0.317	
Percent Saturation:	**54.5**	

DATE	TIME	READING	
1/4	12:50 pm	0.008	
1/4	12:55 pm	0.007	*
1/7	9:00 am	0.007	
1/9	9:00 am	0.006	
1/9	12:50 pm	0.006	
	EI (measured):	-2	
	EI (corrected):	**0**	

* Inundated with Distilled Water

BUTANO GEOTECHNICAL ENGINEERING, INC.	**EXPANSION INDEX** Brommer Complete Stree Improvement	FIGURE B-5

R-value Test Report (Caltrans 301)

COOPER TESTING LABORATORY

Job No.:	673-027	**Date:**	01/08/19	**Initial Moisture,**	7.9
Client:	Butano Geotechnical	**Tested**	PJ	**R-value**	**16**
Project:	18-232-SC	**Reduced**	RU		
Sample	C1,C2,C3,C4_Composite	**Checked**	DC	**Expansion Pressure**	**0** psf
Soil Type:	Dark Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D
Exudation Pressure, psi	362	186	480	
Prepaired Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	45	61	34	
Weight of Soil & Mold, grams	3234	3189	3175	
Weight of Mold, grams	2116	2098	2090	
Height After Compaction, in.	2.58	2.50	2.43	
Moisture Content, %	11.9	13.3	10.9	
Dry Density, pcf	117.4	116.7	122.0	
Expansion Pressure, psf	0	0	43	
Stabilometer @ 1000				
Stabilometer @ 2000	113	135	69	
Turns Displacement	3.62	3.80	3.80	
R-value	23	11	45	

Remarks:

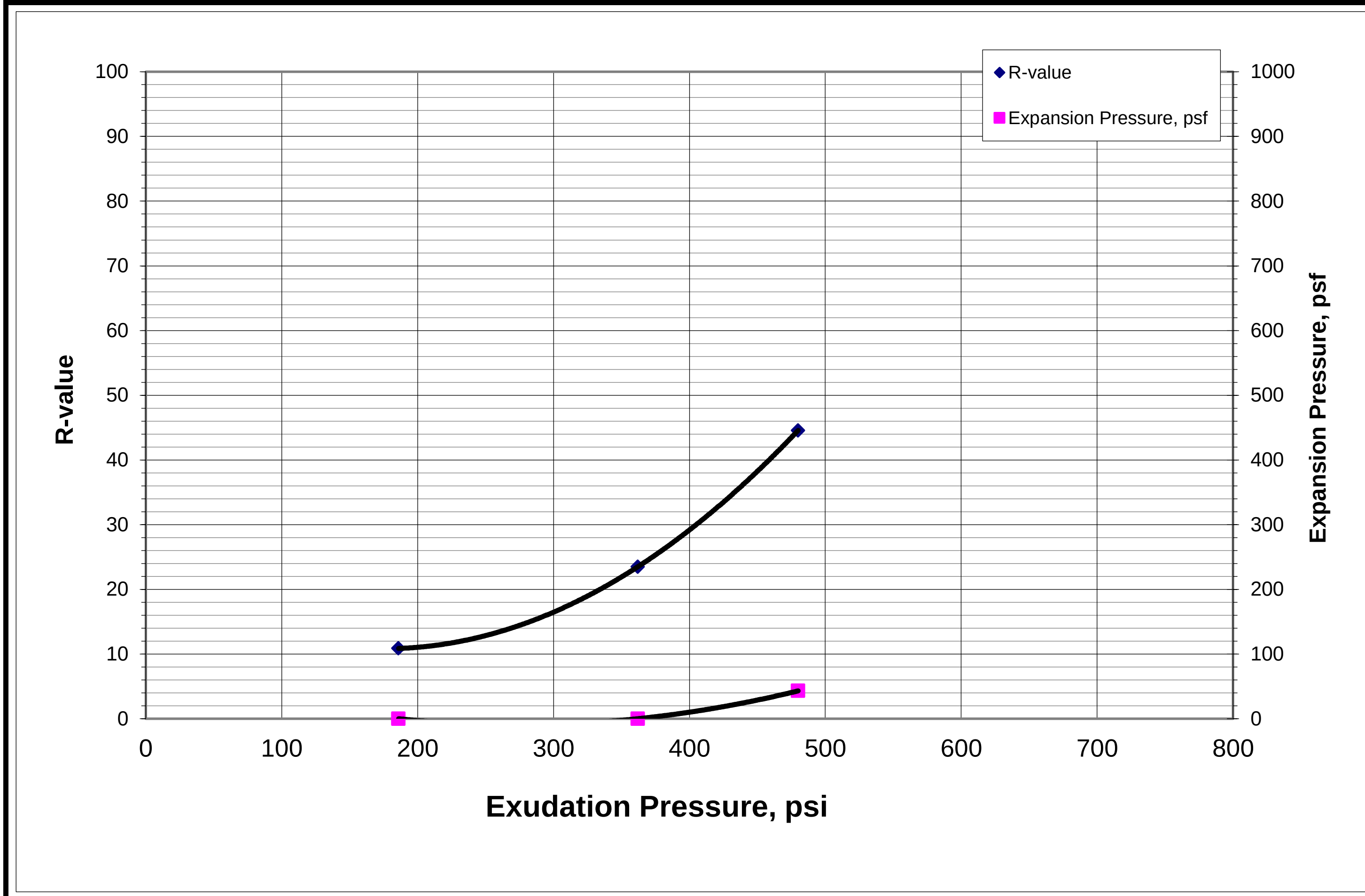
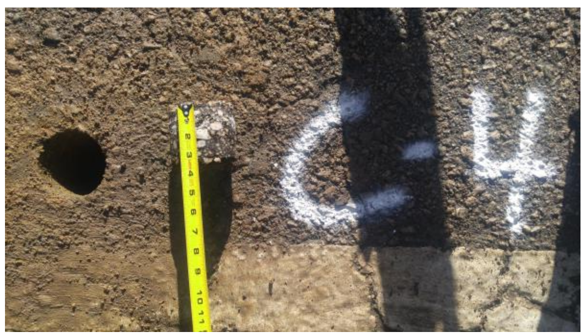


Figure B-6

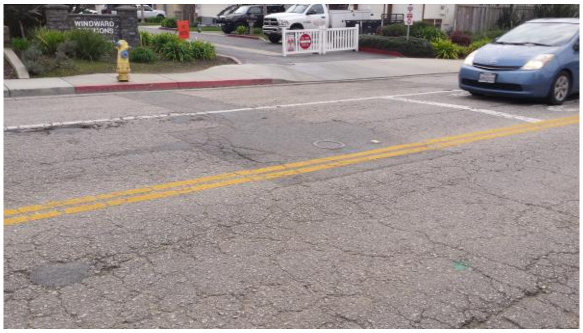
APPENDIX C

PHOTO DOCUMENTATION

PAVEMENT CORES



PAVEMENT CONDITIONS



Area east of 38th Avenue intersection showing severe alligator cracking and potholes.

Area east of 38th Avenue intersection showing potholes, patches, and alligator cracking.

38th Avenue intersection in good condition.

West of 38th Avenue intersection showing some longitudinal cracking.

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

IIGER06085.0MRP