NOTICE: THIS ADDENDUM CONTAINS IMPORTANT INFORMATION THAT AFFECTS YOUR BID– PLEASE RESPOND IMMEDIATELY

PIERCE STREET PARK CONSTRUCTION PROJECT
CONTRACT NO. C15-1
CITY OF ALBANY, CA
ADDENDUM NO. 3 – November 4, 2016

THE PIERCE STREET PARK BID OPENING HAS BEEN EXTENDED TO: November 10th, 2016.

Addendum #1 had the wrong date. It was issued on October 25, 2016.

QUESTION:
Detail 2 on LD-1 shows footing depth and width of 2ft whereas the geotech report recommends a minimum 16" wide by 30" deep footing. Please clarify the design of the footing for the building.

RESPONSE:
Construct per the Detail. Contractor to provide layer of compacted Class 2 AB and non-expansive fill under the slab and footing per the detail and specifications. Onsite soil may meet requirements for non-expansive fill. Geotechnical engineer must approve material to be used as non-expansive fill.

QUESTION:
What are the items highlighted on the attached plan sheet LD-11?

RESPONSE:
The privacy walls shown in the detail on sheet LD-11, are not part of the project. The design detail for the ROMTEC Bathroom structure is in DETAIL 3 SHEET LD-7

QUESTION:
Can the working hours be extended to 6 days a week, 7am – 7pm during the installation of the restroom?

RESPONSE:
No.

QUESTION:
There are two removable bollards called out in sheet LD-5 and D-1, but not mentioned in the specs or the bid sheet. What bid item should this cost be included in?

RESPONSE:

Specifications Section 129300 Site Furnishings to included Removable Bollards as detailed in the contract drawings.

A. Install products per manufacturer's recommendations, provide embedded installation where specified, materials shall be square, plumb, level, accurately aligned, and securely anchored at locations as indicated on Drawings.
B. Provide concrete footing as shown on the plans and per manufacturer's written instructions.
C. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed when furnishings are to be installed in-ground, hold top of footing and finished grade of base material.
D. After completing site furnishing installation, remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.
E. At completion of project, Contractor shall provide City with written guarantee from manufacturer identifying the nature of warranty for each product component.

Measure & Payment for REMOVABLE BOLLARDS shall be *added and included* in the Bid Form as follows:

- Removable Bollard per each

The price bid for Removable Bollards shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work necessary to provide and install site furnishings including shop drawings, delivery, coating, excavation and placement, mock-ups, concrete footings, assembly, hardware, anchorages, and complete installation as shown on the plans and these special provisions, and as directed by the Engineer; and no additional compensation will be allowed therefore.

QUESTION
Raised domes do not appear in the parking space according to the ADA parking layout detail on sheet LD-8, but are a specific bid item 27. Can you please clarify?

RESPONSE:
Raised ADA domes are shown in the sidewalk adjacent to the ADA parking space in LD-8. These ADA domes are a separate bid item. (Other ADA domes are associated with the bid items including curb ramps at the raised crosswalk and the Calhoun/Pierce crossing.)

QUESTION
Is the anti-graffiti coating to be put on all concrete surfaces, or only vertical surfaces?

RESPONSE:
Anti-graffiti coating shall be applied to vertical concrete surfaces, the exposed top of concrete seatwall, and the bathroom building walls.

QUESTION
Are there specific dimensions for the road signs?

RESPONSE:
Road Signs are to be per regulatory standards as noted in the details. See FHWA MUTCD
http://mutcd.fhwa.dot.gov/htm/2009/part2/part2b.html

And also multiple websites for manufacturing:
http://www.trafficsign.us/r1.html

QUESTION:
Is the geotechnical report going to be distributed to the planholders list?

RESPONSE:
Geotechnical Report may be downloaded from Blueprint Express at:
www.blueprintexpress.com/albany

QUESTION:
Section 133423 Part 1.2 A. where it says the contractor will "make corrections and resubmit if needed". Does this mean that if City building department doesn't like something from Romtec that the contractor has to get them to change it?

RESPONSE:
Once Romtec receives a contract for the project, unsealed plans and submittals are provided for the owner (City) and owner's representative (Placeworks) to review and comment on within 2-3 weeks. This provides the owner and owner's representative the opportunity to ensure that the building has been designed correctly, and make any revisions necessary prior to the building department's review.

Romtec has included 1 revision to the sealed plans in response to building department comments in current proposal.

QUESTION:
Are the following warranty limitations issued by Romtec in their quotation and contract acceptable to the City?

WARRANTY LIMITATIONS

i. Romtec does not provide a warranty for metal roofing. Metal roofing manufacturers intend for their roofing to be installed immediately upon delivery from the factory. All project circumstances are different and Romtec cannot guarantee that metal roofing is installed within the timeframe allowed from the manufacturer. Therefore, Romtec does not warrant metal roofing.

ii. Stone veneer will crack over time due to multiple factors including building settlement, water infiltration and freezing, wall movement, and other factors. Romtec cannot guarantee that the stone veneer on the building will not eventually crack. Romtec considers the repairing of cracks as a maintenance issue, and not a warranty issue. In other words, the stone veneer on the building will eventually crack and will not be covered under the building warranty.

RESPONSE:
City accepts the warranty limitation on Romtec provided metal roofing. Romtec has changed metal roofing manufacturer's and offer a two year warranty for the roofing packaged, and sitting on the ground exposed to the elements for Romtec customers only.

Per detail there is no stone veneer. Disregard.

QUESTION:

Has the City developed the project plans in consultation with the public works department to assure that the permitting will go smoothly and without delay or revision? Will the City be charging the Contractor for permit fees paid back to the City?

RESPONSE
Contractor required to obtain a no fee building and encroachment permit from the City. This permitting process should be included in the project schedule.

QUESTION:
Has the City prepared any permit applications for this project such as building, grading, CEQA, etc? What permits will be required by City, County, and State agencies? Among other requirements, the specifications require the contractor to:

- "be responsible for obtaining construction permit"
- "obtain and pay for any and all permits, fees, or licenses, including City of Albany Business License(s), required to perform the Work, unless otherwise indicated in the Contract Documents."
- "obtain all required design documents and calculations, apply for permit, coordinate City plan check, make corrections and resubmit if needed, and pay all permit fees."

RESPONSE:
Yes, per City requirements.

ADDENDUM: IRRIGATION SUPPLEMENT

As part of Specification Section 329300 Plants, and as shown in details 1 and 2 on Sheet LD-10, Irrigation Supplements from DriWater as included in the work for Tree Planting and Shrub Planting *to be replaced* with TreeGator bags (2) per each 24" box and (1) per 15 gallon tree.

Tree Gator bags to be "TreeGator Original" as found at http://treegator.com/

Irrigation Supplements or TreeGator bags are not required for the shrub plantings however, soil preparation for each shrub and tree to also include the following:

- Soil Polymer: Contractor to provide a soil polymer additive to conserve moisture in the soil. Use of terra- sorb gel or approved equal. Apply per manufacturer's instructions.

- Mycorrhizal Funghi & Terra-Sorb. Provide Mycorrhizal fungi with live spores of beneficial endo and ectomychorrhizal fungi, Marilyn's Own™ Myco Drench - (Endo Ecto Blend for solution) http://marilynsown.com/Myco-Drench ;plus Terra-Sorb (water absorbent gel) Roots Terra-Sorbor approved equal as above and biostimulants to assist in plant establishment.

Replacement (3x) of the DriWater supplement as part of the 12 month Landscape Maintenance bid item # shall be replaced with the following:

Contractor to fill gator bags as needed during plant establishment for the 12 month Landscape Maintenance bid item, and include hand watering (via truck watering) of all shrubs and grasses for establishment.

ADDENDUM: BIG BELLY SOLAR TRASH

REMOVED FROM BID ITEM STRIKE #15 “TRASH AND RECYCLING RECEPTACLE” and associated DETAIL 4 SHEET LD-5 are removed from the project and revised bid form attached.

QUESTION:
Do you have a specific material for the park entry sign?

RESPONSE:
As per detail and spec- the sign is to be per Design-A-Sign in Albany because they have done other park signs in the City. The sign is wood, contact Design-A-Sign for more information.

QUESTION:
The following is copied from your Specification 32 31 1-Section A-K

6’ Perimeter fence:
Wire with a diameter of 7 gauge (0.148 inch/3.76 mm)
2. Play area fence: Fence fabric shall be 9 ga. woven mesh 2" x 2" (diameter 0.192”).
Knuckle all selvages.
C. Mesh Size: 1-3/4 inches (44 mm)

9 ga is standard, not even certain there is a 7 ga wire, unless this is the tension wire size

Was this spec was copied and pasted from ASTM? , as most fencing will not use all of these components through the fence line, ie; top rail, mid rail, bottom rail, tension wire, and turn buckles? As shown also on AD.3
Seems over engineered, yet perhaps with all the superlatives, I am misinterpreting

RESPONSE:
6’ fence to have the typical 9 ga. and 2x2 mesh. 7 gauge can be used for required tension wires. Per specifications, contractor to submit product data for components for approval.

BID SCHEDULE

This Bid Schedule must be completed in ink and must be included with the sealed Bid Proposal. The bidder must provide unit prices for each bid item listed below, based on the specified unit of measure. The unit price for each item must include all of the bidder's costs and markup, including labor, materials, equipment, supplies, insurance, taxes, overhead and profit. In the far right column, provide the total amount for each item, calculated as the product of the unit price multiplied by the estimated quantity. Enter the sum of all unit total amounts as the total and enter that amount as the Base Bid on the Bid Proposal form. If bid alternates are required, provide a separate total, as indicated, for the Base Bid and each separate bid alternate, and complete the Bid Proposal form as indicated.

BASE BID: PIERCE STREET PARK CONSTRUCTION PROJECT						
No.	Item Description	Spec Section	Quantity	Unit	Bid Unit Price	Total Amount
1	MOBILIZATION	310000	1	LS		
2	TRAFFIC AND PEDESTRIAN CONTROL	310000	1	LS		
3	STORM WATER POLLUTION PREVENTION PLAN	311000	1	LS		
4	SURVEY STAKING AND LAYOUT	310000	1	LS		
5	CONCRETE SEATWALLS IN PLAY AREA	033000	99	LF		
6	6" CONCRETE FLUSH MOWBAND	033000	51	LF		
7	12" CONCRETE FLUSH MOWBAND	033000	75	LF		
8	6" CONCRETE CURB	033000	248	LF		
9	GRAFFITI RESISTANT COATING	099623	1	LS		
10	PARK ENTRY SIGN	101400	1	EA		
11	PROJECT INFORMATION SIGNS	101400	1	LS		
12	CONSTRUCTION AREA SIGNS	101400	1	LS		
13	ROADWAY SIGNAGE AND STRIPING	101400	1	LS		
14	PLAY STRUCTURES (2-5 YEAR OLD AND 5-12)	116800	1	LS		
~~15~~	~~TRASH & RECYCLING RECEPTACLE~~	~~129300~~	~~2~~	~~EA~~	-	-
16	BIKE RACKS	129300	4	EA		
17	BOULDERS	129300	42	TON		

18	BENCH	129300	3	EA		
19	BENCHES WOODEN (CITY)		3	EA		
20	PICNIC TABLES (ACCESSIBLE PICNIC TABLE INCL.)	129300	3	EA		
21	RESTROOM	133423	1	LS		
22	ELECTRICAL REQUIREMENTS (SERVICE TO RESTROOM BUILDING, FUTURE SITE LIGHTING AND IRRIGATION 6" SLEEVE, PULLWIRE AND BOX)	260000	1	LS		
23	SITE CLEARING AND DEMOLITION	311000	1	LS		
24	CUT AND FILL	312000	2,950	CY		
25	CONCRETE PAVING	321313	3,800	SF		
26	CURB RAMPS AT CALHOUN/PIERCE (INCLUDING DOMES)	321313	2	EA		
27	RASIED DOMES AT ADA PARKING SPACE	321313	110	SF		
28	MID BLOCK CROSSING	321313	1	LS		
29	ASPHALT PAVING AT PIERCE STREET	321316	975	SF		
30	ASPHALT PLUG (12" X10" DEEP FULLDEPTH AC)	321316	100	SF		
31	ASPHALT PATH	321316	4,325	SF		
32	SYNTHETIC SAFETY SURFACING	321816	2,740	SF		
33	QUARRY FINES PAVING	321445	676	SF		
34	6' CHAIN LINK FENCE	323113	745	LF		
35	DOUBLE ACCESS GATE	323113	1	LS		
36	DOUBLE ACCESS GATE REUSED	323113	1	LS		
37	PLAY AREA FENCE	323113	150	LF		
38	SINGLE ACCESS GATE (PLAY AREA)	323113	1	LS		
39	FINE GRADING AND SOIL PREP (MULTI-USE FIELD AREA AND PLANTING AREA)	329200	44,100	SF		
40	NATIVE ORNAMENTAL FINE FESCUE MIX	329200	42,450	SF		

41	NATIVE EROSION CONTROL MIX	329200	57,860	SF		
42	24" BOX TREES	329200	16	EA		
43	15 GAL TREES	329200	23	EA		
44	SHEET MULCH (CARDBOARD & 3" MULCH) (TREES & PLANTED AREAS)	329200	1,534	SF		
45	5 GAL PLANTS	329200	131	EA		
46	LANDSCAPE MAINTENANCE	329200	1	LS		
47	METAL HEADER	329200	165	LF		
48	STORM UTILITY DRAINAGE & PIPING	334100	1	LS		
56	REMOVABLE BOLLARD	129300	2	EA		
Total Bid Items 1 through 48 and 56 all inclusive					$_____	

ADDITIVE ALT A BID: PIERCE STREET PARK CONSTRUCTION PROJECT						
	Item Description	Spec Section	Quantity	Unit	Bid Unit Price	Total Amount
49	FOUNTAIN (INCLUDES SOLAR PUMP, COLUMNS AND BASIN)	129300	1	LS		
50	WATER DISTRIBUTION PIPING: 1" WATER SERVICE LINE AND LATERALS	221113	250	LF		
51	WATER VALVE BOX POC	221113	1	EA		
52	DRY CREEK SOIL	329300	7	CY		
53	DRY CREEK ROCK MULCH	329300	2	CY		
54	WEED FABRIC (DRY CREEK)	329300	182	SF		
55	METAL HEADER (ASPHALT, QUARRY FINES AND PLANTING)	329300	75	LF		
	Total Bid Items 49 through 55 all inclusive				$_____	

END OF BID SCHEDULE

September 25, 2014

Mr. John Hykes
Senior Associate
PLACEWORKS
1625 Shattuck Avenue, Suite 300
Berkeley, CA 94709

RE: Geotechnical Plan Review Comments
Pierce Street Park
Albany, California

Dear Mr. Hykes:

Per your request, A3GEO has reviewed the geotechnical aspects of the project plan package titled, "Pierce Street Park, 100% CD Submittal", dated July 21, 2014. We previously conducted a preliminary geotechnical study for the City of Albany Maintenance Center project and presented the results in our report titled "Phase 1 – Preliminary Geotechnical Study, City of Albany Maintenance Center, Albany, California" dated September 18, 2012.

Our study for the Maintenance Center included two borings located within the proposed Pierce Street Park site. Specific geotechnical recommendations for the Pierce Street Park project were not included in our September 2012 report; however, the recommendations provided for retaining walls, earthwork and concrete slabs on grade can be considered applicable for the Pierce Street Park project.

We reviewed the geotechnical aspects of the general and civil plans. In particular, we reviewed the geotechnical aspects on the following sheets and specification sections:

- Notes, Sheet T-2;
- Demolition Plan, Sheet D-1;
- Civil Plans, Sheets C1.1, 2.1 through 2.3; and
- Project Specifications, Section 312000 (Earthmoving).

COMMENTS ON GEOTECHNICAL ASPECTS OF PROJECT PLANS

Based on our review, the project plans and specifications appear to have been prepared in general conformance with the intent of our geotechnical recommendations presented in our September 2012 report. However, we note the following:

- We recommend showing on the plans the extent of the Caltrans Embankment Confinement System (ECS) located along the western side of the site and including the Caltrans construction plans with the bid documents. This embankment consists of a reinforced fill slope with approximately 20-foot long wire-mesh layers spaced every 2.25 vertical feet. A permeable drainage layer is shown along the back and bottom of the ECS which connects to a perforated plastic pipe running along the toe of the slope. The integrity of the ECS, and its drainage system, needs to be protected and/or restored during the construction of the project and any future projects. The design team should verify that the ECS and associated drainage system will remain functional after the new improvements are constructed. The proposed new fence along the western site perimeter will likely have to penetrate some of the ECS reinforcement. The ECS should be considered when planning the construction of the future bike path.

- We recommend including additional detail regarding fill slope construction. Our recommendations are presented on Plate 1 (attached).

- We recommend that cut slopes (particularly the slope behind the bathroom) be evaluated by A3GEO in the field during construction. Potentially unstable conditions may require overexcavation and recompaction.

CLOSURE

All services rendered by our firm consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

We trust that this provides the information that you require at this time. Should you have questions regarding any of our geotechnical review comments, please do not hesitate to call us.

Very truly yours,

Dona Mann, P.E., G.E.
Principal Engineer
Cell: (415) 425-0247

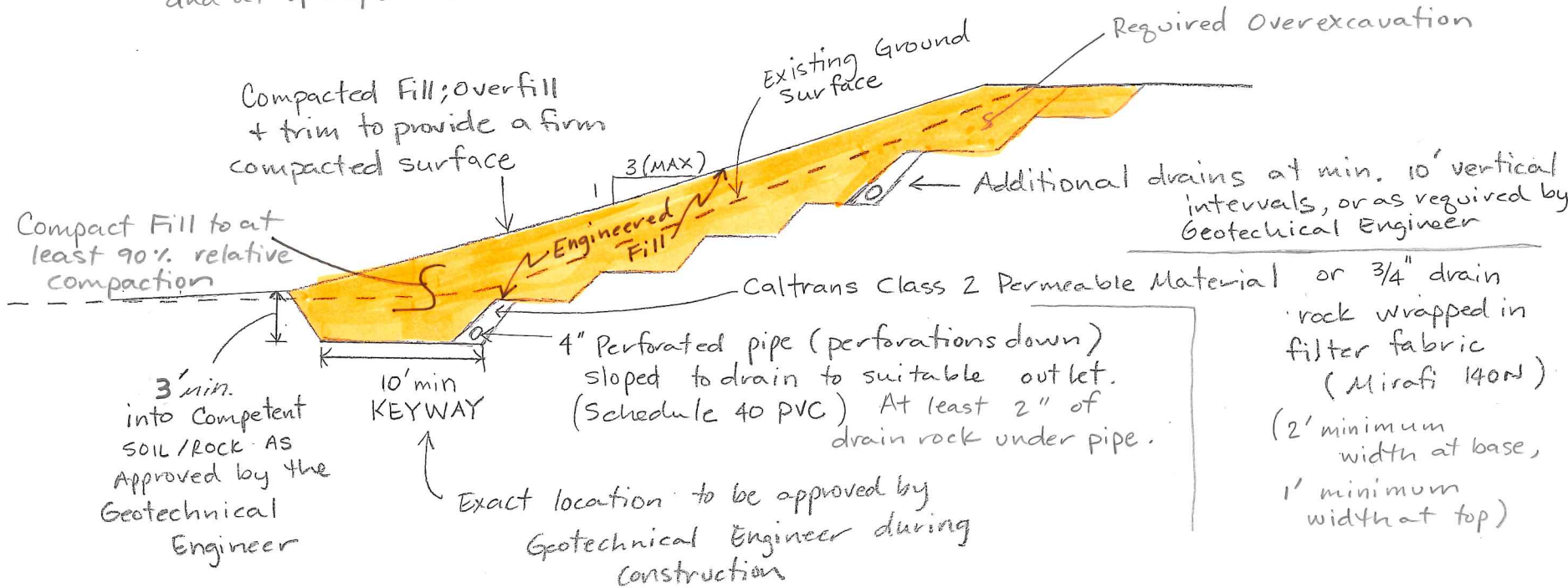
Copies: Addressee (1 via email)

DRAFT

Notes: 1. Keyway Excavation and subdrain installation should be observed by the Geotechnical Engineer.

2. Where existing slope exceeds 5:1 (horizontal to vertical) excavate series of benches in competent soil/rock approved by the Geotechnical Engineer.

3. All subdrains should have cleanouts at a min. of 200' intervals and at upslope end.



FILL SLOPE DETAILS

Plate 1
A3GEO

September 18, 2012

Ms. Judy Lieberman
Projects Director
City of Albany
1000 San Pablo Avenue
Albany, CA 94706

Re: Phase 1 – Preliminary Geotechnical Study
City of Albany Maintenance Center
Albany, California

Dear Ms. Lieberman,

This report presents the results of our preliminary geotechnical study for the City of Albany Maintenance Center Project located at the intersection of Washington Avenue and Cleveland Avenue in Albany, California. Our services were provided under our Agreement for Consultant Services with the City of Albany dated July 30, 2012.

1.00 INTRODUCTION

1.01 Site and Project Description

As shown on the Site Plan (Figure 1) and on the aerial photograph below, the project site is located between Albany Hill and Interstate 80 (I-80) in Albany, California. The site is bounded by Pierce Street and Albany Hill to the east; Cleveland Avenue and I-80 to the west; and Washington Avenue and

residential houses to the south. Surface grades in this area generally slope down towards San Francisco Bay. The present-day shoreline is about 500 feet west of the site. The property was obtained from the California State Department of Transportation (Caltrans) and various streets, ramps, highways, and other transportation-related surface improvements previously existed at the site that have since been demolished. As currently envisioned, the project will include the construction of a new 2-story maintenance facility with offices and parking, a neighborhood public park and a bicycle trail.

1.02 Purpose and Scope of Services

The primary purpose of our study was to provide preliminary geotechnical input to the City and the design team as planning-level concepts and cost estimates are developed. Our scope of work included: 1) participating in team meetings and providing geotechnical consultation, as needed; 2) reviewing available Caltrans records pertaining to previous construction, demolition and grading at the site; 3) confirming subsurface conditions with five borings and laboratory tests; and 4) preparing this report.

The Master Plan is currently being developed and various details involving the project are not yet known. This geotechnical study is intended to be preliminary and is not intended to provide design-level geotechnical recommendations. Prior to final design, a Design-Level Geotechnical Investigation will need to be performed for the project. Our scope of services also did not include an environmental assessment or investigation for the presence of hazardous, toxic, or corrosive materials on, below, or around the site.

2.00 METHODS OF INVESTIGATION

2.01 Review of Existing Data

We accessed and reviewed published maps (geologic maps, liquefaction hazard maps, landslide maps) and relevant reports and plans including the State of California Department of Transportation (Caltrans) Project Plans titled “Construction on State Highway in Alameda County in Albany” dated April 20, 2001. The review of existing data assisted in assessing geologic units, site development history, geologic conditions, and past grading operations.

A discussion of our findings from our existing data review can be found in Section 3.00, Site Conditions. A list of references used in our investigation is presented at the end of this report.

2.02 Subsurface Exploration

On July 24, 2012, we drilled five borings (designated as B-1 through B-5) at the approximate locations shown on the Site Plan, Figure 1. Northstar Drilling drilled the borings using a truck-mounted drill rig equipped with solid stem flight augers. An A3GEO engineer logged the borings, directed the drilling, and obtained samples at frequent intervals.

Soil samples were obtained using a 2-inch outside diameter (O.D.) Standard Penetration Test (SPT) sampler without liners and a 3-inch O.D. California Modified sampler with liners. The samplers were driven with a rope and pulley, 140-pound hammer system with an approximate 30-inch fall. The hammer blows required to drive the sampler the final 12 inches of each 18-inch drive are presented on the boring logs. Modified California sampler blow counts presented on the logs are adjusted N-values. Blow counts have been adjusted for sampler type by multiplying the field values 0.63. At the conclusion of the field investigation, the borings were checked for indications of free groundwater and were then grouted in accordance with Alameda County permit requirements.

During drilling, we visually/manually classified the soil in general accordance with ASTM D2488 classifications which are based on the Unified Soil Classification System (USCS). Field classifications were subsequently checked and revised, where appropriate, based on laboratory test data. The logs of the borings are attached at the end of this report preceded by: 1) a Key to Exploratory Boring Logs that describes the USCS and the symbols used on the logs; and 2) a Key to Rock Descriptions.

The attached boring logs represent our interpretation of the subsurface materials at the boring locations at the time of drilling. The passage of time may result in changes in the subsurface conditions. The boring locations indicated on the Site Plan (Figure 1) were determined by measuring from existing improvements and should be considered approximate.

2.03 Laboratory Testing

Our geotechnical laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical properties of the soils that underlie the site. The following geotechnical laboratory tests were performed:

- Water content per ASTM Test Designation D-2216;
- Dry density per ASTM Test Designation D-2937;
- Percent passing the No. 200 sieve per ASTM Test Designation D-1140; and
- Atterberg limits per ASTM Test Designation D-4318.

The results of the laboratory tests are presented on the attached boring logs at the corresponding sample depths.

3.00 SITE CONDITIONS

3.01 Geologic and Seismic Setting

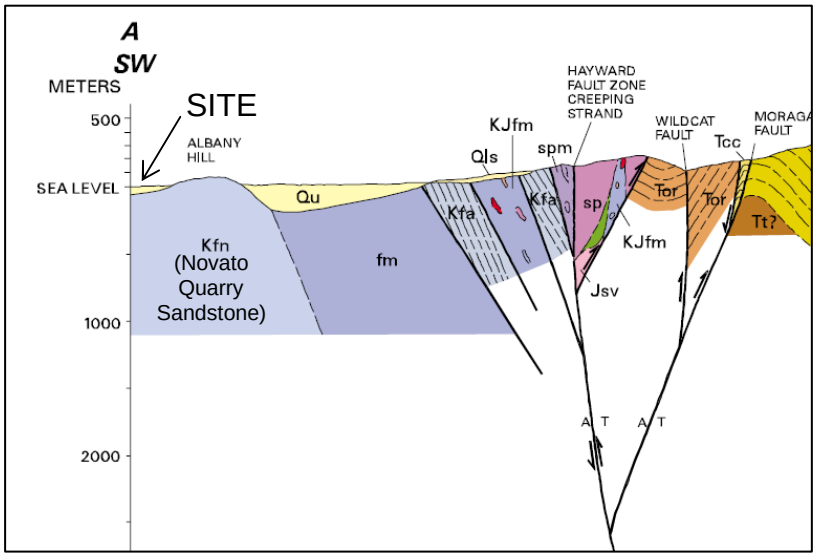
The site is located within the San Francisco Bay Region (SFBR), which is within the Coast Ranges geomorphic province of California. The Coast Ranges are a series of roughly parallel mountain ranges 2,000 to 4,000 (occasionally 6,000) feet in elevation above sea level that trend northwest and are bounded by intervening valleys. San Francisco Bay occupies the coastal valley closest to the Pacific Ocean; the Coast Range on the eastern side of San Francisco Bay is commonly known as the Berkeley Hills, which lie about 1.8 miles northeast of the site. Between the Berkeley Hills and the Bay is a broad gently-sloping plain that includes the cities of El Cerrito, Richmond and Albany. Locally, Albany Hill rises above the level the sloping plain.

The SFBR is situated at the boundary between the North American and Pacific crustal plates, which are in relative motion with respect to each other. Currently, the Pacific Plate is moving northwest relative to the North American plate. Within the region, continuing crustal plate movements are accommodated by a series of major active faults (including the Hayward-Rodgers Creek, Calaveras, Concord-Green Valley, Greenville, West Napa, and San Andreas faults). These major faults generally trend southeast-northwest, are near-vertical and generally exhibit right-lateral strike-slip movement (which means that the movement is predominantly horizontal and when viewed from one side of the fault, the opposite side of the fault is observed as being displaced to the right). Faults that are defined as active exhibit one or more of the following: (1) evidence of Holocene-age (within about the past 11,000 years) displacement, (2) measurable aseismic fault creep, (3) close proximity to linear concentrations or trends of earthquake epicenters, and (4) prominent tectonic-related aseismic geomorphology. Potentially active faults are defined as those that are not known to be active, but have evidence of Quaternary-age displacement (within about the past 2 million years). The closest active fault to the site is the Hayward-Rogers Creek fault which is located approximately 1.8 miles northeast of the site.

3.02 Local Geology and Hazard Mapping

As shown below, Graymer (2000) maps the site as being underlain by Pleistocene alluvium, map symbol Qpaf, and describes these materials as brown, dense gravelly and clayey sand or clayey gravel that fines upward to sandy clay. Albany Hill appears on the geologic map as a patch of unit Kfn, Franciscan rocks of the Novato Quarry terrane.

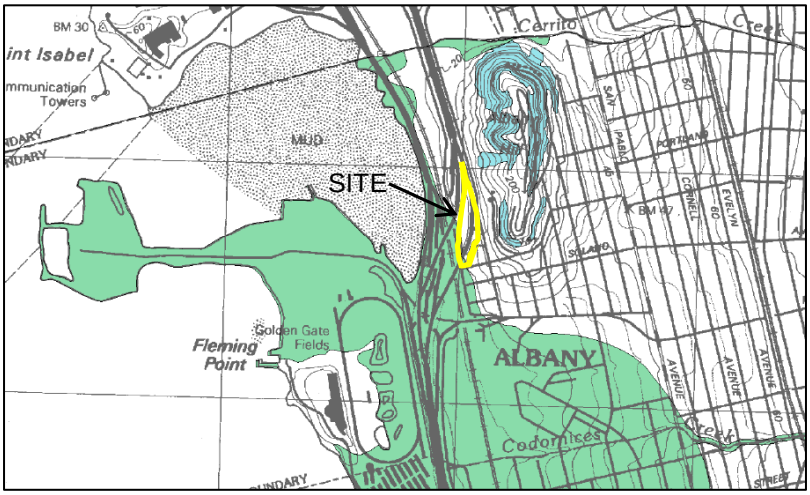
The line labeled "A" marks part of cross-section A–A' (shown below) and intersects the site.



As shown in the photo below, the site is located about 500 feet from the existing shoreline and about 85 feet from the historic shoreline.

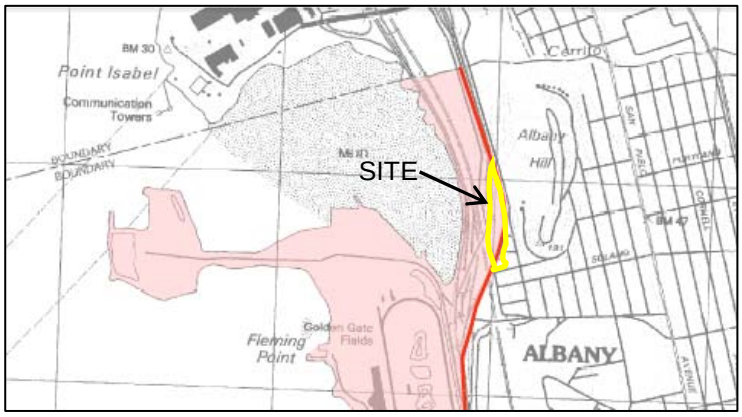
The Alquist-Priolo (AP) Earthquake Fault Zone Map published by the California State Department of Conservation, Division of Mines and Geology (CDMG, 1982), show active traces of the Hayward fault approximately 1.8 miles northeast of the site. The site is not located within an AP Earthquake Fault Zone.

Knudsen, et al (2000) maps the site as having “moderate” liquefaction susceptibility. The CGS State of California Seismic Hazard Zone map for the Richmond quadrangle shows the southern tip of the site in an earthquake-induced liquefaction hazard zone (green-shaded zone below). These State-prepared maps depict zones where investigations are required and not zones where liquefaction hazards are known to be present.



Pike (1999) maps the site as a “flatland” area or with “few” landslides.

As shown on the following page, the California Emergency Agency (Cal-EMA) in conjunction with the CGS and the University of Southern California have developed a series of Tsunami Inundation Zone maps for California. The maps attempt to delineate a “credible upper bound” to inundation at any location along the coastline based on an ensemble of source events affecting a given region. The map that includes Albany (CalEMA, 2009) shows about half of the site within a tsunami inundation area.



3.03 Site Development History and Surface Conditions

As shown in the photos below, I-80 and an off-ramp (Pierce Street ramp) covered much of the site until the late 1990’s.

1993

2002

The former off-ramp was supported on an earth fill abutment which is shown schematically on Figures 2 and 3 (Cross Sections A-A' and B-B'). During the demolition of the off ramp, a portion of the fill abutment was removed. After removal of the off ramp, Caltrans constructed an Embankment Confining System (ECS) (i.e., a reinforced earth slope) along the western margin of the site. The ECS, shown on the Site Plan (Figure 1) and on Schematic Cross Section B-B' (Figure 3) is discussed in more detail in Section 4.03 - Undocumented Fill and Fill Slopes.

3.04 Subsurface Conditions

Our borings typically encountered artificial fill over native clayey alluvium over sandstone bedrock. Figures 2 and 3 present schematic cross sections depicting surface topography and subsurface conditions (the locations of the cross sections are shown on the Site Plan, Figure 1). The cross sections are exaggerated vertically and the former off ramp abutment is shown on the cross sections for illustrative purposes. Please note that the subsurface features and former abutment shown schematically on Figures 2 and 3 are based on very little data and must therefore be considered approximate.

The subsurface conditions encountered in the borings are described briefly below and on the attached boring logs.

> ***Fill –*** Boring B-1 encountered 6.5 feet of fill; Boring B-2 encountered 4 feet of fill; Boring B-3 encountered 21.25 feet of fill; Boring B-4 did not encounter any fill; Boring B-5 encountered 4 feet of fill. The fill varied in consistency and contained layers of clay, sand, silt and gravel. Some fill was found to be highly plastic with a plasticity index (PI) of 40. The existing fill is considered undocumented in that no records have been found to show that the fill was placed in accordance with geotechnical engineering recommendations.
>
> ***Alluvium –*** The alluvium encountered generally consisted of yellowish brown to reddish brown, sandy lean clay (CL) with a layer of fat clay (CH) in Boring 2. The colluvium consistency ranges from firm to very stiff.
>
> ***Bedrock –*** The bedrock encountered consisted of clayey sandstone that was yellowish brown, deeply weathered, weak, intensely fractured to crushed with low hardness.
>
> ***Groundwater –*** Groundwater was not encountered in any of the borings. We anticipate that the depth to groundwater varies and could be higher at other times of the year, particularly during and following periods of prolonged rain.

4.00 <u>PRELIMINARY CONCLUSIONS AND EVALUATIONS</u>

4.01 Site Suitability

Based on the results of our preliminary investigation, we conclude that the envisioned project is feasible from a geotechnical standpoint. The principal geotechnical considerations for the project are discussed in the following sections.

4.02 Preliminary Geologic Hazard Evaluation

The San Francisco Bay Area is seismically active and it is likely that the site will experience earthquake ground shaking within the life of the project. For this reason, structures at the site should be designed to resist strong ground shaking in accordance with the requirements of the California Building Code (CBC) and local design practice. The seismic design provisions of the 2010 CBC include a methodology by which sites are classified as A through F in order to quantify site-specific ground shaking effects. As previously discussed the site is underlain by bedrock at relatively shallow depths, and we judge that a Class C designation (Very Dense Soil and Soft Rock) is appropriate for the design of the Maintenance

Center. Please refer to Section 5.01, Building Code Seismic Design Parameters, for applicable preliminary CBC seismic design parameters.

Historically, earthquake fault rupture most often occurs along pre-existing active faults. The proposed site is not located within an Alquist-Priolo Earthquake Fault Zone and no active faults are mapped across the site. The closest mapped active fault (the Hayward fault) is approximately 1.8 miles northeast of the site. Based on this information, we consider the overall risk of surface fault rupture at the site to be very low.

As previously mentioned, the site is mapped in an area with moderate liquefaction susceptibility by Knudsen (2000), and a very small portion of the site (southern tip) is within a state of California seismic hazard zone for earthquake induced liquefaction. Liquefaction is a phenomenon whereby certain types of soils below groundwater lose strength in response to earthquake shaking. The soils generally considered most susceptible to liquefaction are loose, saturated (i.e., below groundwater), coarse-grained soils (i.e., sands and gravels) having little or no cohesion. Groundwater was not encountered during our investigation and the native soils overlying the bedrock at the site were found to be predominantly clayey and not susceptible to liquefaction. There were some medium dense, granular layers of fill encountered, which if saturated, could be considered susceptible to liquefaction. We have recommended removing and re-compacting the fill during construction, thereby mitigating any potentially liquefiable layers. Based on this information, we consider the overall risk of liquefaction at the site to be low.

A landslide evaluation extending outside the subject site was beyond the scope of our investigation and we did not drill any borings on the slopes above the site. However, to our knowledge, no previously-mapped landslides intersect the site improvements. We did not observe any obvious signs of recent sliding during our reconnaissance or evidence of slide debris in the borings. However, the onsite fill materials are undocumented and we have no knowledge whether they were appropriately engineered. Consequently, we cannot preclude the possibility that the on-site fill slopes could experience future displacements under wet conditions and/or seismic shaking.

4.03 Undocumented Fill and Fill Slopes

As shown on the Site Plan, Figure 1, Borings B-1, B-2 and B-3 were drilled within the areas of the proposed building locations (identified as Alternates A, B and C on the Site Plan). Borings B-1 and B-2, located near Cleveland Avenue on the lower (southern) portion of the site, encountered 6.5 feet and 4 feet of fill, respectively. Boring B-3, located at the top of the fill slope in the center of the site, encountered about 21.25 feet of fill. The fill varied in consistency and included weak and highly expansive materials.

As identified on the Site Plan (Figure 1) and on the Schematic Cross Section B-B' (Figure 3), the fill slope along the western margin of the site consists of a 1:1 (horizontal to vertical) Embankment Confining System (ECS) constructed by Caltrans. The Caltrans construction plans show that the ECS consists of a reinforced fill slope with approximately 20-foot long wire-mesh layers spaced every 2.25 vertical feet. A permeable drainage layer is shown along the back and bottom of the ECS which connects to a perforated plastic pipe running along the toe of the slope. The location and integrity of the ECS, including the drainage system, needs to be considered during the planning phase of the project. Recommendations regarding the ECS are given in Section 5.04.1 - General Grading.

The undocumented fill is unsuitable for the support of new structures and should be appropriately mitigated as part of the design of any new improvements. This can be done in a variety of ways, the most common of which include: 1) removing and re-compacting the undocumented fill with properly engineered fill, or 2) founding structures on deepened foundations that extend below the fill and gain support in underlying natural soils and/or bedrock. In the second case, unbalanced lateral earth loads would also need to be considered where foundations are within or directly adjacent to undocumented fill slopes. We have provided recommendations for the first case, removing and re-compacting the fill beneath the buildings.

4.04 Expansive Soils

Atterberg Limits determinations conducted on selected samples of the fill resulted in Plasticity Indices (PIs) of 5, 40, 17 and 14. Soils with a PI greater than 15 are indicative of soils having a high expansion potential. Expansive materials shrink and swell in response to changes in moisture and have the potential to damage improvements that are supported on them. Swelling of expansive soils can also exert significant pressures, both vertically and laterally.

The damaging effects of expansive soils can be mitigated in a variety of ways, the most common of which include removal and replacement with non-expansive material, strengthening walls and foundations, and/or deepening foundations below the zone of seasonal wetting and drying. For preliminary design purposes, we recommend assuming that new improvements will need to be underlain by a layer of non-expansive material, unless founded below the zone of significant seasonal moisture variations. Additional information regarding expansive soil mitigation can be found in Section 5.04 – Earthwork.

4.05 Foundation Support

The building and site retaining walls can be supported on spread footings that bear on compacted engineered fill or native alluvium below the zone of seasonal wetting and drying. The building foundation recommendations presented in this report apply to the proposed building locations (Alternate A, B and C) and the finished floor elevations shown on the Site Plan, Figure 1, and should be considered preliminary. For the three locations identified, the footings would be supported on engineered fill with a maximum differential fill thickness of about 3 feet across the building pad following removal and replacement of the existing undocumented fill materials. This amount of differential fill thickness beneath spread footings is considered acceptable, from a post-construction settlement standpoint.

We recommend against supporting new spread footings foundations on: 1) engineered fill that varies substantially in thickness; or 2) bearing materials that vary significantly in stiffness (e.g. soil vs. rock). Pier and grade beam foundations could be a feasible alternative to deepened spread footings depending upon the subsurface conditions present at the final building location. Once the building location has been selected, we will conduct our Design-Level Geotechnical Investigation, consult with the design team and revise our foundation recommendations, if appropriate.

For building location Alternates B and C, a permanent retaining wall will need to be constructed at the back of the building. The retaining wall can either be a site retaining wall separate from the building or it can be the building wall. If the building wall will also act as a retaining wall, the wall will have to be: 1) designed as a restrained (basement-type) wall using at-rest earth pressures, 2) designed for surcharge loads, including those caused by vehicles and earthquake shaking, and 3) appropriately waterproofed.

4.06 Slab-on-Grade and Pavement Design Considerations

In general, slabs-on-grade and pavements should not be supported on undocumented fill unless the owner understands and accepts the risk of post-construction cracking and settlements that could be caused by fill-related movement. In addition, all slabs-on-grade and pavements should be underlain by a layer of non-expansive fill to mitigate the potential for damaging expansive soil effects. For preliminary design purposes, we suggest assuming that it may be appropriate to leave some of the deeper undocumented fill materials in place beneath exterior slabs-on-grade and pavements, but that this tentative conclusion would need to be checked as part of our future Design-Level Geotechnical Investigation. Preliminary recommendations for exterior slabs-on-grade, pavements and associated earthwork are presented later in this report.

4.07 Preliminary Construction Considerations

All excavations will need to be shored or sloped for safety in accordance with the applicable California Occupational Safety and Health Administration (Cal-OSHA) standards. If building location Alternate C is selected, the excavation may have to be shored to protect and/or avoid the Caltrans reinforced slope.

5.00 PRELIMINARY RECOMMENDATIONS

5.01 Building Code Seismic Design Parameters

The buildings should be designed in accordance with the applicable seismic design provisions of the California Building Code (California Building Standards Commission, 2010). We judge the following parameters to be appropriate for the site.

2010 California Building Code Seismic Design Parameters

2010 CBC Earthquake Design Factor	Value
0.2-Second Mapped Spectral Acceleration Parameter, S_s	1.761
1-Second Mapped Spectral Acceleration Parameter, S_1	0.652
Site Class	C
Short Period Site Coefficient, F_a	1.0
1-Second Period Site Coefficient, F_v	1.3
Short Period Adjusted MCE[1] Spectral Response Acceleration Parameter, S_{MS}	1.761
1-Second Period Adjusted MCE[1] Spectral Response Acceleration Parameter, S_{M1}	0.847
Short Period Design Spectral Response Acceleration Parameter, S_{DS}	2/3 S_{MS} = 1.174
1-Second Period Design Spectral Response Acceleration Parameter, S_{D1}	2/3 S_{M1} = 0..565

5.02 Foundations

The buildings and site retaining walls can be supported on deepened spread footings founded on either natural undisturbed stiff soil, weathered bedrock, or engineered fill. Prior to footing excavation, all undocumented fill and/or any weak or soft natural soil layers exposed within the planned building footprint should be over-excavated and replaced with engineered fill placed and compacted in accordance with the earthwork recommendations presented in Section 5.04 of this report. In addition, any footings located near or on sloping terrain should be positioned such that there is a minimum horizontal distance of 8 feet between the outside edge of the below grade structural element and the face of an adjacent slope.

Footings should be continuous, interconnected, at least 16 inches wide, and have both top and bottom reinforcement. Footings should extend at least 30 inches below the lowest adjacent finished grade. For preliminary design, the following allowable bearing pressures can be used:

Spread Footing Bearing Pressures for Preliminary Design

Load Case	Maximum Bearing Pressure in pounds per square foot (psf)	Minimum Factor of Safety
Dead Loads	2,000 psf	3.0
Dead plus Live Loads	3,000 psf	2.0
Total Loads (including wind or seismic)	4,000 psf	1.5

Resistance to lateral loads can be provided by friction along the foundation bottom and by passive pressures developing on the sides of below-grade structural elements. An allowable friction coefficient of 0.30 is considered applicable (factor of safety ≈ 1.5). A passive resistance of 300 pounds per cubic foot can be used for preliminary design. Passive resistance may be increased by one-third for short duration wind or seismic loads. In areas not confined by slabs or pavements, passive resistance should be neglected within 1 foot of the ground surface. Passive resistance should also be neglected where there is less than 8 feet, horizontally, between the below grade structural element and the face of an adjacent slope.

5.03 Retaining Walls

5.03.1 Lateral Pressures

Retaining walls should be designed to resist lateral earth pressures as well as any increases in lateral pressure caused by vehicle loadings and/or other surcharges that may be applied at the ground surface. The following equivalent fluid weights can be used to evaluate lateral earth pressures under static (i.e., non-earthquake) conditions.

Equivalent Fluid Weights in Pounds per Cubic Foot (pcf)

Slope Behind Wall	Free-to-Rotate Walls (Active Pressure Distribution)	Restrained Walls (At-Rest Pressure Distribution)
Level	40 pcf	60 pcf
3:1	50 pcf	70 pcf
2:1	60 pcf	80 pcf

Linear interpolation can be used to evaluate lateral earth pressures for other slope inclinations. Backslope inclinations steeper than 2:1 are not recommended.

Increases in lateral pressures caused by vehicle surcharges can be evaluated by applying a uniform lateral pressure of 100 pounds per square feet (psf) over the upper 10 feet of the wall. Increases in lateral loads caused by other types of surcharges can be estimated using a uniform lateral pressure of 0.5 times the anticipated surcharge load. Unusually heavy and/or concentrated surcharge loads should be evaluated on a case-by-case basis.

Increases in lateral pressures caused by seismic shaking can be evaluated using the following uniform lateral pressures; the parameter H is the height of the retaining wall, in feet.

Seismic Lateral Pressure Increase in Pounds per Square Foot (psf)

Slope Behind Wall	Uniform Pressure Increase
Level	18H psf
3:1	20H psf
2:1	24H psf

The applicability of seismic lateral pressure increases in conventional retaining wall design is a topic of ongoing research. The seismic lateral earth pressure increases presented in this section are conservative estimates and can be added to the free-to-rotate lateral earth pressures presented previously, regardless of wall restraint case. Seismic lateral earth pressures and increases in lateral pressures caused by vehicle surcharges need not to be applied simultaneously. It may also be appropriate to neglect seismic lateral pressure increases entirely under certain conditions. A3GEO should be consulted on a case-by-case basis if it is proposed that the seismic pressure increases presented in this section not be used for design.

5.03.2 Wall Drainage

The lateral pressures presented in the Section 5.03.2 are based on the assumption that retaining walls will be fully drained to prevent the build-up of hydrostatic pressure. Wall drainage may consist of either: (1) holes, slots or gaps in the wall that allow water to freely drain through the wall face; or (2) a wall backdrainage system that collects water from behind the wall and drains it, by gravity or other means, to an appropriate discharge location.

Backdrainage should consist of either: (1) prefabricated drainage material (Miradrain or an approved alternative) installed in accordance with the manufacturer's recommendations, or (2) a drain rock layer at least 12 inches thick. The backdrainage should extend up to within 2 feet of the top of the wall. Prefabricated drainage material should drain to a perforated plastic pipe or an approved prefabricated drainage conduit. Backdrainage should drain into a perforated plastic pipe installed (with perforations down) along the base of the walls on a 2-inch-thick bed of drain rock. Plastic pipe should be sloped to drain by gravity to a sump, relief wells or other suitable discharge, and a cleanout should be provided at the pipe's upslope end. Perforated and non-perforated plastic pipe used in the drainage system should consist of 4-inch diameter Schedule 40 PVC or an approved equivalent. Drain rock should conform to Caltrans specifications for Class 2 permeable material. Alternatively, locally available, clean, ½- to ¾-inch maximum size crushed rock or gravel could be used, provided it is encapsulated in a non-woven geotextile filter fabric, such as Mirafi 140N or an approved alternative. The upper 2 feet of retaining wall backfill (above backdrainage) should be comprised of low-permeability soil to limit surface water infiltration into the retaining wall backdrainage system.

5.04 Earthwork

5.04.1 General Grading

Prior to performing site excavations, all active subsurface utilities in and immediately surrounding the work area should be located, marked and protected or re-located. The Caltrans Embankment Confining System (ECS) and associated drainage should be protected during construction activities. Excavations close to the ECS may have to be shored.

5.04.2 Removal and Replacement/Re-compaction

In the locations where new buildings and/or site retaining wall foundations are planned, undocumented fill soils and any weak natural soil layers should be removed to a depth adequate to expose stiff natural soils. Excavated materials that meet the requirements for fill as outlined in section 5.04.2 may be used as backfill material. Excavations should be backfilled in conformance with the fill placement recommendations provided in section 5.04.4. Removal of fill and/or weak natural soil layers should generally extend a minimum of 5 feet laterally beyond the building footprint.

5.04.3 Fill Materials

All proposed fill materials should be approved by A3GEO prior to their use. Preliminary geotechnical requirements for fill materials are presented below.

General Fill - General fill material should have an organic content of less than 3 percent by volume and should not contain environmental contaminants or rocks or lumps larger than 6 inches in greatest dimension. From a geotechnical standpoint, onsite materials can be reused as General Fill if they meet or can be processed (e.g. by sorting and/or crushing) to meet the above requirements. General fill can be used anywhere except where non-expansive fill is required.

Non-Expansive Fill - Non-expansive fill should conform to the requirements for General Fill, have a Plasticity Index no greater than 15, a Liquid Limit no greater than 40. A non-expansive fill layer is required beneath slabs and pavements.

Imported Fill – Imported fill should conform to the requirements for Non-Expansive Fill and should be evaluated by our firm and the project environmental consultant prior to its importation to the site.

From a geotechnical standpoint, lime or cement treatment may be an appropriate means to process soils for use as Non-Expansive Fill; if lime or cement treatment is to be considered, A3GEO would assist the design team in developing an appropriate project- and site-specific specification for its use.

5.04.4 Fill Placement

Fill should be placed on surfaces that are firm, non-yielding and approximately horizontal. Preliminary geotechnical requirements for fill compaction are presented below (per ASTM D-1557 Test Methods):

- General Fill should be moisture conditioned, as necessary, to between 3 and 5 percent over optimum moisture content and compacted to at least 90 relative compaction.
- The upper six inches of subgrade soil underlying pavements should be moisture conditioned, as necessary, to near optimum moisture content and compacted to at least 95 relative compaction.
- Non-Expansive Fill and Aggregate Base should be moisture conditioned, as necessary, to near optimum moisture content and compacted to at least 95 percent relative compaction.

If fill materials are placed on slopes steeper than 5 to1 (horizontal to vertical) the fill should be keyed and benched into stiff native soil or weathered bedrock. Keyways should have a minimum width of 10 feet and the entire keyway should extend a minimum of 2 feet into stiff native soil or weathered bedrock. Gravel backdrainage, as described in section 5.03.2 should be provided along the upslope side of the keyway and benches.

5.04.5 Utility Trenches

Because of the potential for collapse of trench walls, we recommend the contractor carefully evaluate the stability of all trenches and use temporary shoring, where appropriate. The design and installation of the temporary shoring should be wholly the responsibility of the contractor. In addition, all state and local regulations governing safety around such excavations should be carefully followed.

Utility trenches should be backfilled with fill placed in lifts not exceeding 8 inches in un-compacted thickness. Trenches should be filled by placing a granular shading layer beneath and around the pipe, and then 6 to 12 inches of shading should be carefully placed and tamped above the pipe. The remaining portion of the trench should be backfilled with onsite or import soil. The backfill above shading should be placed and compacted by mechanical means to at least 90 percent relative compaction (per ASTM D-1557). If imported granular soil is used, sufficient water should be added during the trench backfilling operations to prevent the soil from “bulking” during compaction. All compaction operations should be performed by mechanical means only. Jetting should not be allowed. The preceding compaction recommendations are based on general geotechnical considerations. If local agency and/or utility company specifications require different or more stringent backfill requirements, those specifications should be followed.

A3GEO should observe utility trench backfilling and test compaction, as appropriate, to confirm and document that the work was performed in accordance with the specifications and the intent of our geotechnical recommendations.

5.05 Concrete Slabs-on-Grade

5.05.1 Interior Slabs

We recommend that any interior slabs that are cast on-grade be underlain by at least 18 inches of non-expansive fill. The upper 6 inches of this layer should consist of a moisture retarder that includes a crushed rock layer and a plastic membrane. Either of the two alternative moisture barrier systems described below are considered acceptable:

- 4 inches of free-draining gravel overlain by a vapor retardant membrane (Class A Vapor Retarder [ASTM E1745, latest revision]), covered with 2 inches of sand, or
- 6 inches of compacted aggregate base overlain by a heavy-duty impermeable membrane (Stego® wrap 15-mil or an approved equivalent) installed and taped in accordance with the manufacturer's recommendations.

The gravel/aggregate base layer associated with the moisture barrier system should be directly underlain by a 12-inch-thick layer of Non-Expansive Fill. The surface of the non-expansive layer should be proof-rolled under our observation and confirmed to be uniform and non-yielding prior to the placement of the gravel/aggregate base layer. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We recommend that interior slabs-on-grade be at least 5 inches thick and be reinforced with steel bar reinforcement.

5.05.2. Exterior Slabs

We recommend exterior slabs-on-grade be supported on a minimum of 12 inches of Non-Expansive Fill. Subgrades beneath slabs-on-grade should be proof-rolled under our observation and confirmed to be uniform and non-yielding prior to the placement of the slab reinforcement. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We recommend that exterior slabs-on-grade be at least 4 inches thick and reinforced with steel bar reinforcement. Exterior slabs should be structurally independent from buildings. Concrete slabs that may be subject to vehicle loadings should be designed in accordance with Section 5.07.2, "Rigid Pavements."

5.06 Surface Drainage

We recommend the rainwater collected on the roof of the buildings be transmitted through gutters and downspouts to closed pipes that flow (by gravity) to an appropriate discharge. The ground surface adjacent to the structure should slope away from the building at least 5%. Planter areas located next to the building should be avoided. If they are necessary, each planter should contain an area drain to allow the collection of water. If onsite disposal of water is required, we recommend that water discharge in areas where expansive soils are not present and as far away from the new building(s) as practical. Also, the designer should consider the possible effects of the shallow bedrock and cohesive nature of the onsite soils; granular import material may be needed to construct an appropriate percolation/infiltration system.

5.07 Pavements

5.07.1 Flexible Pavements

Flexible asphalt concrete (AC) pavements may be used for parking areas and driveways. We developed the following recommended pavement sections for various traffic indices using the Caltrans R-value design method for flexible pavements. The pavement sections presented are based on an assumed subgrade R-value of 30 for Non-Expansive Fill.

Flexible Pavement Thickness Design for Subgrade R-Value = 30

Traffic Index	Asphalt Concrete (inches)	Caltrans Class 2 Aggregate Base (inches)	Total Thickness (inches)
4	2	6	8
5	3	6	9
6	3	9	12
7	3	12	15

We recommend that the aggregate base be underlain by at least 12 inches of Non-Expansive Fill and that this layer extend at least 3 feet beyond the outside pavement edge unless a deepened curb or other moisture cutoff (at least 24 inches deep) is provided. The project civil engineer should choose the appropriate traffic indices for the pavement areas of the site and then use the given section for that traffic index. The upper 6 inches of subgrade beneath planned pavements should be compacted to at least 95 percent relative compaction per ASTM D-1557. Pavement subgrades should be proof rolled and confirmed to be uniformly firm and non-yielding prior to the placement of aggregate base. Aggregate base for use in pavements should conform to Caltrans Standard Specifications for Class 2 Aggregate Base. The aggregate base used in pavement sections should be compacted to at least 95 percent relative compaction as determined by ASTM D-1557.

5.07.2 Rigid Pavements

Rigid Portland cement concrete (PCC) pavements may also be used in driveway/loading areas. This section provides recommendations for Caltrans jointed plain concrete pavement (JPCP), which is engineered with longitudinal and transverse joints to control where cracking occurs. JPCPs do not contain steel reinforcement, other than tie bars and dowel bars. The project civil engineer should design and detail the JPCP per Caltrans specifications. We developed the following pavement thickness design using the Caltrans R-value design method for rigid pavements and an assumed traffic index. The section below is for subgrade soils with an R-value between 10 and 40.

Portland Cement Concrete Pavement Thickness Design

Traffic Index	Portland Cement Concrete (inches)	Caltrans Class 2 Aggregate Base (inches)	Total Thickness (inches)
< 9	9	12	21

In addition, we recommend the aggregate base be underlain by at least 6 inches of non-expansive fill to reduce adverse expansive soil effects. In parking areas and driveways, the non-expansive layer should extend at least 3 feet beyond the outside pavement edge unless a deepened curb or other moisture cutoff (at least 24 inches deep) is provided. The upper 6 inches of subgrade beneath planned pavements should be compacted to at least 95 percent relative compaction per ASTM D-1557. Pavement subgrades should be proof rolled and confirmed to be uniformly firm and non-yielding prior to the placement of aggregate base. Aggregate base for use in pavements should conform to Caltrans Standard

Specifications for Class 2 Aggregate Base. The aggregate base used in pavement sections should be compacted to at least 95 percent relative compaction as determined by ASTM D-1557.

5.08 Future Geotechnical Services

As previously noted, this geotechnical investigation is intended to be preliminary, and a Design-Level Geotechnical Investigation should be completed once the building location has been selected. Future concepts developed by the project team may vary from those presented in this report. In our judgment, it is essential that we be consulted as the final plans and improvement locations are being developed. We recommend that we consult with the project team and review the project plans and specifications to ensure that our geotechnical recommendations are appropriately incorporated. We also recommend that our firm be retained to provide geotechnical engineering services during construction to observe compliance with design concepts, specifications, and recommendations.

6.00 CLOSURE

This report has been prepared for the exclusive use of the City of Albany and their consultants for specific application to the proposed project in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

If you have any questions concerning this report, please call us.

Very truly yours,

Don Irby, P.E.
Project ngineer
Cell: (510) 207-4210

Dona K. Mann, P.E., G.E.
Principal Engineer
Cell: (415) 425-0247

Attachments: References
Figure 1: Site Plan
Figure 2: Schematic Cross Section A-A'
Figure 3: Schematic Cross Section B-B'
Key to Exploratory Boring Logs
Key to Rock Descriptions
A3GEO Boring Logs (B1 through B5)

REFERENCES

California Building Standards Commission, 2010, “California Building Code,” Sacramento, California.

California Division of Mines and Geology, 1982, “Special Studies Zones Map”, Richmond Quadrangle, dated January 1, 1982, 1:24,000.

California Emergency Management Agency (CalEMA), 2009. “Tsunami Inundation Map for Emergency Planning, State of California – County of Alameda, Richmond Quadrangle,” dated July 31, 2009.

California Geology Survey (CGS), 2003, “Seismic Hazard Zone Report of the Richmond 7.5-Minute Quadrangle, Alameda County, California,” Seismic Hazards Zone Report 070.

Graymer, R.W., 2000, “Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa and San Francisco Counties, California” U.S. Geological Survey, Miscellaneous Field Studies MF-2342.

Jennings, Charles W., and Bryant, William A., 2010, “Fault Activity Map of California,” California Geological Survey, Geologic Data Map No. 6.

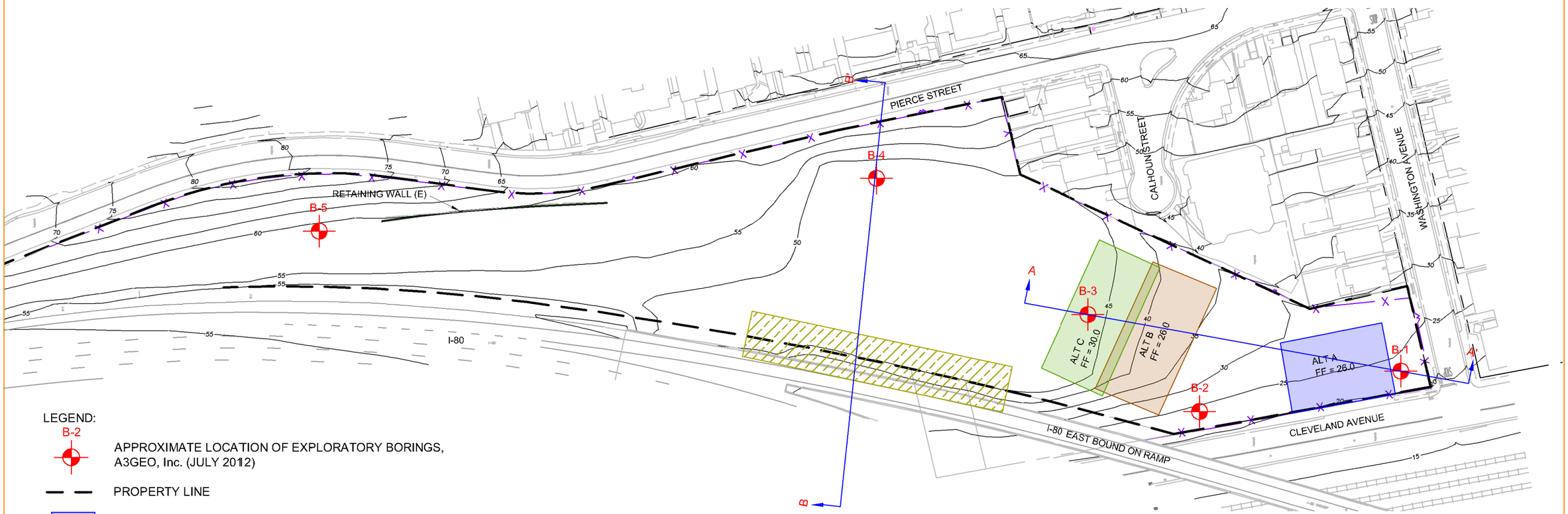
Knudsen, Keith L., Sowers, Janet M., Witter, Robert C., Wentworth, Carl M., and Helley, Edward J., 2000, “Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California: A Digital Database,” U.S. Geological Survey, Open File Report 00-444, Online version 1.0.

Pike, R.J., 1999, “San Francisco Bay Region Landslide Folio Part D – Index to Detailed Maps of Landslides in the San Francisco Bay Region, California,” U.S. Geological Survey, Open File Report 97-745 D, revised September 22, 1999.

State of California Department of Transportation, 2001, ”Project Plans for Construction on State Highway in Alameda County in Albany from 1.0 km South to 0.6 km South of Alameda/Contra Costa County Line, dated April 20, 2001.

A3GEO, Inc.
PROJECT No. 1115-1A
ALBANY MAINTENANCE FACILITY
RICHMOND, CALIFORNIA

A3GEO



LEGEND:

B-2 — APPROXIMATE LOCATION OF EXPLORATORY BORINGS, A3GEO, Inc. (JULY 2012)

PROPERTY LINE

APPROXIMATE LOCATION OF PROPOSED MAINTENANCE CENTER BUILDING (ALT A)

APPROXIMATE LOCATION OF PROPOSED MAINTENANCE CENTER BUILDING (ALT B)

APPROXIMATE LOCATION OF PROPOSED MAINTENANCE CENTER BUILDING (ALT C)

APPROXIMATE LOCATION OF EXISTING CALTRANS EMBANKMENT CONFINEMENT SYSTEM (ECS) - 1:1 REINFORCED FILL SLOPE

SCALE
0 100 200
FEET

NORTH

FIGURE 1
SITE PLAN

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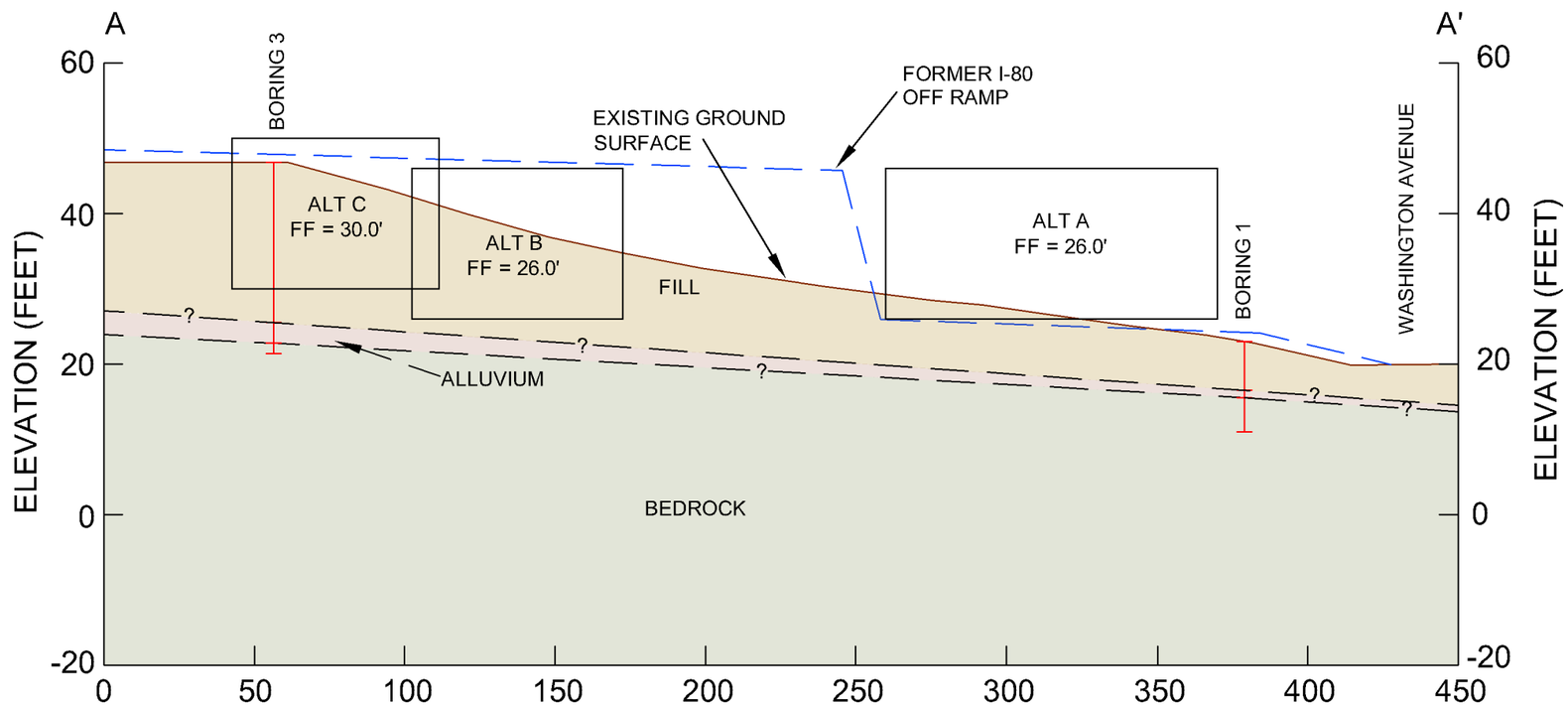
A3GEO, Inc.
PROJECT No. 1115-1A
ALBANY MAINTENANCE FACILTY
ALBANY, CALIFORNIA

A3GEO



LEGEND:

- FILL
- ALLUVIUM
- BEDROCK

NOTE: SUBSURFACE FEATURES AND FORMER GROUND SURFACE ARE SHOWN SCHEMATICALLY AND ARE BASED ON VERY LITTLE DATA AND MUST BE CONSIDERED APPROXIMATE

VERTICAL SCALE: 1" = 20'
HORIZONTAL SCALE: 1" = 50'

FIGURE 2

SCHEMATIC CROSS SECTION A-A'

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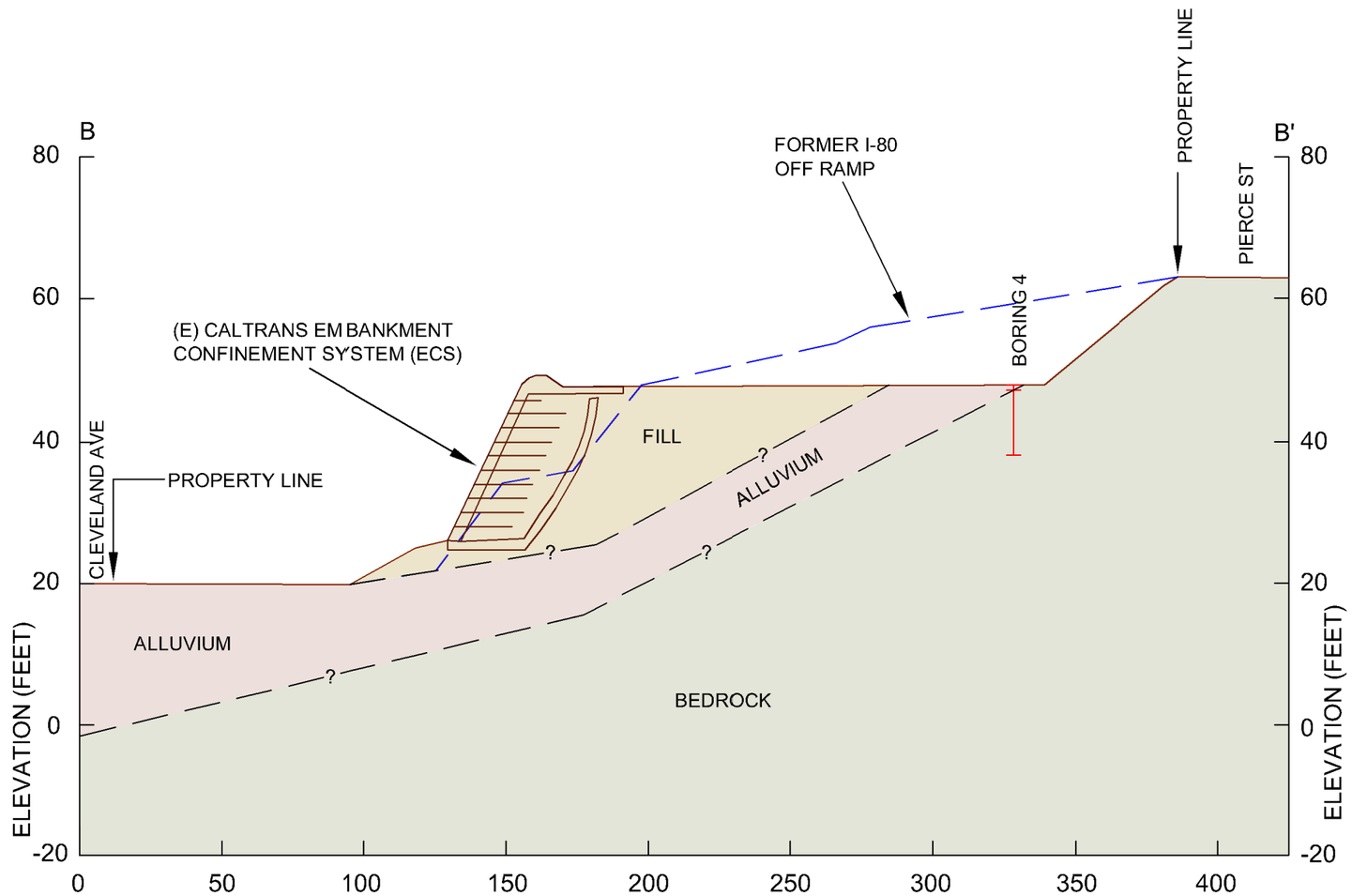
A3GEO, Inc.
PROJECT No. 1115-1A
ALBANY MAINTENANCE FACILTY
ALBANY, CALIFORNIA

A3GEO



LEGEND:

- FILL
- ALLUVIUM
- BEDROCK

VERTICAL SCALE: 1" = 20'
HORIZONTAL SCALE: 1" = 50'

NOTE:
SUBSURFACE FEATURES AND FORMER GROUND SURFACE ARE SHOWN SCHEMATICALLY AND ARE BASED ON VERY LITTLEDATA AND MUST BE CONSIDERED APPROXIMATE

FIGURE 3

SCHEMATIC CROSS SECTION B-B'

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UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYM	TYPICAL NAMES
COARSE GRAINED SOILS: more than 50% retained on No. 200 sieve	**GRAVELS:** 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS: more than 50% of coarse fraction passes through No. 4 sieve	CLEAN SANDS	SW	Well graded sands and gravelly sand, little or no fines
			SP	Poorly graded sands and gravelly sand, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-silt mixtures
FINE-GRAINED SOILS: 50% or more passes No. 200 sieve	**SILTS AND CLAYS:** Liquid Limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			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 sands or silts, elastic clays
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, muck and other highly organic soils

BOUNDARY CLASSIFICATION AND GRAIN SIZES

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
U.S. STANDARD SIEVE SIZES	No. 200	No. 40	No. 10	No. 4	3/4"	3"	12"

KEY TO LOGS

SAMPLE TYPE	DESCRIPTION
	Modified California Sampler (3" O.D.): blowcount is equivalent SPT N value (converted by multiplying field blowcounts by 0.63)
	Standard Penetration Test (2" O.D.)
	Thin-walled tube using Pitcher Barrel
	Shelby Tube, pushed or used Osterberg Sampler
	Disturbed Sample

*NOTE: RECORDED BLOW COUNTS HAVE NOT BEEN ADJUSTED FOR HAMMER ENERGY

KEY TO EXPLORATORY BORING LOGS

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BEDDING OF SEDIMENTARY ROCK		
SPLITTING PROPERTY	THICKNESS	STRATIFICATION
Massive	Greater than 4.0 feet	Very Thick-Bedded
Blocky	2.0 to 4.0 feet	Thick-Bedded
Slabby	0.2 to 2.0 feet	Thin-Bedded
Flaggy	0.05 to 0.2 feet	Very Thin-Bedded
Shaly or Platy	0.01 to 0.05 feet	Laminated
Papery	Less than 0.01 feet	Thinly Laminated

FRACTURING	
INTENSITY	SIZE OF PIECES IN FEET
Very Little Fractured	Greater than 4.0 feet
Occasionally Fractured	1.0 to 4.0 feet
Moderately Fractured	0.5 to 1.0 feet
Closely Fractured	0.1 to 0.5 feet
Intensely Fractured	0.05 to 0.1 feet
Crushed	Less than 0.05 feet

HARDNESS	
Soft	Reserved for plastic material alone
Low Hardness	Can be gouged deeply or carved easily by a knife blade
Moderately Hard	Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away
Hard	Can be scratched by a knife blade with difficulty; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched by a knife blade; leaves a metallic streak

STRENGTH	
Plastic	Very low strength
Friable	Crumbles easily by rubbing with fingers
Weak	An unfractured specimen of such material will crumble under light hammer blows
Moderately Strong	Specimen will withstand a few heavy hammer blows before breaking
Strong	Specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments
Very Strong	Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

WEATHERING:	
— the physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing	
Deep	Moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
Moderate	Slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
Little	No megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
Fresh	Unaffected by weathering agents. No discoloration or disintegration. Fractures usually less numerous than joints.

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BORING NUMBER 1

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 23.5 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No ground water encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		SILTY SAND (SM) - Dark brown to brown, medium dense, trace fine gravel, with thin roots, dry - (FILL)	MC	13		111	10		PI: 5 LL: 22 Gravel: 3.4% Sand: 47% -200: 49.6%
		SANDY LEAN CLAY (CL) - Dark brown, firm, fine to coarse grained sand, with thin roots, low plasticity, dry - (FILL)	MC	7					
		SANDY SILT(ML) - Yellowish brown, light brown, firm, with very fine grained sand, low plasticity, dry - (FILL)							
5		FAT CLAY WITH SAND (CH) - Mottled brown, reddish brown, stiff, high plasticity, with large roots, moist - (FILL)			1.375				PI: 40 LL: 57 Gravel: 0% Sand: 24% -200: 76%
		SANDY LEAN CLAY (CL) - Yellowish brown, light brown, white, very stiff, with fine to coarse sand, some silt, moderately plastic, moist - (ALLUVIUM)	MC	32/5.0"	3.5 >4.5				
10		CLAYEY SANDSTONE - Light brown, yellowish brown, deeply weathered, weak, low hardness, intensely fractured to crushed, dry							
		- at 11.0': increased hardness and strength	SPT	50/0.5"					

Bottom of borehole at 12.0 feet.

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BORING NUMBER 2

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 24 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No ground water encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		CLAYEY SAND WITH GRAVEL (SC) - Light brown to brown, medium dense, with fine to coarse grained sand, fine gravel, abundant roots, dry - (FILL)							
		CLAYEY GRAVEL (GC) - Mottled dark brown, brown, medium dense, with fine to coarse grained sand, fine to coarse angular gravel, low to moderate plasticity, moist - (FILL)	MC	20	1.75	119	8		Gravel: 42% Sand: 30% -200: 28%
		- at 3.0': large angular rock up to 2.5" in diameter							
		SANDY LEAN CLAY (CL) - Mottled yellowish brown, light brown, firm, with fine grained sand, moderately plastic, moist - (ALLUVIUM)	MC	6	0.75 1.0	108	18		
5		- at 4.5': silty sand between 4.5' to 4.75'							
		- at 8.5': mottled reddish brown color and silty sand with clay, fine to medium grained sand and pockets of stiff to very stiff fat clay	MC	14	2.25 3.125	117	15		
10		FAT CLAY (CH) - Red, reddish brown, stiff to very stiff, with some medium to coarse grained sand, highly plastic, moist - (ALLUVIUM)							
		SILTY SANDSTONE - Yellowish brown, deeply weathered, weak, low hardness, intensely fractured to crushed, dry	MC SPT	32/2.0" 50/1.5"					
15									
		Bottom of borehole at 17.1 feet.	SPT	50/1.0"					

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BORING NUMBER 3

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 47 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No groundwater encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		SANDY LEAN CLAY (CL) - Light brown, very stiff, with fine to coarse grained sand, fine to coarse angular gravel, low plasticity, moist - (FILL)							
		- at 1.75': thin lense of sandy gravel, fine to coarse grained sand and gravel up to 1.5" in size	MC	26	3.0	120	7		
			MC	20					
5		- at 4.5': crushed rock							
		- at 6.0': thin layer of black organic fat clay							
			MC	11		100	17		Gravel: 13% Sand: 28% -200: 59%
		LEAN CLAY WITH SAND (CL/CH?) - Mottled dark gray, grayish brown, gray, black, white, bluish gray, stiff, fine to coarse grained sand, with fine gravel, some silt, moderately plastic, moist - (FILL)							
10									
		- at 12.0': increased stiffness, moderately plastic	MC	15	>4.5				
15		SANDY LEAN CLAY (CL) - Gray, dark gray, grayish brown, greenish gray, stiff to very stiff, with fine and medium grained sand, trace fine gravel, some silty fines, moderately plastic, moist - (FILL)							
		- at 17.0': 1'-1.5' thick layer of dark brown, black, gray old topsoil	MC	5	1.0	111	15		LL: 30 PI: 17 Gravel: 1% Sand: 47% -200: 52%
20									

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BORING NUMBER 3

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 47 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No groundwater encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
20									
		SANDY LEAN CLAY (CL) - Yellowish brown, grayish brown, greenish gray, very stiff, with fine to coarse grained sand, fine to coarse gravel, low to moderately plastic, moist - (ALLUVIUM)	MC	21	4.5				
			MC	43					
25		- at 24.5': color grading to reddish brown							
		CLAYEY SANDSTONE - Yellowish brown, deeply weathered, weak, low hardness, intensely fractured to crushed, with dark stained fractures, fine to coarse grained sand, dry	SPT	50/4.5"					

Bottom of borehole at 25.4 feet.

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BORING NUMBER 4

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 48 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No ground water encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		GRAVELLY LEAN CLAY (CL) - Light brown, very stiff, with fine to coarse grained sand, low plasticity, dry							
		CLAYEY SANDSTONE - Mottled yellowish brown, deeply weathered, weak, low hardness, crushed, dry	MC	32/3.0"					
			MC	16/3.0"					
			SPT	50/5.0"					
5									
			SPT	55					
			SPT	50/3.0"					

Bottom of borehole at 9.8 feet.

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BORING NUMBER 5

CLIENT Burkstoma
PROJECT NAME Albany Maintenance Facility
PROJECT NUMBER 1115-1A
PROJECT LOCATION Albany, California
DATE STARTED 7/24/12 **COMPLETED** 7/24/12
GROUND ELEVATION 59.5 ft **HOLE SIZE** 4.5"
DRILLING CONTRACTOR Northstar Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY MNP **CHECKED BY** DKM
AT END OF DRILLING ---
NOTES No ground water encountered
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ROCK RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		CLAYEY GRAVEL (GC) - Dark brown to brown, medium dense, angular, low plasticity to non plastic, dry - (FILL)							
		LEAN CLAY (CL) - Light brown, yellowish brown, very stiff, with pockets of moderate to highly plastic clay, dry - (FILL)	MC	23		114	10		LL: 30 PI: 14 Gravel: 32% Sand: 32% -200: 36%
		CLAYEY GRAVEL (GC) - Dark brown to brown, medium dense, angular, low plasticity to non plastic, dry - (FILL)							
		GRAVELLY LEAN CLAY (CL) - Dark brown to black, very stiff, with medium to coarse grained sand, low to moderate plasticity, dry - (FILL)	MC	32/3.0"					
5		CLAYEY SANDSTONE - Yellowish brown, reddish brown, deeply weathered, weak, low hardness, intensely fractured to crushed, with quartz crystal, dry							
			SPT	50/5.5"					
		Bottom of borehole at 9.5 feet.	SPT	50/0.0"					

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