City of Pittsburg
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Public Works Department – Engineering Division

October 23, 2024

ADDENDUM NO. 1

PROJECT 3080 PITTSBURG PREMIER FIELDS

NOTICE TO BIDDERS:

The following clarifications, amendments, additions and/or deletions as set forth herein shall apply to the above project contract documents and shall be made a part thereof and shall be subject to all the requirements thereof as though originally specified and/or shown. Submitters shall assure themselves that all addendum changes have been incorporated into their proposal.

A. ADDITIONS/DELETIONS

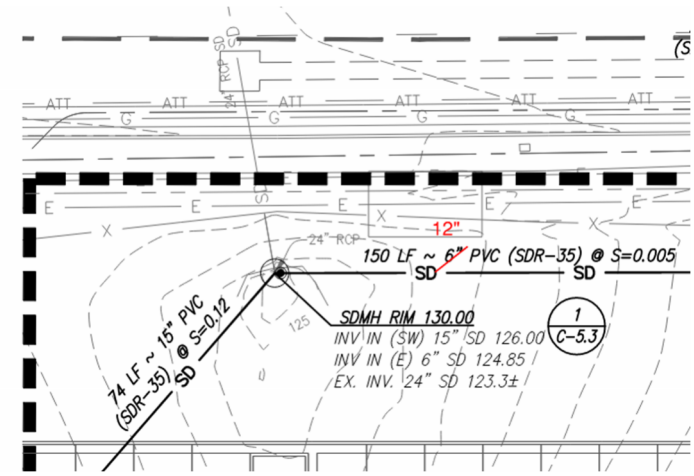
1. **Replace** the Bid Schedule – Attachment A
2. **Replace** the Spec Section "UNIT PRICES" 01 22 00 – Attachment B
3. **Added** the Geotechnical Report – Attachment C
4. **Replace** the following Plans/Specifications:
   a. Sheet C4.2 – Utility Plan (added services pipe sizes/modified SD pipe sizes)
   b. Sheet C4.3 – Utility Plan (removed deduct alternate #1 note/added irrigation pipe service size/revised SD pipe sizes and SDCB for field)

B. CLARIFICATIONS

Please be advised of the following clarifications to the contract documents:

1. *Question:* Please confirm what is to be included in the storm drain connection bid item 25. The new park drainage appears to all remain onsite. The offsite drainage connects to the existing 24" SD with a manhole, but not sure where else there is another SD connection.

   Answer: Both on-site and off-site SD connections are accounted for in this bid schedule as item 25 (2 locations). The connection to the existing 24" SD pipe shown on C4.4 include manhole cost. The other SD connection is shown on sheet C4.2 where the existing 24" SD line is intercepted with a SDMH which MH cost is accounted as well, see below.



2. *Question:* Bid item 30 "Potable Water Line" includes 90 lf, yet the Fire Water Line bid item #31 includes 45 lf. Please confirm that the Potable Water Line bid item includes the two water laterals as they don't appear to be differentiated between potable and Fire.

   Answer: The "Potable Water Line" quantity includes the irrigation line shown on C4.3. The quantity is correct.
   - *45' LF of 6" line for Fire water*
   - *45' LF of 4" line for Domestic Water*
   - *45' LF of 4" line for Irrigation water*

3. *Question:* Irrigation Air Relief Valve Assembly bid #60 calls out 12 ea. Please confirm where these are located as only one appears to be shown on the plans.

   Answer: The quantity shall be revised to "18". The item has been renamed to "Flush Valve". See the revised Bid Schedule. These are drip system air relief valve assemblies. The mainline air relief valve shall be included in the cost paid for by bid items 67 & 68, see revised Spec Section 01 22 00 - UNIT PRICES

4. *Question:* Per detail L-1 on sheet L6.1 trees are shown with 2 ea pipe with deep root bubblers, this conflicts with the tree bubbler detail shown I014/L4.7. Please confirm which is correct and provide a model number for the deep root bubbler if it is required.

   Answer: Tree bubbler layout shall be placed as shown in detail I-14 (plan view). Install Rainbird RWSB1401 with non-potable cap (2 per tree).

5. *Question:* Please confirm the quantity of bid item 43 Valley Gutter in the amount of 1311 LF. Seems like a quantity bust.

Answer: The quantity shall be revised to 142 LF. See revised Bid Schedule.

6. *Question:* Please confirm what thickness of the new asphalt pathway bidders should assume for bid purposes as shown on L3.3 where it mentions "asphalt paving, typ. to match existing trail".

Answer: 2" AC over 4" class II base.

7. *Question:* Please confirm what size and type the Bubble Up Boxes per detail (6/C-5.3) are. Also please confirm where these items are to be paid as there is not a bid item for these bubble ups.

Answer: 12" x 12", and is under bid item 16 which has been revised on quantity to 2 and title to "Storm Drain Area Drain". They are located on the bioretention basins.

8. *Question:* Please confirm that the offsite storm as shown on C-4.4 is to be included in the proposal. If so, where should this work be included in the bid as the quantities aren't included in the bid items.

Answer: Yes, the offsite SD is to be included in this bid. Bid item 18 has been replaced with the 24" SD pipe quantity, see revised Bid Schedule.

9. Per C-4.3 there is an area delineated "deduct alternate #1" please confirm where this alternate is shown on the bid form.

Answer: Deduct alternate is eliminated and is bid item 94. The deduct note shown on sheet C-4.3 has been eliminated, see revised plan sheet attached.

10. *Question:* Please confirm the size of the existing water line we're connecting to for the Fire and potable water. Also please confirm the sizes of the new services we're installing.

Answer: The new services are follows: fire line (6"), potable line (4"), and irrigation (4"). See revised sheet C4.2 attached.

11. *Question:* Please confirm that bid item 29 "Sanitary Sewer Connection" Includes a new manhole at the sewer connection as shown on C-4.1. If this connection bid item does not include the manhole, where is that item to be paid?

Answer: This bid item includes the new sewer manhole for the sewer connection cost. The unit price spec section has been updated to include the SSMH cost.

12. *Question:* Bid item 66 is for Irrigation Sleeves 4" & 8", Plan sheet L4.3 shows 10" irrigation sleeve, please confirm where this will be paid for.

Answer: All pipe sizes are included in bid item 66. Bid item title has been revised to include the 10" sleeving. See revised Bid Schedule.

13. *Question:* Please provide a detail where new Type A Concrete per detail (1/L6.3) abuts new curb. Will we still be required to provide the 15" thickened edge?

    Answer: Thickened edges of Type A concrete are only required at interfaces to planting areas.

14. *Question:* The SDAD shown on C-4.2 appears to be a round inlet. Please confirm what model this is, and where it is to be paid.

    Answer: Refer to question 7.

15. *Question:* Several sections of the specifications refer the Geotechnical Report by BSK and a Project Asbestos and Lead Inspection Report. Please provide these reports for review.

    Answer: Geotech report will be included in this Addendum as attachment C. Disregard Asbestos and Lead inspection report notations within the project specifications as they are not applicable.

16. *Question:* Several sections mention a Field Office, if required by the Special Provisions. We did not see anywhere in Specials specifically requiring a field office. Is one required, and if so is it for Contractor's use or City's? If for City, please specify what is required.

    Answer: No, field office is required by the City.

17. *Question:* Plan Sheets C3.5 and C3.6 call out Slurry Seal. There are no specs provided for slurry seal and there is no bid item. Can you please provide specs and where it is to be paid?

    Answer: See revised civil sheets. Slurry Seal has been eliminated.

18. *Question:* Item 19 of the Instructions to Bidders states, "The prime contractor must perform at least 50% of the Work on the Project, calculated as a percentage of the base bid price, with its own forces, except for any Work identified as "Specialty Work in the Contract Documents." There are several significant sub packages associated with this project, none designated as specialty. Would the City consider lowering the self-perform requirement to 30% per Caltrans Standard Spec Section 5-1.13 Subcontracting?

Answer: No.

19. *Question:* Bid item 11 for Fine grading has a quantity of 265,262 sf. Bid item 48 for Hydroseed and Bid item 53 for Landscape Soil Preparation include fine grading. There isn't another 265,262 sf of area to fine grade on the project. Please confirm what is to be included in bid item 11 and if this quantity is correct.

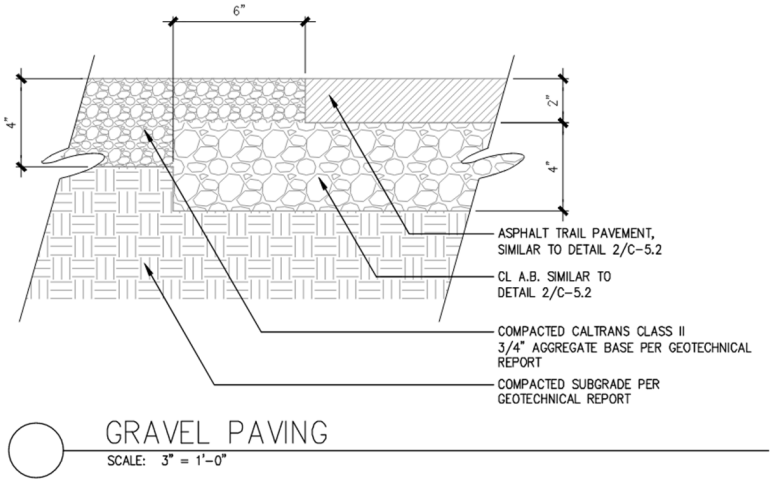
    Answer: See revised Unit Price Description for Items 48 and 53 as Fine Grading has been removed from the description. All Fine Grading shall be paid for under Bid Item 11 and the quantity has been revised to 261,000 SF. As a result of this Bid Item 48 has been revised to 49,508 SF, see revised bid schedule.

20. *Question:* Please confirm the required thickness of topsoil in all planting areas. Also, while the specifications are not clear we would expect to strip the existing topsoil and reuse in all planting areas in lieu of import. Please confirm what thickness of topsoil should be assumed currently exists, 6" is industry standard. If we should assume all import topsoil, please confirm.

    Answer: On-Site" topsoil may be stripped, stockpiled, placed and amended for reuse in planting areas. Topsoil & organics shall be removed in accordance with the Geotechnical Report. The thickness of placement of On-Stie Topsoil may vary between 2"- 4" for lawn areas and 4"-6" for landscape planting areas, although there is no maximum. Topsoil with organics shall not be utilized for any fill slopes exceeding 3:1 slope

21. *Question:* Per C-3.2 Gravel, S.L.D. callout which is the wide gravel path from the drive lane to the soccer field. Please provide a detail and pay item for this gravel.

    Answer: The gravel paving is 4" ¾"CL II AB over compacted subgrade per Geotech report, see detail below. This detail will be added to the conform construction set.

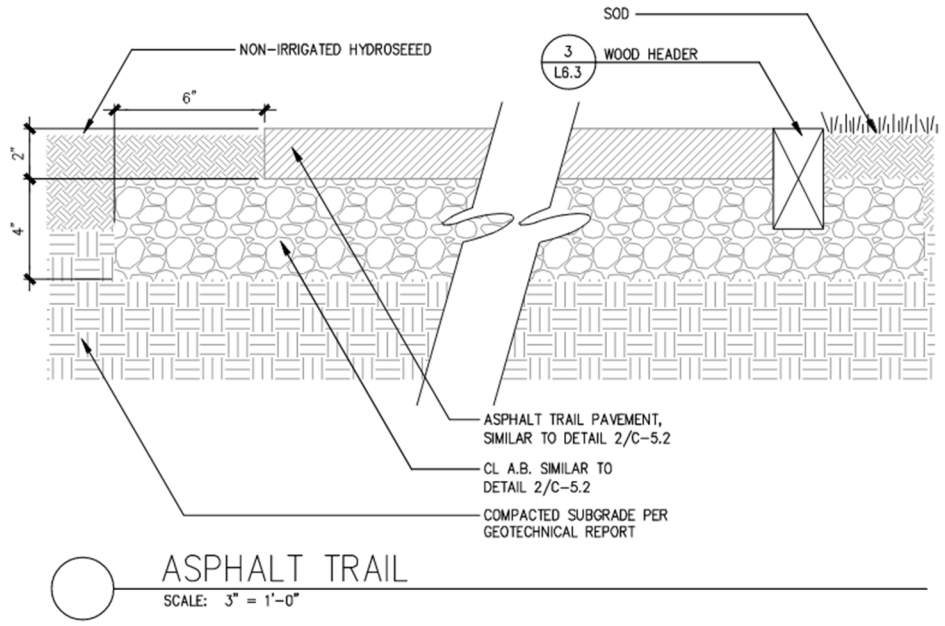


22. We completed our takeoff and our quantity for Bid Item No. 36 – Asphalt Pavement is almost 25% higher than the bid quantity listed – 1,740 tons. Could the City please check and make sure their quantity for this bid item is correct.

    Answer: The updated quantity is 1,900 tons.

23. Please confirm that the asphalt pedestrian walkway structural section will be 3 ½" of hot mix asphalt over 12" of aggregate base.

    Answer: 2" over 4" per updated detail for Pedestrian Asphalt, see detail below. The detail will be added to the conform construction plan set.



24. Does the City want to utilize a ¾" or ½" asphalt mix for the pedestrian pathway?

    Answer: You can use ¾" but the top layer needs to be ½" for a smoother final product.

25. Does the asphalt pedestrian pathway when not adjacent to a concrete curb require redwood header to be installed?

    Answer: Asphalt pathway along the sod field shall have a Douglas fir header. The back of the walkway shall not have a header.

26. If redwood header is required how will the contractor be compensated for this scope of work?

Answer: Header is paid for under bid item 81, Header.

27. Section 31-05-13 page 11 of Contract Specifications indicates potentially lime treating the soil but nothing is indicated on the drawings as far as depth of lime treatment. Please clarify if the soil is to be lime treated and at what depth?

    Answer: Refer to Geotechnical report for depths and preparation of subgrade using Lime. All landscape areas to receive planting to be kept free of lime treatment.

28. The Contract Specifications discuss the Contractor obtaining permits, but no permits are listed. Please provide permits Contractor will be responsible to obtain and potential fees of these permits.

    Answer: There is a water meter permit that can be obtained at City Hall, application with the pricing is appendix C in the specs. An encroachment permit will also be needed but that's at a no fee cost.

29. Will temporary fencing with screening be required around the entire site?

    Answer: Screening is not required. The site has existing fencing which can be partially utilized. Additional temp fencing to secure the site will be required.

30. Question: Per 33 01 30 paragraph 2.5 "For Capital Improvement Projects (CIP) and new development projects, the CCTV inspections shall be completed by the City. The project developer shall pay the city for the CCTV inspection services and fees...". Please confirm whether the contractor will be responsible to provide CCTV or the city will provide it, and who pays for it?

    Answer: If CCTV inspections are required they will be performed by the city.

31. With Non-Mandatory walk scheduled tomorrow, and to allow proper time to review plans and specifications. Any possibility to push out the project Bid date 1-2 weeks ? Would love adequate time to review project

    Answer: Unfortunately, we cannot push the bid date.

32. Estimated Start Date and Completion Date?

    Answer: As outlined in the Notice Inviting Bids sheet 6, section 2.2; We are expected to kick off construction in December and complete within 240 calendar days from the start date set on the Notice to Proceed.

33. Contract Duration ?

Answer: Refer to answer above.

BIDDERS MUST SIGN AND ATTACH one (1) copy of this addendum document to the proposal as acknowledgment of receipt of these instructions and that said addendum was properly evaluated in the proposal.

ANY PROPOSAL NOT IN COMPLIANCE WITH THIS ADDENDUM MAY BE REJECTED.

Issued: 10/23/24

Mariana Mena, P.E.
Senior Engineer

ADDENDUM NO. 1, PROJECT 3080 PITTSBURG PREMIER FIELDS is hereby acknowledged and was considered in this Project Proposal.

Bidder's Signature _____ Date _____

Firm Name _____

Mailing Address _____

City/State/Zip+4 _____

Bid Schedule

This Bid Schedule must be completed in ink and included with the sealed Bid Proposal. Pricing must be provided for each Bid Item as indicated. Items marked "(SW)" are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the "Extended Total Amount" column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal form.

AL = Allowance CF = Cubic Feet CY = Cubic Yard EA = Each LB = Pounds
LF = Linear Foot LS = Lump Sum SF = Square Feet TON = Ton (2000 lbs)

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
1	Bonding & Mobilization	1	LS		
2	Construction Surveying	1	LS		
3	Traffic Control	1	LS		
4	SWPPP	1	LS		
5	QSP Services	1	LS		
6	Clearing & Grubbing	1	LS		
7	Demolition	1	LS		
8	Tree Protection	1	LS		
9	Tree and Stump Removal	23	EA		
10	Earthwork - Rough Grade	50,000	CY		
11	Fine Grading	261,000	SF		
12	Bioretention Soil Mix (BSM)	470	CY		
13	Traffic Signalization	1	LS		
14	Drainage Catch basins (12" SQ)	4	EA		
15	Drainage Catch basins (18" SQ)	10	EA		
16	Storm Drain Area Drain	2	EA		
17	Storm Drain Manhole	5	EA		
18	Storm Drain Piping 24"	275	LF		
19	Storm Drain Piping 6" Perforated	311	LF		
20	Storm Drain Piping 6"	319	LF		
21	Storm Drain Piping 8"	241	LF		
22	Storm Drain Piping 10"	215	LF		
23	Storm Drain Piping 12"	1,002	LF		
24	Storm Drain Piping 15"	424	LF		

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
25	Storm Drain Connection	2	EA		
26	Storm Drain Cleanouts	8	EA		
27	Sanitary Sewer Cleanouts	2	EA		
28	Sanitary Sewer Piping 4"	386	LF		
29	Sanitary Sewer Connection	1	EA		
30	Potable Water Line	90	LF		
31	Fire Water Line	45	LF		
32	Water Valve	3	EA		
33	Water Line Tie In	3	EA		
34	Backflow Preventor	1	EA		
35	Bioretention Drain Rock	392	CY		
36	Asphalt	1,900	TONS		
37	Aggregate Base Course	8,000	TONS		
38	Concrete Curb	3,900	LF		
39	Concrete Paving A	5,437	SF		
40	Landscape Wall	40	LF		
41	Curb Ramp	8	EA		
42	Traffic Signage	1	LS		
43	Concrete Valley Gutter	1,311	LF		
44	Wheel Stops	8	EA		
45	Striping Removal	1	LS		
46	Striping	1	LS		
47	Stairs & Handrails	1	LS		
48	Hydroseed	49,508	SF		
49	Shrub - 1 Gal	1,489	EA		
50	Sod	66,095	SF		
51	Trees - 24" Box	30	EA		
52	Trees - 15 Gallon	28	EA		
53	Landscape Soil Preparation	146,500	SF		
54	Root Barrier	768	LF		
55	Mulch	19,100	SF		
56	Plant Establishment Period	146,500	SF		
57	Irrigation Controller	1	EA		

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
58	Irrigation Rotors	48	EA		
59	Irrigation Bubblers	465	EA		
60	Flush Valve	18	EA		
61	Irrigation Tree Bubblers	116	EA		
62	Irrigation Lateral Line	8,700	LF		
63	Irrigation Conduit	10	LF		
64	Irrigation Gate Valves	5	EA		
65	Irrigation Drip	13,400	SF		
66	Irrigation Sleeves	1,075	LF		
67	Irrigation Main line 2"-3"	1,250	LF		
68	Irrigation Main line 4" & 6"	725	LF		
69	Irrigation Master Valve and Flow Sensor	1	EA		
70	Irrigation Low voltage wire	1	LS		
71	Irrigation Quick Coupler Valves	9	EA		
72	Irrigation Remote Control Valves	34	EA		
73	Irrigation Angle Valves	4	EA		
74	Irrigation Restoration	1	LS		
75	Boulders	2	EA		
76	Fence A (6')	155	LF		
77	Fence B (8')	135	LF		
78	Gate A	1	EA		
79	Gate B	2	EA		
80	Gate C	2	EA		
81	Header	455	LF		
82	Soccer Goals	2	EA		
83	Park Sign	1	EA		
84	Relocated Park Sign	1	EA		
85	Site/Area Post top Luminaire	27	EA		
86	Lighting control system	1	LS		
87	Electrical Main Switchboard	1	LS		
88	Distribution Power	1	LS		
89	Transformers	1	LS		

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
90	Conduit and Conductors (Electrical and Lighting)	1	LS		
91	Conduit (Technology, 2-inch, 4-inch)	960	LF		
92	Handholes (Pullbox)	27	EA		
93	Underground vaults	3	EA		
94	Fill slope, Keyway and Subdrain	1	LS		

* Final Pay Quantity

TOTAL BASE BID: Items 1 through 94 inclusive
$_____

Note: The amount entered as the "Total Base Bid" should be identical to the Base Bid amount entered in Section 1 of the Bid Proposal form.

BIDDER NAME:
_____

END OF BID SCHEDULE

SECTION 01 22 00 –UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies procedures and requirements for measurement and payment for unit price items listed on the Bid Form for each unit of work described herein.

B. Refer to Division 00 General Conditions and Division 00 Article 8 – Payment for related requirements pertaining to change orders, payments and unit prices.

C. Prices:
1. In addition to Base Bid, Bidder shall quote unit prices, in appropriate spaces on Bid Form for each unit of work as described herein. Change Orders will be based on unit prices quoted on Bid Form for applicable work.
2. In event any unit price quoted appears to compare unfavorably with currently established prices for type of work, City reserves the right to require quoted price to be substantiated or adjusted prior to execution of contract.
3. Unit prices listed on the Bid Form for the following items shall constitute full and complete compensation for each unit, and shall include cost of temporary and administrative work, permits, bonds, insurance, sales taxes, overhead, profit and every other expense, direct or indirect, incident to accomplishment of work under each item.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 MEASUREMENT

A. Measurement of quantities for payment will be made or determined by City's Inspector.
1. Volume of any material shall be based on information included with Drawings and additional measurements obtained by Inspector, or by combination of such information, or in a manner which, in the opinion of the Inspector, is best suited to obtain necessary accuracy.
2. In case of unit prices based upon weight measurement, certified weight tickets shall be supplied at time of delivery of materials.

3. Excess materials delivered to the site, but not incorporated in the work, will not be paid for.

3.2 UNIT PRICE ITEMS

A. Bid Item No.1 – Bonding & Mobilization

1. All work involved in Mobilization will be measured by Lump Sum, unless otherwise specified in the Contract Documents.
2. Payment for “Mobilization” shall constitute but not limited to full compensation for all such work. Payment for mobilization will be made in the form of a Lump Sum, non-prorate-able payment, no part of which will be approved for payment under the Contract until all mobilization items listed herein have been completed as specified. The scope of the work included under this bid item shall include the obtaining of all bonds, insurance, and permits; moving onto the project site, inclusive of any staging areas, all equipment, personnel, and permanent and temporary facilities as required for the proper performance and completion of the Work. Mobilization shall include but not be limited to the following principal items:
   a. Arrangement with and payment for project staging areas with necessary responsible parties, inclusive of all necessary site investigation, reporting, permitting, traffic control, temporary fencing, crushed rock surfacing (if required), and all other improvements upon the land and work associated with the establishment and ongoing maintenance of staging areas.
   b. Moving on to the project site of all Contractor's equipment, personnel, and temporary and permanent facilities required for the project.
   c. Installing a minimum of one (1) project identification sign, including all necessary work to manufacture, label, place, maintain, remove, and dispose of such identification signs and all labor, materials, tools, and equipment in performing the work required per the Contract Documents.
   d. Providing on site sanitary facilities and potable water facilities.
   e. Furnishing, installing, and maintaining all storage buildings or sheds required for temporary storage of products, equipment, or materials that have not yet been installed in the Work. All such storage shall meet manufacturer's specified storage requirements, and the specific provisions of the specifications, including temperature and humidity control, if recommended by the manufacturer, and for all security.
   f. Any work, coordination, hardware/software, Internet, and related technical or process-based activities associated with the project’s web-based document management system.
   g. Obtaining and paying for all required bonds, insurance, permits and licenses.
   h. Posting all OSHA required notices and establishment of safety programs.
   i. Submittal of required Construction Schedule.

j. Conducting a pre-construction photographic survey of construction access, existing areas to remain, and all work areas.

3. Note: Contractor is advised that no payment for the “Mobilization” bid item will be made unless the construction schedule and traffic control plan have been submitted and accepted by the Engineer.
4. In addition to the requirements specified above, all submittals shall conform to the applicable requirements of Section City Standard Section 1-14, Shop Drawings and Product Data Submittals for submittal requirements and procedures.
5. No payment for any of the listed mobilization and demobilization work items will be made until all of the listed items have been completed, as specified, to the satisfaction of the Engineer.

B. Bid Item No 2 – Construction Surveying

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in land survey and staking, including control surveying, staking calculations, calculating grades for all hardscape, pipes grading and all other items listed in the specifications, submitting staking calculations in AutoCAD to the engineer for all items listed in the specifications, field surveying/staking, topo shots on curb forms prior to pouring concrete, protecting survey monuments, referencing survey monuments, pothole survey, quality control survey and as-built GPS surveys complete in place as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

C. Bid Item No 3 – Traffic Control

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in providing Traffic Control and Pedestrian Access Plans for each stage of construction, including placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system (excluding construction area signs), installing AC paving as required for all traffic control and handling, temporary traffic striping and markers as required and supervision, furnishing Flaggers as necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered, complete in place, including coordinating for traffic control and maintaining of existing, temporary and proposed bus stops; providing Temporary Railings (Type K) and crash cushions, and all other work described in this section, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Full compensation for providing pedestrian facilities shall be considered as included in the contract Lump Sum price paid for Traffic Control System & Construction Area Signs and no additional compensation will be allowed, therefore.

Full Compensation for Flagging Costs shall be considered as included in the contract Lump Sum price paid for Traffic Control System & Construction Area Signs and no additional compensation will be allowed, therefore.

Full Compensation for doing all the work involved in furnishing, installing, maintaining Construction Area Signs and for removing Construction Area Signs when no longer required, including pedestrian access signs shall be considered as included in the contract Lump Sum price paid for Traffic Control System & Construction Area Signs and no additional compensation will be allowed. Therefore.

Full Compensation for temporary K-Railing and crash cushions including furnishing, placing, maintaining, repairing, replacing, and removing the temporary railing, including excavation and backfill, any flagging costs, drilling holes and bonding threaded rods or dowels when required, removing threaded rods or dowels and filling the drilled holes with mortar and moving and replacing removable panels as required to new locations of K-Rail shall be considered as included in the contract Lump Sum price paid for Traffic Control System & Construction Area Signs and no additional compensation will be allowed, therefore.

3. Includes public notice to police, fire, school, etc.

D. Bid Item No 4 – SWPPP (Storm Water Pollution Prevention Plan)

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Measurement: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing, installing, maintaining, relocating and removing when no longer required best management practices, erosion and sedimentation control measures such as temporary fiber rolls, temporary silt fences, hydroseeding during construction, maintenance of construction entrance, protecting adjacent waterways, temporary drainage inlet protection, maintaining construction entrance/exit, temporary concrete washout, stockpile cover, protection of storage and recyclable materials, portable toilets, maintaining drainage patterns to allow flows to the low points, as shown on the Plans, as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer.

3. All temporary and permanent storm water pollution prevention facilities, equipment, and materials as required by or as necessary to comply with the SWPPP/WPCP as described in the current California Stormwater Quality Association (CASQA) BMP handbook.

4. Temporary erosion and sediment control work shall consist of applying erosion control materials to embankment slopes, excavation slopes and

other areas designated on the plans, installing silt fence, inlet protection, gravel bags, headwall protection and stabilized construction entrance ways, or other measures as specified in the project SWPPP/WPCP or necessary for compliance with the CGP.

E. Bid Item No 5 – QSP Services

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in QSP Services including but not limited to complying with the project SWPPP as shown on the plans, as specified and as directed by the Engineer.

F. Bid Item No 6 – Clearing & Grubbing

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in clearing and grubbing including but not limited to removal of organics, off haul, trucking, testing, and disposal as shown on the plans, as specified and as directed by the Engineer, including the removal and disposal of all the resulting material.

G. Bid Item No 7 – Demolition

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all work involved in Demolition, including obtaining demolition permits, permit fees, fence removal and disposal, sawcut, remove asphalt and concrete paving and base to design subgrade, remove foundation and base; terminating and removing utilities to be demolished and other items of work as specified in the plans, Standard Specification and the Technical Specifications, and as directed by the Engineer.

3. Miscellaneous demolition includes removal, off-haul, and legal disposal of incidental items included in the scope as specified in the plans, Standard Specification and the Technical Specifications, and as directed by the Engineer.

H. Bid Item No 8 – Tree Protection

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in tree protection as shown on the plans, as specified and as directed by the Engineer, including the removal and disposal of all the resulting material.

3. Tree Protection includes standard construction fencing and posts. Includes review and approval by the Engineer.

I. Bid Item No 9 – Tree and Stump Removal

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in tree and stump removal as shown on the plans, as specified, and as directed by the Engineer, including the removal and disposal of all the resulting material.
3. This bid item is for the removal and disposal of all trees with a trunk diameter size of six inches or greater including the root balls. Tree and stump removal includes review and approval by the Engineer.

J. Bid Item No 10 – Earthwork – Rough Grade

1. Basis of Measurement: By Cubic Yard as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to excavating existing subsoil, verifying if existing subsoil meets the engineered fill requirements, supplying engineered fill, materials, stockpiling, maintaining, moving, placing, rough grading, and compacting of engineered fills as shown on the plans, as specified, and as directed by the Engineer.

K. Bid Item No 11 –Fine Grading

1. Basis of Measurement: By Square Feet as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Fine Grading as shown on the plans, as specified, and as directed by the Engineer.

L. Bid Item No 12 – Bioretention Soil Mix (BSM)

1. Basis of Measurement: By Cubic Yard as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, bioretention soil mix, soil testing report, tools, equipment, and incidentals, and for doing all work involved in Bioretention Soil Mix as shown on the plans, as specified, and as directed by the Engineer.

M. Bid Item No 13 – Traffic Signalization

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing labor, materials, tools, equipment and incidentals, to install traffic signals including, but not limited to, the installation of signal poles, traffic signal controller, cabinet and cabinet equipment, battery backup system and equipment, input/output files, detector handholds, signal detection system as indicated on Plan, push buttons and posts, signal heads, conduits, all associated wiring and conductors, pull boxes, sign installations, internally illuminated street name signs, mounting equipment, foundations, trenching/backfill, and all other necessary materials not otherwise included in separate items, as indicated in the Plans, and these Technical Provisions, in order to provide a fully functioning traffic signal system as directed by the Engineer, as well as all testing as required and as directed by the Engineer, as well as coordination with PG&E to provide service connection to the cabinet, and no additional compensation shall be allowed.

N. Bid Item No 14 – Drainage catch basins (12" SQ)

Bid Item No. 15 - Drainage catch basins (18" SQ)

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents. Structure bedding and backfill are incidental to the bid item most closely related to and no separate compensation allowed therefore.
2. Basis of Payment: Shall include but not limited to excavating, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, concrete foundation slab, concrete structure sections, bedding, backfill, concrete masonry structure construction, transition to cover frame, cover frame and cover to indicated design depth, forming, sealing pipe inlets and outlets and air testing of structures as required by the contract documents and as directed by the Engineer.

O. Bid Item No 16 – Storm Drain Landscape Area Drain

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents. Structure bedding and backfill are incidental to the bid item most closely related to and no separate compensation allowed therefor.
2. Basis of Payment: Shall include but not limited to excavating, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, concrete foundation slab, concrete structure sections, bedding, backfill, concrete masonry structure construction, transition to cover frame, cover frame and cover to indicated design depth, forming, sealing pipe inlets and outlets and air testing of structures as required by the contract documents and as directed by the Engineer

P. Bid Item No 17 – Storm Drain Manhole

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents. Structure bedding and backfill are incidental to the bid item most closely related to and no separate compensation allowed therefore.
2. Basis of Payment: Shall include but not limited to excavating, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, concrete foundation slab, concrete structure sections, bedding, backfill, concrete masonry structure construction, transition to cover frame, cover frame and cover to indicated design depth, forming, sealing pipe inlets and outlets and air testing of structures as required by the contract documents and as directed by the Engineer.

Q. Bid Item No 18 – Benching subdrain 4" Perforated
1. Basis of Measurement: By Linear Foot as specified in the bid form measured from edge of structure to edge of structure for various pipe materials and various sizes irrespective of the depth of pipes, complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Storm Drainage Piping, complete in place including bends, elbows or other pipe fittings, saw cut, excavating to required elevations, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, removing excavated materials, dewatering, bedding, cradles, backfill and backfill material, pipe installation with warning tape, restoration and disposing of materials outside the Right-of-Way and connections to existing or new storm drainage mains and manholes as required by the contract documents and as directed by the Engineer.

R. Bid Item No. 19 – Storm Drain Piping 6" Perforated

1. Basis of Measurement: By Linear Foot as specified in the bid form measured from edge of structure to edge of structure for various pipe materials and various sizes irrespective of the depth of pipes, complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Storm Drainage Piping, complete in place including bends, elbows or other pipe fittings, saw cut, excavating to required elevations, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, removing excavated materials, dewatering, bedding, cradles, backfill and backfill material, pipe installation with warning tape, restoration and disposing of materials outside the Right-of-Way and connections to existing or new storm drainage mains and manholes as required by the contract documents and as directed by the Engineer.

S. Bid Item No 20 – Storm Drain Piping 6”
Bid Item No 21 – Storm Drain Piping 8”

Bid Item No 22 – Storm Drain Piping 10”
Bid Item No 23 – Storm Drain Piping 12”
Bid Item No 24– Storm Drain Piping 15”

1. Basis of Measurement: By Linear Foot for various sizes of storm drain piping as specified in the bid form measured from edge of structure to edge of structure for various pipe materials and various sizes irrespective of the depth of pipes, complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Storm Drainage Piping, complete in place including bends, elbows or other pipe fittings, saw cut, protecting the excavation in compliance with Cal/OSHA, excavating to required elevations, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, removing excavated materials, dewatering, bedding, cradles, backfill and backfill material, pipe installation with warning tape, restoration and disposing of materials outside the Right-of-Way and connections to existing or new storm drainage mains and manholes as required by the contract documents and as directed by the Engineer.
3. Includes sawcut, excavation, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OHSA, pipe and fittings, bedding, backfill, and surface restoration including AC patch.

T. Bid Item No 25 – Storm Drain Connection

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Storm Drain Connection costs shall be paid for at the contract per the number of Public Main Storm Drain Connection, which includes full compensation for furnishing all labor, interception of the existing 24” Storm Drain line and install a new Storm Drain Manhole, materials, tools, equipment, and incidentals, and for doing all work involved in Storm Drain Connection as shown on the plans, as specified and as directed by the Engineer, including the removal and disposal of all the resulting material.
3. Includes City staff inspection and Testing.

U. Bid Item No 26 – Storm Drain Cleanouts

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to sawcut, excavation, including all utility trenching work as specified in Section 31 23 16 – Utility Trenching, traffic-rated box, riser, accessories, concrete collar, tests, backfill and surface restoration as required by the contract documents and as directed by the Engineer.

V. Bid Item No 27 – Sanitary Sewer Cleanouts

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Sanitary Sewer Cleanouts, complete in place including all utility trenching work as specified in Section 31 23 16 – Utility Trenching, riser pipe installation, pipe connection, fittings, aggregate base for subgrade, compaction, restoration of trench, testing, CCTV inspections and disposing of materials outside the Right-of-Way and connection to existing or new sewer mains as required by the contract documents and as directed by the Engineer.

W. Bid Item No 28 – Sanitary Sewer Piping 4”

1. Basis of Measurement: By Linear Foot as specified in the bid form , measured along the top centerline of the pipe from inside of a structure to structure, complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Sanitary Sewer Pipes, complete in place including all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, pipe installation with warning tape, pipe connection, connection to manholes, fittings, aggregate base for subgrade, compaction, restoration of T-trench, AC patch, testing, CCTV inspections and disposing of materials outside the Right-of-Way and connection to existing or new sewer mains and manholes as required by the contract documents and as directed by the Engineer.

X. Bid Item No 29 – Sanitary Sewer Connection

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Sanitary Sewer Connection by intercepting the existing 8” SS and install a new Sanitary Sewer Manhole, complete in place including all utility trenching work as specified in Section 31 23 16 – Utility Trenching, riser pipe installation, pipe connection, fittings, aggregate base for subgrade, compaction, restoration of trench, AC patch, testing, CCTV inspections and disposing of materials outside the Right-of-Way and connection to existing or new sewer mains as required by the contract documents and as directed by the Engineer.

Y. Bid Item No 30 – Potable Water Line

Bid Item No. 31 – Fire Water Line

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to hand-trimming, sawcut, excavation, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, pipe and fittings, bedding, backfill, surface restoration, AC patch, concrete thrust restraints, mechanical joints, warning tape, tracer wire, polyethylene fittings, connection and stub for future service, pressure pipeline testing, flushing, disinfection and connection and tie into municipal utility water source as required by the contract documents and as directed by the Engineer.

Z. Bid Item No 32 – Water Valve

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to sawcut, excavation, including all utility trenching work as specified in Section 31 23 16 – Utility Trenching, water valve, valve box, riser, accessories, concrete collar, tests, backfill and surface restoration as required by the contract documents and as directed by the Engineer.

AA. Bid Item No 33 – Water Line Tie In

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to sawcut, excavation, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, pipe and fittings, bedding, backfill, surface restoration, AC patch, concrete thrust restraints, mechanical joints, warning tape tracer wire, tapping sleeve, tapping valves, and accessories to connect to the existing water main, pressure pipeline testing, flushing, disinfection and surface restoration as required by the contract documents and as directed by the Engineer.

BB. Bid Item No 34 – Backflow Preventor

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to sawcut, excavation, backflow assembly, accessories, test, and backfill and surface restoration complete in place as required by the contract documents and as directed by the Engineer.
3. Includes City Staff inspection and Testing.

CC. Bid Item No 35 – Bioretention Drain Rock

1. Basis of Measurement: By Cubic Yard as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to supplying and installation of Bioretention and Gravel Drain Rock materials, testing, stockpiling, maintaining, moving, placing, grading, and compaction complete in place as required by the contract documents and as directed by the Engineer.

DD. Bid Item No 36 – Asphalt

1. Basis of Measurement: By Tons and will be based on certified weight-meters certificates showing gross, net weight and the type and grading of the mix for each load complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to priming surfaces, tack coating surfaces, fog seal, furnishing, placing, compacting asphalt pavement (3” for Full Depth Areas) complete in place as required by the contract documents and as directed by the Engineer.

EE. Bid Item No 37 – Aggregate Base Course

1. Basis of Measurement: By the Tons as specified in the bid form. Quantities of aggregates will be calculated on the basis of dimensions shown on the plans. No allowance will be made for aggregate rejected or placed outside said dimensions unless otherwise order by the Engineer.

2. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, driveways, curb ramps, median curbs, median nose surfacing, bus turnouts, retaining curbs, and in utility trenches shall not be measured unless specified otherwise in the Contract Documents.

3. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment and incidentals, in aggregate base supplying fill material, stockpiling, scarifying subgrade surface, placing where required, watering, dust palliative, leveling, compacting and certifying the top of aggregate base design grades complete in place as required by the contract documents and as directed by the Engineer.

4. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, retaining curbs, etc. shall considered incidental to the item most closely related to and no separate compensation will be allowed therefore. Aggregate base used in utility trenches shall be considered incidental to the cost per linear foot paid for the utility pipes as shown on the bid form and no separate compensation will be allowed therefore.

FF. Bid Item No 38 – Concrete Curb

1. Basis of Measurement: By Linear Feet as specified in the bid form complete in place, unless otherwise specified in the Contract Documents. Concrete pads around utility facilities and miscellaneous concrete footings are incidental to the bid item most closely related to and no separate compensation allowed therefor. Curb and gutter and vertical curbs adjacent to the curb ramp will be measured separately. Concrete Survey Monuments shall be measured on a per unit basis.

2. Basis of Payment: Shall include but not limited to all labor, materials, tools, equipment, and incidentals including subgrade preparation, excavation,

base preparation, forms, reinforcing, concrete, accessories, placing concrete, finishing concrete, expansion joints, weakened plane joints, scoring joints, curing, removal of all forms, and testing complete in place as required by the contract documents and as directed by the Engineer.

GG. Bid Item No 39 - Pedestrian Concrete Paving A

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing full compensation for furnishing all labor, materials, tools, equipment, incidentals, excavation, subgrade preparation, aggregate base, compaction testing, Portland cement mix, finishes, sand base, reinforcing steel, up to (3) 4’ x 4’ field mock-up panels of each paving type, and for doing all the work involved in in installing Pedestrian Concrete Paving A, complete in place as required by the contract documents and as directed by the Engineer.

HH. Bid Item No 40– Landscape Wall

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for full compensation for furnishing all labor, materials, tools, equipment, incidentals, Portland cement, integral color concrete, finishes, caulking, aggregate base, reinforcing steel, field mock-up wall, and for doing all the work involved in installing Landscape Wall, complete in place as required by the contract documents and as directed by the Engineer.

II. Bid Item No 41– Curb Ramp

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents. Truncated domes for curb ramps are not measured separately and are considered incidental to the pay item for Curb Ramps. Retaining curbs at curb ramps are not measured and are considered incidental to the measurement of curb ramps.

2. Basis of Payment: Includes all labor, materials, tools, equipment, and incidentals including subgrade preparation, excavation, base preparation, forms, reinforcing, concrete, accessories, placing concrete, finishing concrete, expansion joints, weakened plane joints, scoring joints, curing, removal of all forms, and testing complete in place as required by the contract documents and as directed by the Engineer.

JJ. Bid Item No 42– Traffic Signage

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, signage, post, footing, and incidentals, and for doing all work involved in installing Traffic Signage complete in place as required by the contract documents and as directed by the Engineer.

KK. Bid Item No 43– Concrete Valley Gutter

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to all labor, materials, tools, equipment, and incidentals including subgrade preparation, excavation, base preparation, forms, reinforcing, concrete, accessories, placing concrete, finishing concrete, expansion joints, weakened plane joints, scoring joints, curing, removal of all forms, and testing as required by the contract documents and as directed by the Engineer.

LL. Bid Item No 44 – Wheel Stops

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing Wheel Stops as required by the contract documents and as directed by the Engineer.

MM. Bid Item No 45 – Striping Removal

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Striping Removal, as shown on the plans, as specified and as directed by the Engineer, including the removal and disposal of all the resulting material.

NN. Bid Item No 46 – Striping

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, paint, template, tools, equipment, and incidentals, and for doing all work involved in Striping as required by the contract documents and as directed by the Engineer.

OO. Bid Item No 47 – Stairs & Handrail

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for full compensation for furnishing all labor, materials, tools, equipment,

incidentals, excavation, footings, metal fabrication, finishing, Portland cement, decomposed granite, binder, aggregate base, and for doing all the work involved in installing Stairs & Handrail, complete in place as required by the contract documents and as directed by the Engineer.

PP. Bid Item No 48 – Hydroseed

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, seed mix, binder, soil amendment, organic fertilizers, warranties, and for doing all the work involved in installing in installing Hydroseed, complete in place as required by the contract documents and as directed by the Engineer.

QQ. Bid Item No 49 – Shrub -1 Gallon

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, 1-gallon shrubs, and warranties and for doing all the work involved in installing Shrub (1-Gallon), complete in place as required by the contract documents and as directed by the Engineer.

RR. Bid Item No 50 – Sod

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, sod, post-planting fertilizers, warranties, and for doing all the work involved in installing in installing Sod, complete in place as required by the contract documents and as directed by the Engineer.

SS. Bid Item No 51 –Tree – 24” Box

Bid Item No 52 –Tree – 15 Gallon

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, excavation, tree stakes, tree ties, warranties, and for doing all the work involved in installing Tree (24” Box) and Tree (15 Gallon),, complete in place as required by the contract documents and as directed by the Engineer.

TT. Bid Item No 53 – Landscape Soil Preparation

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, and incidentals, soil testing report, soil amendment with organic compost, import topsoil, organic fertilizers, warranties, and for doing all the work involved in installing in Landscape Soil Preparation, complete in place as required by the contract documents and as directed by the Engineer.

UU. Bid Item No 54 – Root Barrier

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, root barrier, and warranties and for doing all the work involved in installing Root Barrier, complete in place as required by the contract documents and as directed by the Engineer.

VV. Bid Item No 55 – Mulch

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, mulch, and for doing all the work involved in installing Mulch, complete in place as required by the contract documents and as directed by the Engineer.

WW. Bid Item No 56 – Plant Establishment Period

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, repairs, soils testing, irrigation adjustments, additional bark mulch, fertilizers, weed control, mowing, rodent control, and for doing all the work involved in Plant Establishment Period (90 days) complete in place as required by the contract documents and as directed by the Engineer.

XX. Bid Item No 57 – Irrigation Controller

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, rain sensor, cellular network card, irrigation controller, and for doing all the work involved in installing Irrigation Controller complete in place as required by the contract documents and as directed by the Engineer.

YY. Bid Item No 58 – Irrigation Rotors

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, adjustments, , trenching, backfill, warranties, and for doing all the work involved in installing Irrigation Rotors complete in place as required by the contract documents and as directed by the Engineer.

ZZ. Bid Item No. 59 – Irrigation (Bubblers)

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, adjustments, , trenching, backfill, warranties, and for doing all the work involved in installing Irrigation (Bubblers) complete in place as required by the contract documents and as directed by the Engineer.

AAA. Bid Item No 60 – Flush valve

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, irrigation air relief valve assembly, connection to air relief valve, and for doing all the work involved in installing Irrigation Air Relief Valve Assembly complete in place as required by the contract documents and as directed by the Engineer.

BBB. Bid Item No 61 – Irrigation Tree Bubblers

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, tree bubblers, and for doing all the work involved in installing Irrigation Tree Bubbler complete in place as required by the contract documents and as directed by the Engineer.

CCC. Bid Item No 62– Irrigation Lateral Line

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, conduits, trenching, bedding, fittings, fill and compaction, and for doing all the work involved in installing Irrigation Lateral Line complete in place as required by the contract documents and as directed by the Engineer.

DDD. Bid Item No 63– Irrigation Conduit

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, conduits, and for doing all the work involved in installing Irrigation Conduit complete in place as required by the contract documents and as directed by the Engineer.

EEE. Bid Item No 64 – Irrigation Gate Valves

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, irrigation gate valve assembly, valve box, drain rocks, wire mesh, PVC pipe, connection to gate valve, and for doing all the work involved in installing Irrigation Gate Valve complete in place as required by the contract documents and as directed by the Engineer.

FFF. Bid Item No 65– Irrigation Drip

1. Basis of Measurement: By Square Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, schedule 40 PVC pipe, schedule 40 tee, fittings, dripline, operation indicator, flush valve, tubing, and for doing all the work involved in installing Irrigation Drip complete in place as required by the contract documents and as directed by the Engineer.

GGG. Bid Item No 66 – Irrigation Sleeves

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, excavation, 4” dia. and 8” dia. sleeves, backfill, air release valve, and for doing all the work involved in installing Irrigation Sleeves (4”, 8”, and 10”) complete in place as required by the contract documents and as directed by the Engineer.

HHH. Bid Item No 67 – Irrigation Main line 2"-3"

Bid Item No 68 – Irrigation Main line 4" & 6"

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, excavation, 1120-200 psi PVC pipe, air release valve, with ductile iron fittings, concrete thrust blocks, Class 315 PVC pipe with schedule 80 PVC solvent weld fittings, backfill, and for doing all the work involved in installing & testing Irrigation Main Line (2”-3”, 4” & 6”) complete in place as required by the contract documents and as directed by the Engineer.

III. Bid Item No 69 – Irrigation Master Valve and Flow Sensor

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, flow sensor cable & master valve wires, 4” PVC conduit and low voltage wires extended to new controller and for doing all the work involved in installing Master Valve and Flow Sensor complete in place as required by the contract documents and as directed by the Engineer.

JJJ. Bid Item No 70 – Irrigation Low Voltage Wire

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, and for doing all the work involved in installing Irrigation Low Voltage Wire complete in place as required by the contract documents and as directed by the Engineer.

KKK. Bid Item No 71 – Irrigation Quick Coupler Valves

Bid Item No 72 – Irrigation Remote Control Valves

Bid Item No 73 – Irrigation Angle Valves

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, incidentals, warranties, irrigation quick coupler and remote control valve assembly, valve box, drain rocks, wire mesh, PVC pipe, connection to gate valve, and for doing all the work involved in installing Irrigation Quick Coupler Valves and Irrigation Remote Control Valves complete in place as required by the contract documents and as directed by the Engineer.

LLL. Bid Item No 74 – Irrigation Restoration

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, air release valve, incidentals, warranties to remove, or replace all aspects of the irrigation system, mainline, lateral lines, spray heads, rotors, sleeves, valve boxes, wires, conduits, trenching, backfill which is damaged during and, or impacted by construction, and for doing all the work involved in installing Irrigation Restoration complete in place as required by the contract documents and as directed by the Engineer.

MMM. Bid Item No 75 – Boulders

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, boulder, excavation, coordination of delivery incidentals, warranties, and for doing all the work involved in installing Boulder complete in place as required by the contract documents and as directed by the Engineer.

NNN. Bid Item No 76 – Fence A (6’)

Bid Item No 77 – Fence B (8’)

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, shop drawings, chain link fence posts of various height, chain link fabric, anchors, accessories, excavation, concrete footings, incidentals, warranties, and for doing all the work involved in installing Fence A (6’), and Fence B (8’) complete in place as required by the contract documents and as directed by the Engineer.

OOO. Bid Item No 78– Gate A

Bid Item No 79 – Gate B

Bid Item No 80 – Gate C

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, shop drawings, steel members, steel posts, finishing, hardware, accessories, reflective tape, excavation, receiver posts, knox boxes, concrete footings, incidentals, warranties, and for doing all the work involved in installing Gate A, Gate B, and Gate C, complete in place as required by the contract documents and as directed by the Engineer.

PPP. Bid Item No 81 – Header

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, header, stakes, accessories, incidentals, and for doing all the work involved in installing Header complete in place as required by the contract documents and as directed by the Engineer.

QQQ. Bid Item No 82 – Soccer Goals

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, soccer goal, hardware, wheels, net, handle, coordination of delivery, incidentals, warranties, and for doing all the work involved in installing Soccer Goals complete in place as required by the contract documents and as directed by the Engineer.

RRR. Bid Item No 83 – Park Sign

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, shop drawings, sign, stone veneered base, letters, City logo, accessories, excavation, concrete footing, reinforcing, incidentals, warranties, and for doing all the work involved in installing Park Sign complete in place as required by the contract documents and as directed by the Engineer.

SSS. Bid Item No 84 – Relocated Park Sign

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, excavation, concrete footing, reinforcement, incidentals, and for doing all the work involved in installing Relocated Park Sign complete in place as required by the contract documents and as directed by the Engineer.

TTT. Bid Item No 85 – Site/Area Post top Luminaire

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.
2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, connection, pole, light fixture, concrete base, reinforcement, gravel dry well, pull box, expertise and incidentals, warranties, and for doing all the work involved in installing Site/Area Post Top Luminaire complete in place as required by the contract documents and as directed by the Engineer.

UUU. Bid Item No 86 – Lighting Control System

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, lighting control panel, connection, expertise and incidentals, warranties, acceptance testing, and for doing all the work involved in installing Lighting Control System (non-sports lighting) complete in place as required by the contract documents and as directed by the Engineer.

VVV. Bid Item No 87 – Electrical Main Switchboard

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, concrete pad, subgrade preparation, wiring, connections, expertise and incidentals, testing, warranties, and for doing all the work involved in installing Electrical Main Switchboard complete in place as directed by the Engineer.

WWW. Bid Item No 88– Distribution Power

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, panels, connections, concrete pad, supports, subgrade preparation, anchors, bracing, fittings, supports, reinforcement, wiring, expertise and incidentals, testing, warranties, and for doing all the work involved in installing the Distribution Power complete in place as required by the contract documents and as directed by the Engineer

XXX. Bid Item No 89 – Transformers

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, concrete pad or supports, subgrade preparation, connection, expertise and incidentals, warranties, and for doing all the work involved in installing Transformer complete in place as required by the contract documents and as directed by the Engineer.

YYY. Bid Item No 90 – Conduit and Conductors (Electrical and Lighting)

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, expertise and incidentals, warranties, and for doing all the work involved in installing Conduit and Conductors complete in place as required by the contract documents and as directed by the Engineer.

ZZZ. Bid Item No 91 – Conduit (Technology, 2-inch, 4-inch)

1. Basis of Measurement: By Linear Foot as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, expertise and incidentals, warranties, and for doing all the work involved in installing Conduit (Technology, 2-inch, 4-inch) complete in place as required by the contract documents and as directed by the Engineer.

AAAA. Bid Item No 92 – Handholes (Pullbox)

1. Basis of Measurement: By Each as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, expertise and incidentals, warranties, and for doing all the work involved in installing Handholes complete in place as required by the contract documents and as directed by the Engineer.

BBBB. Bid Item No 93 – Underground Vaults

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: Shall include but not limited to full compensation for furnishing all labor, materials, tools, equipment, expertise and incidentals, warranties, and for doing all the work involved in installing Underground Vaults complete in place as required by the contract documents and as directed by the Engineer.

CCCC. Bid Item No 94 - Fill Slope, Keyway and Subdrain

1. Basis of Measurement: By Lump Sum as specified in the bid form complete in place, unless otherwise specified in the Contract Documents.

2. Basis of Payment: This shall include but not be limited to the lump sum cost for the full deduction for removal of Fill Slope, Keyway, and Subdrain as shown on sheet C4.3 and Detail 4/ C5.4. This shall include all related labor, work, materials, engineered fill, earthwork, benching, compaction, hydroseed, and temporary irrigation for the southern cut fill slope as specified by the contract documents and as directed by the Engineer. Site conditions shall be reviewed in the field during Earthwork excavation with the Engineer to determine the direction of the bed rock bedding plane and to determine if keyway and subdrain shall be implemented.

END OF SECTION 01 22 00

ATTACHMENT C

GEOTECHNICAL INVESTIGATION REPORT
PREMIER FIELDS
WEST LELAND ROAD
PITTSBURG, CALIFORNIA

BSK PROJECT NO.: G00000268

PREPARED FOR:

GATES+ASSOCIATES
1655 NORTH MAIN STREET
WALNUT, CA 94596

March 17, 2023

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Figures and Appendices

FIGURES

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Sent via e-mail: chuck@dgates.com

March 17, 2023 BSK Project No. G00000268

Mr. Chuck Gardella
Principal
Gates+Associates
1655 North Main Street
Walnut Creek, California 94596

SUBJECT: **Geotechnical Investigation Report**
Premier Fields
West Leland Road
Pittsburg, California

Dear Mr. Gardella:

BSK Associates (BSK) is pleased to submit our geotechnical investigation report for the planned Premier Fields west of Contra Costa Canal and south of West Leland Road at the former Delta View Golf Course in Pittsburg, California (Site). A Vicinity Map showing the location of the project is presented on Figure 1. This report contains a description of our site investigation methods and findings, including field and laboratory data. This report supersedes our technical memorandum issued on February 21, 2023, which included preliminary geotechnical findings, conclusions, and recommendations for the project.

The purpose of this investigation was to obtain and classify subsurface soil samples to provide geotechnical recommendations for the planned improvements. The scope of services, as outlined in our proposal (BSK Proposal No. G00000268) dated December 19, 2022, included the following:

- Pre-field activities,
- Field investigation – deep and shallow soil borings, percolation testing and seismic refraction survey,
- Laboratory testing,
- Engineering analysis, and
- Preparation of this report.

This investigation specifically excludes the assessment of site environmental characteristics, particularly those involving hazardous substances.

1. PROJECT DESCRIPTION

The City of Pittsburg (City) intends to develop a portion of the former Delta View Golf Course, approximately 10 acres, west of the Contra Costa Canal into three (3) multi-purpose fields to serve as a

regional draw for the economic benefit of the residents of the City of Pittsburg. The design will also include sport field lighting, an electrical score board, landscaping and irrigation, various site furnishings, a restroom/concession building, bioretention areas, and tree plantings. In addition, a parking lot will be constructed along with paved and unpaved walkways and trails circling the proposed facility, and a pedestrian drop-off and pick-up area. The driveways for the parking lot will be paved with asphalt concrete (AC), while most parking stalls will be surfaced with gravel (i.e., no AC layer) to allow for some infiltration of runoff water into the subgrade soils within the parking stalls. The project site (Site) topography is hilly and site grades change by about 65 feet over a horizontal distance of approximately 600 feet. According to the recent 65 percent complete grading plan provided to us by Gates+Associates, the finished design grade for the project will be approximately 145 feet for most of the Site with cuts of up to about 45 feet deep below existing grade and fills up to about 20 feet above existing grade. This includes an approximately 30-foot-high cut slope with an approximate gradient of 2H:1V (horizontal to vertical) that is proposed near the south side of one of the proposed sport fields. Fill slopes with an approximate gradient of 2H:1V and ranging from about 10 to 15 feet in height are planned along the northern and eastern project limits.

If the actual project description differs significantly from that described above, we should be notified so that we can evaluate whether to modify the conclusions and recommendations presented herein.

2. SITE DESCRIPTION

The former golf course is located within a residential area adjacent to and south of West Leland Road. The project area is surrounded by West Leland Road to the north, the Contra Costa Canal to the east, John Henry Johnson Parkway to the west, and Stoneman Trailhead and undeveloped land to the south. The former golf course consists of a hilly terrain with paved and unpaved pathways and low-lying depressions (water hazards, ponds, bunkers, etc.) that were previously filled with water and/or sand. As shown on the Site Plan, Figure 2, a former golf course pond covers over half of the area of the planned westernmost multi-purpose field. Within the project limits, the area is covered by natural grass/shrubs. Many of the trees within the project limits have recently been removed, and only stumps are left in-place. According to the recent topographic survey prepared by Sandis, the civil engineers for the project, the elevation across the project area ranges from about 130 feet along West Leland Road to about 190 feet at the highest point at a knoll located near the southeast corner of the Site. The majority of Leland Road and John Henry Johnson Parkway are situated at a lower elevation than the former golf course.

3. FIELD INVESTIGATION

BSK's field investigation for this project was conducted on January 26 and 27, 2023 and consisted of the following (see Figure 2 for approximate exploration point locations):

- Drilling ten (10) soil borings to depths of about 6½ to 46½ feet below the existing ground surface (BGS),

- Installing three (3) percolation test holes to depths of about 10 feet BGS for percolation testing, and
- Performing three (3) seismic refraction lines to estimate depth to bedrock and evaluate bedrock rippability (i.e., excavatability).

The borings were drilled using a CME 55 remote controlled track-mounted rig with rubber tracks for limited access locations and soft soil conditions (see Exhibit 1). The rig was equipped with 4-inch diameter solid augers. The borings were logged by a BSK field geologist.

Exhibit 1 – Track-mounted drill rig used for this project

Relatively undisturbed samples of the subsurface materials were obtained from the borings using a split spoon sampler with a 2.5-inch inside diameter (I.D.) and a 3-inch outside diameter (O.D.) fitted with stainless steel liners. In addition, disturbed samples were obtained with a Standard Penetration Test (SPT) split spoon sampler with a 1.4-inch I.D., without stainless steel liners. The samplers were driven 18 inches using a 140-pound, automatic trip hammer falling 30 inches, and blow counts for successive 6-inch penetration intervals were recorded. The blow counts are reported on the final boring logs. After the samplers were withdrawn from the boreholes, the samples were removed, sealed to reduce moisture loss, labeled, and returned to our laboratory. Prior to sealing the samples, strength characteristics of the cohesive soil samples recovered were evaluated using a hand-held pocket penetrometer. The results of these tests are shown adjacent to the samples on the boring logs.

Soil and bedrock classifications made in the field from auger cuttings and samples were re-evaluated in the laboratory after further examination and testing. The soils were classified in the field in general accordance with the Unified Soil Classification System (Visual/Manual Procedure - ASTM D2488), while the bedrock was classified per the Rock Description Criteria presented on Figure A-4. Where laboratory tests were performed, the designations reflect the laboratory test results in general accordance with ASTM D2487 as presented on Figure A-1 in Appendix A. The Soil Description Key and Log Key are presented on Figures A-2 and A-3. Logs of the borings are presented in Appendix A as well. A discussion of the subsurface conditions encountered is presented in the “Subsurface Conditions” section of this report.

The locations of the borings were estimated by our field representatives based on approximate GPS coordinates from a phone-based application and rough measurements from existing features at the Site. Elevations shown on the boring logs were estimated using the existing elevations shown on the recent

topographic map included in the 65 percent complete grading plans[1] prepared by Sandis. As such, the locations and elevations of the borings should be considered approximate to the degree implied by the methods used.

4. PERCOLATION TEST HOLES

Three (3) percolation test holes labeled P-1, P-2, and P-3 were installed near borings B-4, B-7, and B-9, respectively, as shown on Figure 2. The percolation test holes were approximately 10 feet deep BGS. A 2-inch diameter perforated PVC pipe was installed in each test hole and the annulus was backfilled with ¾-inch drain rock. The percolation test holes were pre-soaked overnight and on January 30, 2023, percolation testing was conducted at each location for six (6) consecutive 60-minute intervals until percolation rates stabilized. Following completion of the percolation tests, the PVC pipes were left in-place and backfilled with soil. During construction, the percolation test hole locations should be overexcavated and backfilled with engineered fill as described in the "Site Preparation and Grading" section of this report.

5. LABORATORY TESTING

Our laboratory testing program consisted of performing dry density and moisture content tests, sieve analysis tests, Atterberg limits, sieve analysis, hydrometer analysis, unconsolidated-undrained triaxial compression (TXUU), staged consolidated-drained triaxial compression with pore pressure (TXCU-pp), and corrosivity testing. Most of the test results are presented on the boring logs, while the Atterberg limits, hydrometer analysis, TXUU, and TXCU-pp test results are presented graphically in Appendix B along with the corrosivity test results.

6. SITE GEOLOGY AND SEISMICITY

The Site is located within the southeastern portion of the Honker Bay Quadrangle, approximately 2 miles south of the San Joaquin River, along the northeastern end of the low-lying Los Medanos Hills, which are part of the Diablo Range in the Coast Ranges Geomorphic Province. The low-lying areas adjacent to the San Joaquin River are occupied by Holocene to Pleistocene deposits derived from the surrounding hills, while the Los Medanos Hills consist of Tertiary rocks (sandstone, shale, conglomerate, and tuff formations) exposed in narrow to wide linear outcrops that typically dip to the north or northeast and become younger to the northeast. These bedrock units form moderately steep slopes with narrow north-south trending valleys and drainages. The units typically strike to the west/northwest, with north to northeast dips ranging from up to about 40 degrees in older units to as low as about 12 degrees in younger units. Most of the hills in the Antioch-Pittsburg area have been subjected to extensive grading and

[1] Sandis (2023), Grading and Drainage Plan, Pittsburg Premier Fields, Drawing No. C-3.0, dated January 12, 2023.

development, significantly altering the topographic expression of the bedrock units (California Geological Survey [CGS], 2019[2]).

According to the CGS (2019), the Site is underlain by Holocene and Pleistocene alluvial fan deposits and the Pliocene Tehama Formation (see Exhibit 2 below – note that Site limits shown are approximate). These units are described by the CGS as follows:

- Holocene alluvial fan deposits (map symbol Qhf) – poorly-sorted to well-sorted sediments contain unconsolidated mixtures of sand, silt, clay, and gravel, with particle size typically fining downstream, away from Los Medanos Hills. These deposits are typically found in narrow bedrock canyons, incised within older alluvium fans.
- Pleistocene alluvial fan deposits (map symbol Qpf) – gravely and clayey sand or clayey gravel that fines upward to sandy clay. These deposits display various sorting and are generally located higher topographically than Holocene alluvial deposits.
- Pliocene Tehama Formation (map symbol Pth) – poorly consolidated, non-marine, siltstone, claystone, sandstone, tuff, and weakly indurated pebble to cobble conglomerate.

According to Ellen and Wentworth (1995[3]), the units within the Tehama Formation are generally soft to firm when both weathered and fresh (not weathered). However, calcite-cemented sandstone and conglomerate units are possible, which can be firm to hard. Most to almost all the bedrock is expansive, with the most severely expansive being claystone. Most to almost all surficial soil mantle is severely expansive.

[2] California Geological Survey Staff (2019), Seismic Hazard Zone Report for the Honker Bay 7.5-Minute Quadrangle, Contra Costa County, California, Seismic Hazard Zone Report 127.
[3] Ellen, S.D. and Wentworth, C.M. (1995), Hillside Materials and Slopes of the San Francisco Bay Region, California: U.S. Geological Survey Professional Paper 1357.

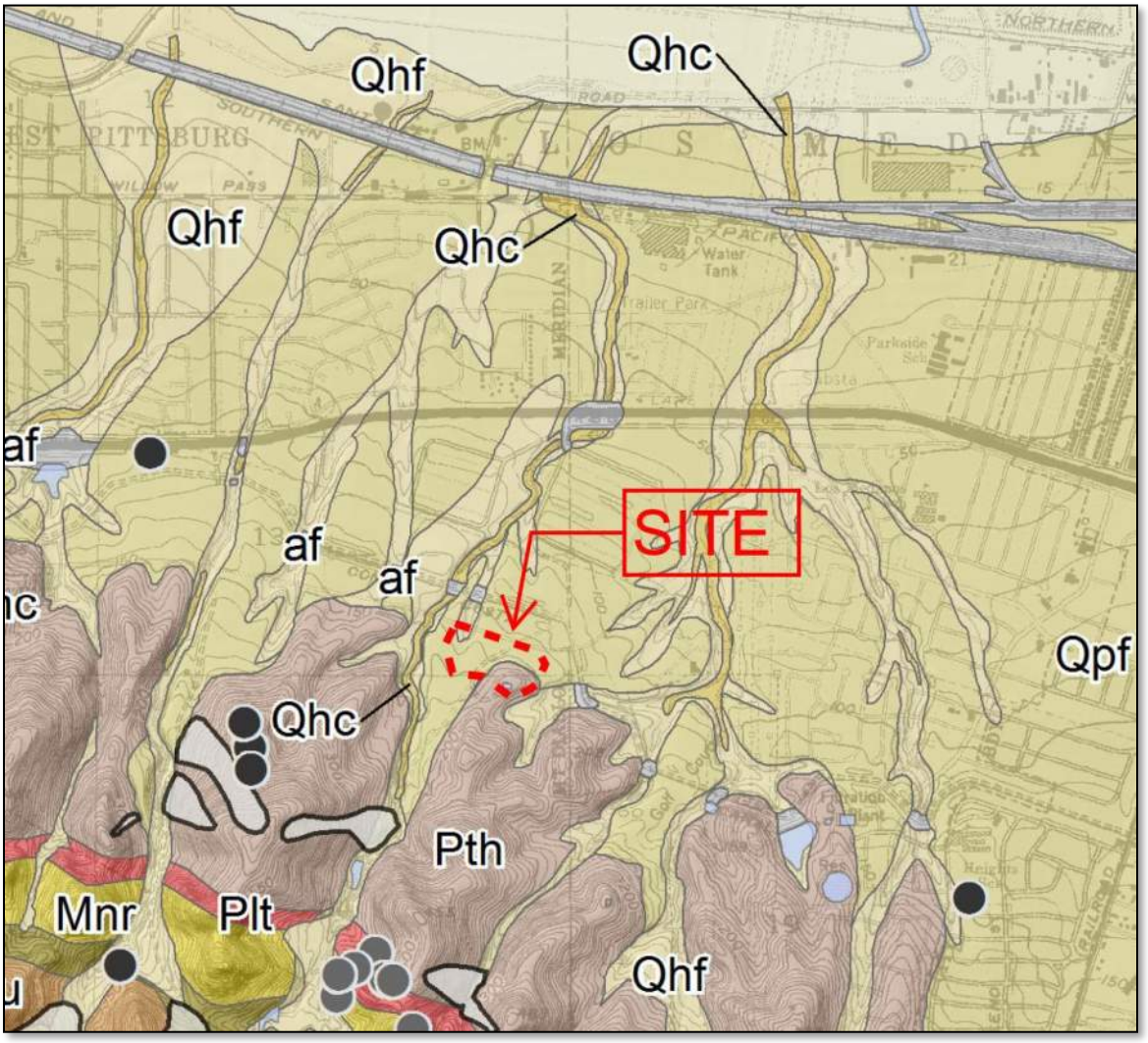


Exhibit 2 – Area Geology Map (CGS, 2019)

The Site is in a highly seismic area being near a few active faults. Faults in the project area include the Pittsburg-Kirby Hills fault zone, the Vaca Fault, and the Davis Fault. These Quaternary faults are not zoned by the CGS. The Site is not located within an Alquist-Priolo Earthquake Fault Zone and no mapped active fault traces are known to traverse the Site. However, portions of the Site are within a Seismic Hazard Zone for liquefaction (see Exhibit 3 below – note that Site limits shown are approximate) per CGS (2019[4]). The nearest active, zoned faults include the Clayton Section of the Greenville Fault located approximately 3 miles southwest of the Site and the Concord Fault located approximately 8 miles west of the Site. Since the Site is near active faults, we expect the Site to be subjected to moderate to intense ground shaking

[4] California Geological Survey Staff (2019), Earthquake Zones of Required Investigation, Honker Bay Quadrangle: California Geological Survey Seismic Hazard Zones, April 4, 2019.

due to a future significant seismic event along the active faults in the region surrounding the Site during the design life of the project.

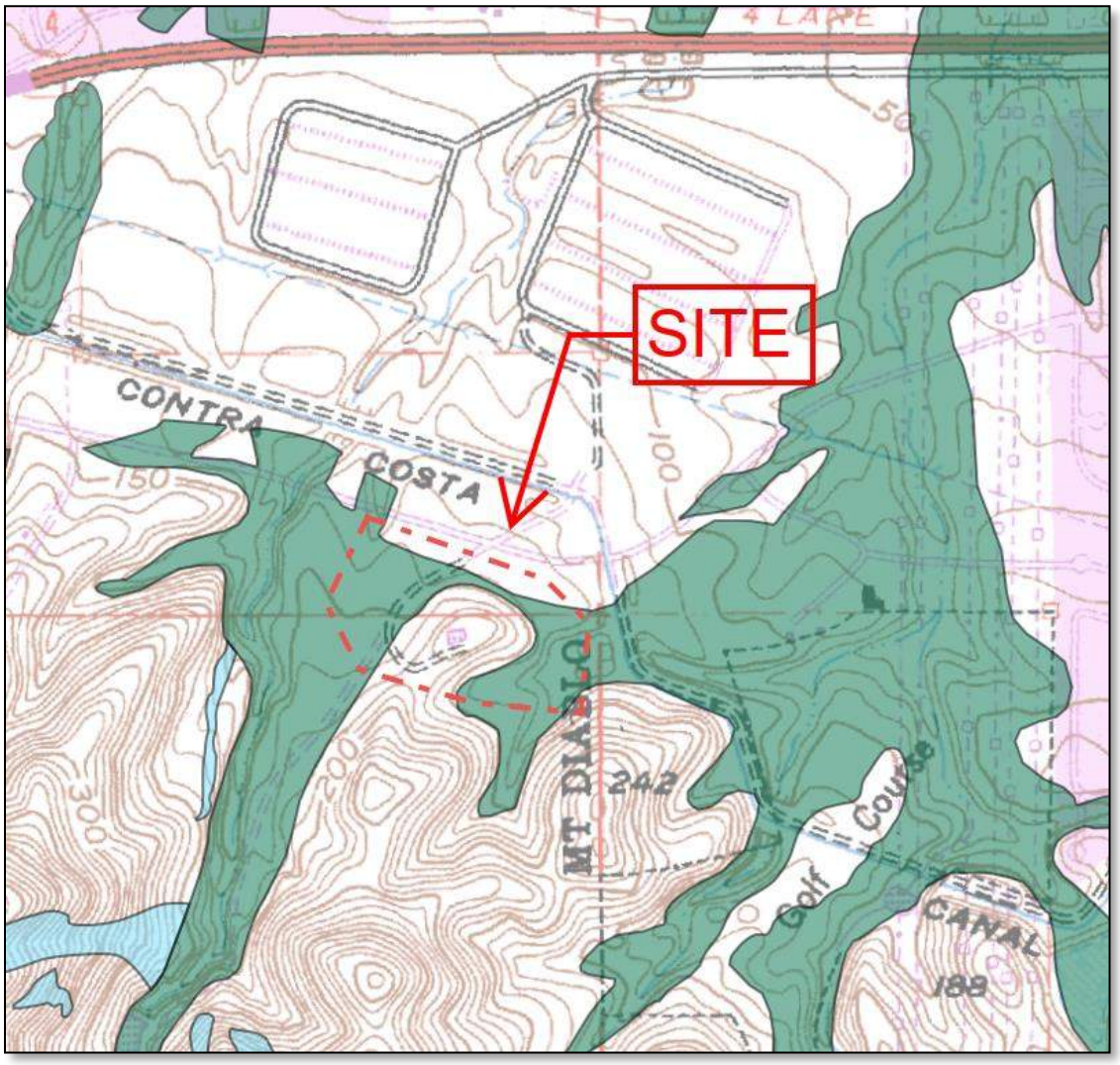


Exhibit 3 – Seismic Hazard Zones (Green Color=liquefaction, Blue Color=Landslide)

7. SUBSURFACE CONDITIONS

The subsurface conditions encountered in our borings generally consisted of fill, alluvial soils (interbedded clays and sands), and bedrock to the maximum depth of our explorations (approximately 46½ feet BGS). The fill and alluvial soils generally consist of firm to hard lean and sandy lean clays, and medium dense sand in the upper 10 feet BGS. Weak, highly weathered bedrock consisting of claystone and sandstone was encountered as shallow as 2 feet BGS at higher elevations, but generally encountered beneath the alluvial soils at about 5 to 10 feet BGS.

Atterberg limits test results for the soils in the upper 1 to 35 feet BGS are indicative of soils and bedrock having a moderate to high shrink and swell potential (i.e., moderate to high expansive potential) when exposed to cycles of moisture fluctuation.

Free groundwater was not observed within our borings. Past readings available for a groundwater monitoring well[5] located approximately 2,000 feet northeast of the Site, indicate a groundwater depth deeper than 40 feet BGS. According to the CGS (2019), historically high groundwater depths within most of the Site are approximately 30 feet BGS but become shallower (as shallow as 10 feet BGS) towards the southern limits of the Site. It should be noted that groundwater levels can fluctuate depending on factors such as seasonal rainfall, groundwater withdrawal, and construction activities on this or adjacent properties or if water seepage from leaking pipelines or other exposed improvements within excavations is encountered.

The above is a general description of the soil, bedrock, and groundwater conditions encountered at the Site. For a more detailed description of the subsurface conditions encountered, refer to the boring logs presented in Appendix A. It should be noted that subsurface conditions can deviate from those conditions encountered at the boring locations. If significant variation in the subsurface conditions is encountered during construction, it may be necessary for BSK to review the recommendations presented herein and recommend adjustments as necessary.

8. PERCOLATION TEST RESULTS

We conducted percolation tests at three locations as discussed in the "Percolation Test Holes" section of this report. The percolation rate measured at each test hole was converted into an infiltration rate using the Porchet method. The converted infiltration rates were approximately 0.06, 0.05, and 0.04 inch/hour at percolation test holes P-1, P-2, and P-3, respectively. **The converted infiltration rates recorded should be considered only as index values because of the many factors related to the soils that may affect the results**. **Please refer to the "Storm Water Runoff Mitigation" section of this report for our conclusions and recommendations regarding storm water runoff mitigation for this project.**

9. LIMITED SLOPE STABILITY ANALYSIS

We performed limited slope stability analysis to evaluate the proposed 30-foot-high, 2H:1V cut slope to be located immediately south of the proposed middle sport field. Our analysis consisted of evaluating the static and seismic slope stability for non-circular failure surfaces for Subsurface Cross Section A-A', Figure 3, at the following cut slope angles: 3H:1V, 2½H:1V, and 2H:1V. For each different slope configuration, the toe of the slope was fixed at the same location shown on Figure 3. The cross section shown on Figure 3 is based on the topographic map included in the 65 percent complete grading plans and inferred subsurface layers from boring B-8. The approximate location of the cross section is shown on Figure 2.

[5] https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels

The native clay soil shear strength parameters used in our analyses were based on the results of the TXCU-pp testing performed on a sample obtained from boring B-6 (see Figure B-6) and our experience with similar materials. The bedrock shear strength parameters were based on the results of the TXCU-pp testing performed on bedrock samples obtained from boring B-8 (see Figures B-7 and B-8), the range of typical total shear strength values for the Tehama Formation presented by the CGS (2019) for the Honker Bay quadrangle, and our experience with similar materials. Based on regional preliminary geologic mapping by Dawson (2009)[6], the Tehama formation dips to the north and northeast at an angle of approximately 15 degrees or less. Therefore, we conservatively projected a dipping angle of 15 degrees for the subsurface clayey sandstone and sandy claystone bedrock units shown on Figure 3. Note that based on our subsurface interpretation as shown on Figure 3, the clayey sandstone was not included in our analysis since it will be removed during cutting associated with the future grading operations for the project. The table below summarizes the moist unit weights and shear strength parameters used in our slope stability analyses. The unit weights are based on the laboratory test results and our experience.

SUMMARY OF SOIL SHEAR STRENGTH PARAMETERS USED

Layer Description	Moist Unit Weight (pcf)	Friction Angle (degrees)		Cohesion (psf)	
		Effective[1]	Total[2]	Effective[1]	Total[2]
Native Clay	130	23	15	500	700
Bedrock (Sandy Claystone)	125	30	24	350	500

Notes:
1. The effective strength parameters (i.e., drained conditions) were used for static analysis, which represents long-term conditions.
2. The total strength parameters (i.e., undrained conditions) were used for seismic analysis, which represent short-term conditions.

Free groundwater was not observed in our borings during our investigation. However, in order to be conservative, we assumed groundwater at 30 feet BGS in our slope stability model.

The limit-equilibrium Janbu corrected, Spencer, and Morgenstern and Price's methods and the slope stability program Slide2 were used in our analyses. Based on the methodology provided by Special Publication 117A[7], we used a horizontal seismic coefficient of 0.21 in our analyses for pseudo-static (seismic) conditions, which was developed using the following parameters:

[6] Dawson, T.E. (2009), Preliminary geologic map of the Lodi 30' X 60' quadrangle, California, California Geological Survey, Preliminary Geologic Maps PGM-09-04, 1:100,000.

[7] California Geological Survey (2008), Guidelines for Evaluating and Mitigating Seismic Hazards in California: Special Publication 117A.

- Adjusted PGA_M of 0.628g (i.e., PGA_M of 0.942g divided by 1.5) as permitted by checklist No. 25 in CGS Note 48[8]. The PGA_M was obtained using OSHPD Seismic Design Maps[9] available at https://seismicmaps.org/ at the vicinity of Site.
- Earthquake moment magnitude of M6.5 derived from the seismic deaggregation by the USGS Unified Hazard Tool[9] (https://earthquake.usgs.gov/hazards/interactive/).
- Fault distance of less than 8 km (about 5 miles).
- Displacement threshold of 15 centimeters.

According to Special Publication 117A, a slope is considered stable when its factor of safety (FOS) is greater than or equal to 1.5 and 1.0 under static and seismic conditions, respectively.

The results of our slope stability analysis are summarized in the table below. Based on these results, 3H:1V, 2½H:1V, and 2H:1V cut slope configurations have Factors of Safety (FOS) greater than 1.5 under static conditions and 1.0 under seismic conditions and are considered globally stable. Therefore, a 2H:1V gradient cut slope is considered suitable at the location where Subsurface Cross Section A-A' is shown on Figure 2 for the project.

Note that our slope stability model is an interpretation based on field observations, subsurface exploration, and regional geologic mapping. **It is possible that adverse bedding conditions could be exposed on the proposed cut slope during grading (i.e., the bedding planes sloping down towards the cut face of the slope), which if left unmitigated could lead to future instability of the cut slope.** It should also be noted that our slope stability analysis was limited to the 30-foot-high, 2H:1V cut slope proposed immediately south of the proposed middle sports field only.

CROSS SECTION A-A' SLOPE STABILITY RESULTS

Slope Configuration	Stability Condition	Failure Surface Search	Estimated FOS[1]			Required FOS
			Janbu Corrected	Spencer	Morgenstern Price	
3H:1V Cut Slope	Static (long-term)	Non-circular	2.65	2.95	2.92	1.5
	Seismic (short-term)		1.72	1.89	1.87	1
2.5H:1V Cut Slope	Static (long-term)	Non-circular	2.32	2.5	2.46	1.5
	Seismic (short-term)		1.52	1.65	1.62	1
2H:1V Cut Slope	Static (long-term)	Non-circular	2.07	2.16	2.14	1.5
	Seismic (short-term)		1.42	1.52	1.5	1

Note:
1. FOS = Factor of safety

[8] California Geological Survey (2013), Note 48, Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings, October 2013.
[9] Using coordinates for Site 5.

10. CONCLUSIONS AND GENERAL RECOMMENDATIONS

Based on the results of our investigation, it is our opinion that the proposed project and related improvements are feasible geotechnically and that the Site may be developed as planned. This conclusion assumes that the recommendations presented in this report will be incorporated into the design and construction of this project.

Additional discussions, conclusions, and recommendations are presented below. Specific recommendations regarding geotechnical design and construction aspects for the project are presented in the "Recommendations" section of this report.

10.1 Geologic and Seismic Hazards

10.1.1 Fault-Related Ground Surface Rupture and Ground Shaking

As previously discussed, the Site is not situated within a State-designated Alquist-Priolo Earthquake Fault Zone where site-specific studies addressing the potential for surface rupture are required, and no known active faults traverse the Site. In our opinion, the potential for fault-related ground surface rupture at the Site is low. However, as noted in the "Site Geology and Seismicity" section of this report, the Site is proximate to several active faults that are capable of producing significant ground shaking at the Site. Therefore, we conclude that the Site could be subjected to moderate to intense ground shaking from a future significant earthquake on the active faults in the region surrounding the Site. Mitigation of ground shaking should be addressed by incorporating pertinent seismic requirements of the 2022 California Building Code (CBC) in the design of the new structures for the project.

10.1.2 Expansive Soils

Based on our Atterberg limits test results, the soils and bedrock at the Site have a moderate to high expansion potential when exposed to cycles of moisture fluctuation. To reduce the potential for movement due to shrinking and swelling of the surficial expansive soils, we recommend deepening spread footings and the edge of mat foundations, use of "non-expansive" fill beneath interior slabs, exterior flatwork, and pavers, use of deepened edges or moisture barriers at the edge of exterior flatwork, and moisture conditioning of the subgrade soils as discussed in the "Site Preparation and Grading," "Spread Footings and Mat Foundations", "Slabs-on-Grade", "Interior Floor Slabs", and "Exterior Concrete Flatwork and Pavers" sections of this report.

10.1.3 Liquefaction Potential

Liquefaction is a condition where saturated, granular soils undergo a substantial loss of strength and deformation due to pore pressure increase, resulting from cyclic stress application induced by earthquakes. In the process, the soil acquires mobility sufficient to permit both horizontal and vertical

movements if the soil is not confined. Soils most susceptible to liquefaction are loose, clean, uniformly graded, silt and fine sand, as well as some lean clay deposits.

In order for liquefaction triggering to occur due to ground shaking, it is generally accepted that four conditions will exist:

- The subsurface soils are in a relatively loose state
- The soils are saturated
- The soils have low plasticity
- Ground shaking is of sufficient intensity to act as a triggering mechanism

In addition, after soil liquefies, dissipation of the excess pore pressures can produce volume changes within the liquefied soil layer, which can result in ground surface settlement.

Due to the composition and relatively density of the surficial soils, the absence of free groundwater in our borings, and the presence of shallow bedrock at the Site, we conclude that the potential for liquefaction to occur at the Site is low.

10.1.4 Lateral Spread Potential

Lateral spread is a potential hazard commonly associated with liquefaction where extensional ground cracking and settlement occur as a response to lateral migration of subsurface liquefiable material. These phenomena typically occur adjacent to free faces such as slopes and creek channels. Because we deem the liquefaction potential at the Site to be low, we conclude that the potential for lateral spread to occur at the Site is also low.

10.1.5 Dynamic Compaction/Seismic Settlement Potential

Another type of seismically induced ground failure, which can occur as a result of seismic shaking, is dynamic compaction or seismic settlement. Such phenomena typically occur in unsaturated, loose granular material or uncompacted fill soils. Based on the stratigraphy and consistency/density of the soils encountered in our borings, we conclude that the potential for seismic settlement to occur at the Site is low.

10.2 Cut/Fill Transition Zones

Significant amounts of cuts and fills are planned for the project, particularly within the proposed sports fields. Cut/fill transitions, particularly at transitions between cuts within the bedrock, can lead to significant differential settlement if not properly mitigated. Therefore, we recommend overexcavating all cut areas a minimum of 3 feet below finished subgrade elevation within the sports fields, exterior flatwork, pavers, and pavements and a minimum of 5 feet below foundations. The overexcavation should extend a

minimum of 5 feet laterally beyond the cut limits, where feasible. The overexcavated zone can then be backfilled with properly compacted engineered fill according to the requirements of the "Site Preparation and Grading" section of this report. The overexcavated material can be re-used as engineered fill provided it meets the fill requirements of this report.

To further reduce the potential for significant cut/fill differential settlement, we recommend using a higher compaction requirement for the portion of fills deeper (i.e., thicker) than 7 feet as recommended in the "Site Preparation and Grading" section of this report.

10.3 Bedrock Rippability/Excavatability

Cuts up to about 45 feet deep are planned for this project. Such cuts will result in deep cuts within bedrock. A seismic refraction survey (refer to Appendix C) was performed as part of our investigation to estimate depth to bedrock and evaluate bedrock rippability (i.e., excavatability). Although the bedrock encountered in our borings is predominantly highly weathered claystone and sandstone and can generally be excavated using convention earthwork equipment, such as trenchers and backhoes, moderately weathered and strongly cemented sandstone and conglomerate zones will be more difficult to excavate, especially in confined spaces, such as trench or drilled pier excavations. Therefore, more specialized earthwork equipment, such as dozers, excavators, hydraulic hammer attachments, and more powerful drilling equipment will likely be needed, particularly where deep cuts are planned.

10.4 Stability of Cut Slopes

Although our limited slope stability analysis indicates that the planned 30-foot-high, 2H:1V cut slope should be globally stable, it is possible that adverse bedding conditions could be exposed on the proposed cut slope during grading, which if left unmitigated could lead to future instability of the cut slope. Therefore, **the cut slope should be evaluated by a qualified geologist from BSK during grading operations in order to decide whether the cut slope should be overexcavated laterally and then be rebuilt as a fill slope**.

10.5 Golf Pond Sediments

Although not encountered in our boring performed within the former golf course pond, it is possible that a layer of organics and soft sediments is present over the pond bottom. If so, this material will need to be removed prior to placement of backfill within the pond limits to reach design finish grades. If the material excavated from the pond contains high amounts of organics, it may need to be disposed offsite or in landscaping areas.

Note that we did not visually observe evidence of a geotextile liner within the former golf course pond during our investigation, but it is possible that such a liner exists. If so, it should be removed and disposed offsite prior to placement of backfill within the pond limits.

11. RECOMMENDATIONS

Presented below are our recommendations for earthwork (including cut and fill slopes), foundations, seismic considerations, retaining walls, interior slabs-on-grade, exterior concrete flatwork and pavers, pavements, landscaping and irrigation considerations, site drainage, and storm water runoff mitigation as well as associated construction considerations for the planned improvements at this Site.

11.1 Earthwork

11.1.1 Site Preparation and Grading

Our general site preparation and grading recommendations are as follows:

1. The areas to be graded should be cleared of debris, significant surface vegetation and obstructions including abandoned underground pipes, foundations, and concrete slabs. Stripped surface organics should be stockpiled and may be reused only in landscaping areas or disposed off-site.

   We anticipate the depth of stripping to range from 3 to 6 inches depending on the amount of organics present. However, deeper stripping may be necessary within the limits of the former golf pond if organics and soft sediments are encountered there.

2. The root system of trees to be demolished should be removed such that there are no roots thicker than approximately 1-inch in diameter and the remaining organics are no greater than 3 percent by dry unit weight within the upper 5 feet of finished subgrade or the depth of the root ball, whichever is shallower and laterally a minimum of 5 feet beyond the limits of the improvements (defined as the outside perimeter of walls or footing outer limits, whichever results in the greatest building envelope) and 3 feet beyond the edge of flatwork, pavers, and pavement where achievable. A BSK representative should check the excavation bottoms before they are backfilled with engineered fill[10].

3. Existing pipelines crossing the Site to be abandoned should be removed whenever feasible. Abandoned pipes to remain should be capped at both ends if smaller than 2 inches in diameter or be filled with 1-sack sand-cement slurry if greater than 2 inches in diameter. Existing pipelines to remain, including subdrain lines, should be carefully located and protected during demolition and during construction.

[10] "Engineered fill" is defined in this report as suitable **on-site soil and bedrock and imported fill** that is used to backfill excavations or raise site grade and is properly moisture conditioned and compacted per the requirements of this report. The requirements for the suitability of on-site soils and bedrock and import fill are provided in the "Site Preparation and Grading" section of this report.

4. **From a geotechnical standpoint only, the on-site soils and bedrock are generally suitable for re-use as general engineered fill[11] provided they are free of debris, vegetation, and other deleterious matter and properly processed so that particle sizes are not greater than 6 inches in largest dimension.** At least 90 percent by weight of the general engineered fill/backfill materials should be passing the 1-inch sieve. Nesting (i.e., concentration) of larger particles should be avoided to reduce the potential that this could create voids and allow future settlement in the overlying fill/backfill. All fill materials should be subject to evaluation and approval by a BSK representative prior to their use.

   If zones of loose/soft or saturated soils, including in existing fill areas, are encountered during excavation and compaction, deeper excavations may be required to expose firm soils. This should be evaluated in the field by a BSK representative. Where deleterious matter is encountered in excavations, this material should be overexcavated and disposed off-site.

5. Controlled Low Strength Material (CLSM) typically consists of a mixture of cement, fly ash, coarse and fine aggregate, an air entrainment admixture, and water. Where foundations will bear on CLSM, the CLSM should have a 28-day compressive strength of at least 50 pounds per square inch (psi) tested in conformance with ASTM D4832 and sampled in accordance with ASTM D5971. For future excavatability of the CLSM, its 28-day compressive strength should not exceed 1,000 psi. A minimum of one set of cylinders should be cast each day CLSM is placed. One flowability test should be conducted per ASTM D6103 each day CLSM is placed and should be at least 8 inches diameter prior to placement.

   The CLSM mix design should be reviewed by the design team and BSK for approval at least 10 business days prior to its use. CLSM placement should be observed and tested by a qualified representative of BSK.

6. Existing concrete flatwork and AC walkways may be pulverized and mixed with existing aggregate base for use as general engineered fill if the pulverized material meets the gradation requirements general engineered fill or "non-expansive" fill[12] if it meets the requirements provided below for "non-expansive" fill. This material can also be used as Caltrans Class 2 aggregate base for future paved areas and exterior flatwork provided it meets the gradation, R-Value, durability index, and sand equivalent requirements of Section 26 of the 2018 Caltrans Standard Specifications unless otherwise indicated by BSK during construction.

7. Proper granular bedding and shading should be used beneath and around new utilities. Imported fill material should not be any more corrosive than the on-site soils and should not be classified as being more corrosive than "moderately corrosive." **Imported fill, including "non-expansive"**

[11] "General engineered fill" is defined in this report as suitable **on-site soil or bedrock** that is used to backfill excavations or raise site grade and is properly moisture conditioned and compacted per the requirements of this report. The requirements for the suitability of on-site soils and bedrock are provided in the "Site Preparation and Grading" section of this report.

[12] "Non-expansive fill" is defined as imported soil material that has a low expansion potential and meets the requirements for "non-expansive fill" provided in the "Site Preparation and Grading" section of this report.

fill, should be granular in nature, adhere to the above gradation recommendations, and conform to the minimum criteria presented in the table below (unless otherwise permitted by BSK). Highly pervious materials such as pea gravel or clean sands are not recommended because they permit transmission of water to the adjacent and/or underlying soils.

IMPORT FILL AND "NON-EXPANSIVE" FILL CRITERIA	
Plasticity Index	12 or less
Liquid Limit	Less than 30%
% Passing #200 Sieve	8% – 40% (general engineered or "non-expansive" fill) Less than 8% (bedding and shading)

8. Following stripping and removal of deleterious materials in areas of the Site to receive fill, the Site should be scarified to a minimum depth of 12 inches, moisture conditioned to at least 2 percent above optimum moisture content, and re-compacted to a minimum of 90 percent relative compaction. **It is important to meet this minimum moisture conditioning due to the expansion potential of the near-surface soils.** Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density determined by ASTM D1557 compaction test procedures. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density. Scarification and recompaction should extend laterally a minimum of 5 feet beyond the limits of structures (defined as the outside perimeter of building walls or foundation outer limits, whichever results in the greatest building envelope) and 3 feet beyond the edge of flatwork, pavers, and pavements, where achievable.

9. We expect fill to settle an amount equivalent to 1 percent of the fill thickness even if it is compacted to a minimum of 90 percent compaction. For instance, if the fill thickness is 20 feet, that would be equivalent to about 2½ inches of settlement. Although most of this settlement is expected to occur during construction, a portion of this settlement could occur several months to 1+ year after grading for the project is completed. To address this potential settlement, the required compaction for deeper fills should be increased. Therefore, **where fills/backfills are greater than 7 feet in depth below finish grade, the zone below a depth of 7 feet should be compacted to a minimum of 95 percent relative compaction**. Note that increasing the compaction effort should reduce the amount of fill settlement, but it will not eliminate it.

10. **Overexcavation and Backfill of Percolation Test Hole Locations:** Where new improvements are constructed over or within 3 feet laterally of the percolation tests holes performed for our investigation, the pertinent test hole areas should be overexcavated to the terminated depths discussed in the "Percolation Test Holes" section of this report during grading and replaced with properly compacted and moisture conditioned engineered fill. The overexcavated areas should measure 5 feet by 5 feet in plan dimensions, where achievable. The approximate location of our percolation test holes (P-1 through P-3) are shown on Figure 2.

11. **Cut/Fill Transitions:** We recommend overexcavating all cut areas a minimum of 3 feet below finished subgrade elevation within the sports fields, exterior flatwork, pavers, and pavements and a minimum of 5 feet below foundations. The overexcavation should extend a minimum of 5 feet

laterally beyond the cut limits, where feasible. The overexcavated zone can then be backfilled with properly compacted engineered fill according to the requirements of the "Site Preparation and Grading" section of this report. The overexcavated material can be re-used as engineered fill provided it meets the fill requirements of this report.

12. **In areas to be exposed to vehicular traffic**, the upper 12 inches of the soil subgrade immediately below the aggregate base layer should be compacted to a minimum of 92 percent relative compaction at least 2 percent above optimum moisture content. Subgrade preparation should extend a minimum of 3 feet laterally beyond the edge of flatwork, pavers, and pavements, where feasible. The aggregate base layer underneath such flatwork, pavers, and pavement should be compacted to a minimum of 95 percent relative compaction at near optimum moisture content. In addition to these compaction requirements, areas to be exposed to vehicular traffic should be firm and stable and should be proof rolled with a heavy piece of construction equipment, such as a loaded dump truck or water truck, to check for signs of subgrade instability.
13. Compact the upper 12 inches of subgrade for **bioretention areas** to no more than 85 percent compaction at least 2 percent over optimum moisture content. Compact the upper 12 inches of subgrade for **pervious pavers** to no more than 90 percent compaction near optimum moisture content (the subgrade for pervious pavers exposed to vehicular traffic should be compacted as recommended above for areas to be exposed to vehicular traffic). No vibratory compaction should be applied to the subgrade for bioretention areas and pervious pavers.
14. Unless otherwise indicated above, all fill and backfill should be placed in thin lifts up to 8-inch maximum uncompacted thickness, properly moisture conditioned to at least 2 percent above optimum moisture content for clayey soils and to near optimum moisture content for granular soils, and compacted to at least 90 percent compaction per ASTM D1557. Aggregate base should be moisture conditioned to near-optimum moisture content.
15. Permanent cut and fill slopes for this project should meet the requirements of the "Cut and Fill Slopes" Section of this report.
16. Observations and compaction testing should be carried out by a BSK representative during grading and backfill operations to assist the contractor in obtaining the required degree of compaction and proper moisture content. Where the moisture content or compaction is outside the range required, additional compactive effort and adjustment of moisture content should be made until the specified compaction and moisture conditioning is achieved.
17. BSK should be notified at least 48 hours prior to any grading and backfill operations. The procedure and methods of grading may then be discussed between the contractor and BSK.

11.1.2 Cut and Fill Slopes

Temporary cut slopes are the responsibility of the contractor and their gradient will depend on the planned construction methodologies, the actual conditions exposed in the cuts, and the level of risk selected by the contractor. **A qualified geologist from BSK should be present during grading operations**

to check exposed conditions that could impact short-term and long-term stability, such as water seepage, adverse bedding, and weak or intensely sheared areas.

Cut Slopes

Permanent cut slopes for this project should have gradients no steer than 2H:1V (horizontal to vertical). **If adverse conditions, such as adverse bedding (i.e., bedding planes exposed along the cut face), weak and intensely sheared areas, or seepage, are exposed along portions of cut slopes, they may need to be overexcavated and then reconstructed as fill slopes.** The lateral overexcavation of cut slopes that are reconstructed as fill slopes should be a minimum 15 feet wide in order to allow for the construction of a keyway and proper benching of the back cut of the reconstructed fill slope. For additional details, refer to the "Fill Slopes" section below.

Fill Slopes

Fill slopes should be overbuilt a minimum of 2 feet laterally and then cut back to finished grade to allow proper compaction of the finished slope face. The standard of practice is to construct permanent fill slopes using a maximum gradient of 2H:1V, supported on keyways, and including a subdrain system. The backside (back cut) of the fill slope should be benched into the underlying material at regular vertical intervals of about 2 to 3 feet as the fill placement proceeds as shown on the Typical Fill Slope, Keyway, and Subdrain Detail, Figure 4. The bench width should be a minimum of 3 feet wide. A keyway and subdrain are not required for fill slopes less than 5 feet in vertical height.

Keyways should be embedded a minimum of 5 feet vertically into firm native soils or weathered bedrock and be at least 8 feet wide at the base as shown on Figure 4. A subdrain line should be installed at the base of the keyway.

Additional subdrain lines should be constructed at approximately 15-foot vertical intervals if applicable. The subdrain pipes should be placed to provide positive gravity flow towards an appropriate drainage device, such as a solid drainpipe, connected to a storm drain. Alternatively, an energy dissipator (such as rock slope protection, RSP, underlain by RSP fabric) should be constructed at the end of the drainpipes where they discharge at the ground surface. However, the surficial discharge points should be located such that they do not adversely impact the stability of the adjacent slope(s) or erode the ground surface.

The subdrain lines should consist of a 4-inch diameter, rigid, perforated subdrain pipes (Type SDR-35 or equivalent with perforations pointing down). Based on our experience, flexi-pipes have a tendency to buckle and collapse and, therefore, such pipes should not be used for this project. The perforated subdrain pipes should be surrounded by a 2-foot-thick zone of Caltrans Class 2 permeable material. Figure 4 presents a typical subdrain detail.

Erosion Protection

The surface of cut and fill slopes greater than 5 feet in vertical height should be covered by a turf reinforcing mat to help provide temporary erosion protection until vegetation is re-established over the area to provide long-term erosion protection of the slope surface. A Type A turf reinforcing mat meeting the requirements of Section 21-2.02O(5) of the 2018 Caltrans Standard Specifications, such as Mirafi TM13C or equivalent, should be used. The turf reinforcing mat should be overlapped a minimum of 1 foot at the seams and fixed to the surface of the slope per the manufacturer's requirements. At the conclusion of construction operations, cut and fill slopes should be hydroseeded to help encourage growth of vegetation on the surface to serve as an additional long-term erosion control measure.

11.1.3 Quicklime Treatment

Quicklime treatment of the in-situ soils (if used) should be performed using high calcium or dolomitic quicklime. Extensive quality control is needed as well as possibly laboratory testing to evaluate the appropriate quicklime treatment mixture. Our experience has indicated that about 5 percent quicklime by dry unit weight of the soil is typically needed for treatment. For design purposes, an in situ dry unit weight of 110 pcf may be assumed. The negative impact of quicklime treatment on future vegetation should be considered.

The quicklime treatment operation should be conducted in general accordance with Section 24 of the Caltrans Standard Specifications, 2018 edition. Quicklime treatment typically consists of spreading the required amount of quicklime over the area to be treated, followed by initial mixing of the quicklime and water within the soil section to be treated. This initial mixing is then allowed to sit for a period of about 24 hours or longer to permit the resulting chemical reaction to break down the material and change it chemically. Following this "mellowing" period, the soil-quicklime section is re-mixed and additional water, if needed, is added. It is important that adequate water be added before final mixing to ensure complete hydration of the quicklime and to bring the soil moisture content to at least 3 percent above the optimum moisture content before compaction takes place.

After the quicklime-treated pad/subgrade is compacted, it should be allowed to harden (cure) until loaded dump trucks and other construction equipment can operate on it without rutting the surface. Throughout this curing period, the surface of the quicklime-treated soil should be kept moist to aid in strength gain. Alternatively, the quicklime-treated surface can be covered with the 6 inches of capillary break or aggregate base material.

It is very important that the general steps outlined above be performed in a manner that introduces sufficient water to the soil-quicklime mix to allow the quicklime to thoroughly hydrate and react chemically with the soil subgrade. Likewise, it is equally important that proper curing of the quicklime-treated section take place.

11.1.4 Weather/Moisture Considerations

If earthwork operations and construction for this project are scheduled to be performed during the rainy season (usually November to May) or in areas containing saturated soils, provisions may be required for drying of soil or providing admixtures, such as quicklime treatment, to the soil prior to compaction. Conversely, additional moisture may be required during dry months. Water trucks should be made available in sufficient numbers to provided adequate water during earthwork operations.

If unstable (i.e., pumping) subgrade conditions are exposed during construction, the pertinent areas should be evaluated by a BSK representative prior to mitigation. Possible mitigation measures could include the following:

- Do nothing if the area in question would not adversely affect site performance;
- 12-inch scarification and air/wind drying of the affected soils over a period of several days/weeks;
- Treating the upper 12 inches of the subgrade with between 3 to 5 percent of quicklime or cement by dry unit weight; and/or
- 12 inches of overexcavation, placement of geotextile fabric (such as Mirafi 600X or equivalent), and backfill with dryer on-site soil or Caltrans Class 2 aggregate base.

During the summer months, consideration could be given to lining the sides and/or bottoms of the foundation excavations with burlap and periodically moisturizing it in order to help maintain the moisture content and shape of the sides of the excavations if they will not be backfilled with concrete within a couple weeks of excavation, especially during hot, dry, windy weather conditions. Consideration could also be given to placing a “rat” slab at the bottom of the footing excavations that consists of at least 2 inches of CLSM. The “rat” slab would serve a dual role of protection moisture loss of the subgrade soils below the footings and also helping protect the subgrade soils from being saturated during rainstorms. Prior to placing CLSM, the bottoms of footing excavations should be observed by a BSK representative to check that they are consistent with the soils encountered in our investigation, properly moisture conditioned, firm and stable, and provide adequate bearing.

The above preliminary mitigation measures are not all-inclusive and may need to be modified or enhanced during construction based on actual field conditions and BSK’s input.

11.1.5 New Utility Trench Excavation and Backfill

All excavations should conform to current OSHA requirements for work safety. Where trenches or other excavations extend deeper than 5 feet, the excavations may become unstable and should be evaluated by the contractor to monitor stability prior to personnel entering the trenches. Shoring or sloping of any trench wall may be necessary to protect personnel and to provide stability. It is the contractor’s responsibility to follow OSHA temporary excavation guidelines and grade the slopes with adequate

layback or provide adequate shoring and underpinning of existing structures and improvements, as needed. Slope layback and/or shoring measures should be adjusted as necessary in the field to suit the actual conditions encountered, in order to protect personnel and equipment within excavations. Based on the subsurface conditions encountered in our borings, we expect the sidewalls of trenches that extend to depths of up to about 5 feet to remain relatively vertical for a period of several days. Nevertheless, the longer the trenches remain open the higher the potential for the sidewalls to start to slough off or cave.

Free groundwater was not observed in our borings. However, the actual depth at which groundwater may be encountered in trenches and excavations may vary. As a minimum, provisions should be made to ensure that conventional sump pumps used in typical trenching and excavation projects are available during construction in case substantial runoff water accumulates within the excavations as a result of wet weather conditions or if groundwater is encountered in the excavations.

Material quality, placement, and compaction requirements for utility bedding and shading materials[13] should meet applicable agency requirements and/or the maximum fines content recommended in the "Site Preparation and Grading" section of this report for the bedding and shading material. Utility trench backfill above the shading materials may consist of general engineered fill as described in the "Site Preparation and Grading" section of this report. Backfill materials should be placed in lifts not exceeding 8 inches in loose thickness, moisture conditioned, and compacted to the requirements provided in the "Site Preparation and Grading" section of this report.

Where new utility trenches extend from the exterior into the interior limits of a building or pavement, CSLM or lean concrete should be used as backfill material for a distance of 2 feet laterally on each side of the perimeter footing centerline or the pavement edge to reduce the potential for the trench to act as a conduit for exterior surface water. In addition, where new utilities cross through exterior footings, flexible waterproof caulking should be provided between the sleeve and the pipe. Utility trenches located in landscaped areas should also be capped with a minimum of 12 inches of compacted on-site clayey soils.

11.2 Foundation Recommendations

11.2.1 Spread Footings and Mat Foundations

We recommend the criteria presented in the tables below be incorporated into the design of spread footings and mat foundations for this project. Due to the moderate to high expansion potential of the surficial soils, **a continuous perimeter footing should be constructed for the new restroom/concession building** (unless it is supported on a mat foundation) to reduce the potential for moisture fluctuation

[13] Bedding material typically consists of sand used to backfill a few inches (typically 3 to 6 inches) below the invert elevation of a pipe. Shading material typically consists of sand used to backfill around and a few inches (typically 6 to 12 inches) above the top of a pipe.

underneath these structures, which could lead to vertical movement associated with shrinkage/swell cycles.

FOOTING DESIGN CRITERIA	
Static Allowable Bearing Capacity[1]	2,500 psf
Seismic/Wind Allowable Bearing Capacity[1]	3,750 psf
Passive Resistance (Equivalent Fluid Pressure)[2,3]	350 pcf
Allowable Lateral Sliding Resistance Adhesion[3]	600 psf
Minimum Embedment Depth[4]	24 inches
Minimum Width	12 inches (continuous) 18 inches (isolated)

Notes:

1. Includes a factor of safety of at least 3 for static loading and at least 2 for transient loading (i.e., seismic or wind conditions).
2. Neglect upper 1 foot if surface is not confined by concrete slab or pavement. **For foundations located on or proximate to sloping ground, such as bioretention areas, the passive resistance should be neglected in the upper portion of the foundation until there is a horizontal distance of at least 7 feet between the slope face and the nearest edge of the foundation.**
3. The sliding resistance and passive resistance may be used concurrently, and the passive resistance can be increased by one-third for wind and/or seismic loading. Values include a factor of safety of at least 1½. The sliding resistance adhesion should be multiplied by the foundation area to obtain horizontal sliding resistance.
4. Below lowest adjacent grade considered to be bottom of slab on the interior or finished grade on the exterior.

MAT SLAB FOUNDATION CRITERIA[1]	
Static Allowable Bearing Capacity[2]	1,500 psf
Seismic/Wind Allowable Bearing Capacity[2]	2,250 psf
Passive Resistance (Equivalent Fluid Pressure)[3, 4]	350 pcf
Allowable Coefficient of Friction[4]	0.30
Modulus of Vertical Subgrade Reaction[5]	120 psi/in
Minimum Slab Thickness[6] at the Edges	18 inches

Notes:

1. Mat slab foundations should be supported on a minimum of 12 inches of compacted Caltrans Class 2 aggregate base to provide enhance slab support. If moisture vapor through the slab is objectionable (i.e., moisture sensitive flooring or objects will be placed over slabs), a vapor barrier at least 15 mils thick (meeting the requirements of the "Floor Slab Moisture" section of this report) and capillary moisture break consisting of a minimum 6-inch-thick layer of crushed drain rock should be installed underneath mat foundations. If used, the crushed drain rock layer may substitute an equivalent amount of the recommended aggregate base layer. The crushed rock layer should be ¾-inch maximum size with no more than 10 percent by weight passing the #4 sieve.
2. Includes a factor of safety of at least 3 for static loading and at least 2 for transient loading (i.e., seismic or wind conditions).
3. Neglect upper 1 foot if surface is not confined by concrete slab or pavement. **For foundations located on or proximate to sloping ground , such as bioretention areas, the passive resistance should be neglected in the upper portion of the foundation until there is a horizontal distance of at least 7 feet between the slope face and the nearest edge of the foundation.**
4. The allowable coefficient of friction and passive resistance may be used concurrently, and the passive resistance can be increased by one-third for wind and/or seismic loading. Values include a factor of safety of at least 1½.
5. Based on a one square foot bearing plate. This unadjusted value needs to be adjusted for the actual size of the mat as follows:
    a. Multiply by [(m+0.5)/(1.5 x m)] where m is the ratio of the mat length divided by its width (unitless).
    b. If a computer program is used to design the mat for this project and it requires the input of a modulus of subgrade reaction for the Site, the designer should check whether the program requires input of the unadjusted or adjusted modulus of vertical subgrade reaction.
6. Below lowest adjacent finished grade. The thickened edge should be a minimum of 12 inches wide. The slab designer should determine the slab concrete thickness and reinforcing.

Provided that the foundations are designed according to the recommendations presented above and constructed properly, total and differential elastic settlements are estimated to be on the order of 1 inch and ½ inch, respectively. Differential settlement is defined in this report as the vertical difference in settlement between adjacent foundation supports or across a horizontal distance of 30 feet, whichever is less. A majority of the estimated elastic settlement is expected to occur during construction as the foundation is loaded.

11.2.2 Additional Considerations for Shallow Foundations

Where foundations are located adjacent to below-grade structures (including existing footings) or near major underground utilities, the foundation should extend below a 1H:1V (horizontal to vertical) plane projected upward from the structure foundation or bottom of the underground utility to avoid surcharging the below grade structure and underground utility with foundation loads. Where this is not possible or feasible, we recommend that CLSM be used to backfill the portion of the utility trench that extends below the 1H:1V projection. Also, if a utility crosses perpendicular to a footing, if it is located within 2 x W of the bottom of the footing, where W = width of footing, the utility should be encased in CLSM or lean concrete. If a perpendicular utility is located below a depth of 2 x W below the footing, the utility does not need to be encased in CLSM or lean concrete, but the trench should be backfilled with impervious material a distance of 2 feet laterally on each side of the perimeter footing centerline as recommended in the "New Utility Trench Excavation and Backfill" section of this report.

Concrete for foundations should be placed neat against firm native soil or engineered fill. **It is critical that foundation excavations not be allowed to dry before placing concrete.** If shrinkage cracks appear in the foundation excavations, the excavations should be thoroughly moistened to close all cracks prior to concrete placement. The foundation excavations should be monitored by a representative of BSK for compliance with appropriate moisture control and to confirm the adequacy of the bearing materials.

Where utilities cross under the perimeter footings line and enter "interior" space, the trench backfill should consist of a vertical barrier of impervious type material as explained in the "New Utility Trench Excavation and Backfill" section of this report. In addition, where utilities cross through footings, flexible waterproof caulking should be provided between the sleeve and the pipe. Utility plans should be reviewed by BSK prior to trenching for conformance to these requirements.

11.2.3 Shallow Drilled Piers

Ancillary, non-critical structures, such as light poles, flag poles, basketball hoops, fences, and gates, can be supported on shallow drilled piers. We recommend the following criteria be incorporated into the design of shallow drilled pier foundations for this project.

DRILLED PIER FOUNDATION CRITERIA	
Static Allowable Downward Skin Friction[1]	500 psf
Seismic/Wind Allowable Downward Skin Friction[1]	670 psf
Passive Resistance (Equivalent Fluid Pressure)[2]	350 pcf
Minimum Pier Diameter	18 inches
Minimum Pier Depth Below Ground Surface	5 feet[3]
Minimum Pier Center to Center Spacing	3D[4] (axial loading) 6D[4,5] (lateral loading)

Notes:

1. Includes a factor of safety of at least 2 for static loading and at least 1½ for transient loading (i.e., seismic or wind conditions). Uplift resistance may be taken as 2/3 of downward capacity. Weight of piers may be used to resist upward loading.
2. Neglect upper 1 foot if surface is not confined by concrete slab or pavement. **For piers located on or proximate to sloping ground, the passive resistance should be neglected in the upper portion of the piers until there is a horizontal distance of at least 7 feet between the slope face and the nearest edge of the piers.** Passive resistance should be limited to 1,500 psf and may be applied to twice the diameter of the piers. Passive resistance may be increased by 1/3 for seismic or wind loads. Value includes a factor of safety of at least 1½.
3. The pier embedment depth may be reduced to 3 feet for chain link fences and chain link gates that are up to 6 feet in vertical height.
4. D = pier diameter. Minimum spacing for lateral loading only applies to piers aligned in the direction of loading (i.e., one or more piers shadow another pier).
5. For **piers spaced less than 6D apart** and where the loading direction is such that there is one or more trailing pier(s) shadowing the leading pier, reductions to lateral capacity of the trailing pier(s) should be applied as follows:
    a. For trailing[14] piers spaced 3D (D = pier diameter) apart, reduce trailing pier capacity by 50 percent (multiply contribution of trailing piers to group capacity by 0.5),
    b. For trailing piers spaced between 4D and 5D apart, reduce trailing pier capacity by 40 percent (multiply contribution of trailing piers to group capacity by 0.6),
    c. For trailing piers spaced 6D or greater apart, no reduction is needed, and
    d. For trailing piers spaced between 3D and 4D apart and 5D and 6D apart, interpolate the reduction factors provided above.

Provided that the drilled piers are designed according to the recommendations presented above and constructed properly, the total and differential elastic settlements are estimated to be on the order of ½-inch and ¼-inch, respectively. Differential settlement is defined in this report as the vertical difference in settlement between adjacent foundation supports or across a horizontal distance of 30 feet, whichever is less. A majority of the estimated elastic settlement is expected to occur during construction as the foundation is loaded.

[14] The leading pier is defined as the pier that has no pier in front of it in the direction of lateral loading, while the trailing pier is defined as the pier that is behind (i.e., shadows) the leading pier in the direction of lateral loading.

11.2.4 Additional Considerations for Drilled Piers

We expect that conventional drilling equipment can be used for piers that extend into the Site's surficial soils. However, as discussed in the "Bedrock Rippability/Excavatability" section of this report, more powerful drilling equipment will likely be needed for drilled piers that extend into moderately weathered and strongly cemented sandstone and conglomerate zones, which will be more difficult to excavate, particularly where deep cuts are planned.

We recommend that drilled pier steel reinforcement and concrete be placed within about 4 to 6 hours upon completion of each drilled hole. As a minimum, the holes should be poured the same day they are drilled. If the holes cannot be backfilled the same day they are drilled, the hole needs to be checked for caving, sloughing or squeezing prior to setting the rebar cage and checked again before pouring concrete. The steel reinforcement should be centered in the drilled hole. Concrete used for pier construction should be discharged vertically into the holes to reduce aggregate segregation. Under no circumstances should concrete be allowed to free-fall against either the steel reinforcement or the sides of the excavation during construction.

As discussed in the "Subsurface Conditions" section of this report, free groundwater was not observed in our borings. However, the actual depth at which groundwater may be encountered in excavations may vary. If water more than 6 inches deep is present during concrete placement, either the water needs to be pumped out or the concrete needs to be placed into the hole using tremie methods. If tremie methods are used, the end of the tremie pipe must remain below the surface of the in-place concrete at all times. Unit prices for dewatering and/or tremie placement methods should be obtained during the bidding process.

Concrete for drilled piers should be designed and placed in general conformance with the recommendations provided in ACI 336.3R-14, Design and Construction of Drilled Piers[15]. The recommendations provided within ACI 336.3R-14 should be followed, in particular when concrete placement is necessary below groundwater level, in caving or sloughing soils, or in sand, which may necessitate casing or the slurry displacement method for concrete placement. These methods require concrete placement at higher slumps than "dry" conditions and concrete mix specifications, including the addition of concrete admixtures and consideration of consolidation methods, should be provided by the design team. If temporary casing is used, it should consist of smooth walled steel. **Corrugated metal pipe (CMP) should not be used as temporary casing because it has a tendency to create voids or disturbed zones during removal and temporary smooth-walled casing should not be left in the hole.**

11.2.5 2022 CBC Mapped Seismic Design Parameters

The seismicity of the region surrounding the Site is discussed in the "Site Geology and Seismicity" section of this report. From that discussion, it is important to note that the Site is in a region of high seismic

[15] ACI Committee 336, 2014

activity and will likely be subjected to moderate to intense ground shaking during the life of the project. As a result, structures for this project should be designed in accordance with applicable seismic provisions of the California Building Code (CBC) presented in the table below. Use of the 2022 CBC mapped seismic design criteria presented in the table below is considered appropriate for the design of structural improvements for this Site.

2022 CBC MAPPED SEISMIC DESIGN PARAMETERS			
Seismic Design Parameter	**Value**		**Reference[1]**
Site Class	C		Table 20.3-1, ASCE 7-16
MCE_R Mapped Spectral Acceleration (g)	S_S = 1.895	S_1 = 0.648	USGS Mapped Values based on Figures 1613.2.1(1) and 1613.2.1(3), 2022 CBC
Site Coefficients	F_a = 1.2	F_v = 1.4	Tables 1613.2.3(1) and 1613.2.3(2), 2022 CBC
MCE_R Mapped Spectral Acceleration Adjusted for Site Class Effects (g)	S_{MS} = 2.274	S_{M1} = 0.907	Section 1613.2.3, 2022 CBC
Design Spectral Acceleration (g)	S_{DS} = 1.516	S_{D1} = 0.604	Section 1613.2.4, 2022 CBC
Seismic Design Category	D		Section 1613.2.5, 2022 CBC
MCE_G peak ground acceleration adjusted for Site Class effects (g)	PGA_M = 0.942		Section 11.8.3, ASCE 7-16
Definitions: MCE_R = Risk-Targeted Maximum Considered Earthquake MCE_G = Maximum Considered Earthquake Geometric Mean **Notes:** When referencing ASCE 7-16, Supplement 1 must also be checked for changes to ASCE 7-16.			

11.3 Retaining Walls

Short (below-grade) retaining walls up to 5 feet in height may be constructed for bioretention areas. These walls may be supported on spread footings per the recommendations presented in the "Spread Footings and Mat Foundations" section above. Lateral earth pressures for retaining walls are presented in the table below and are expressed as equivalent fluid pressures (unit weights) in units of pounds per cubic foot (pcf) assuming that "non-expansive" fill or permeable material is used as wall backfill in the zone extending up at a 1H:1V slope from the bottom of the back of the wall. If the walls do not include a drainage system, then hydrostatic pressures should be included in the design of the walls.

RECOMMENDED LATERAL EARTH PRESSURES (FOR WALLS UP TO 5 FEET IN HEIGHT)		
Description	**Level Backfill up to 6H:1V[1]**	
	Does not include hydrostatic pressures	**Includes hydrostatic Pressures**
Active Earth Pressure (flexible walls)[2]	45 pcf	85 pcf
At-Rest Earth Pressure (restrained walls)[2]	60 pcf	90 pcf

Notes:
1. Horizontal to vertical.
2. Expressed as an equivalent fluid pressure.

11.3.1 Seismic Wall Pressures

According to Section 1803.5.12 of the 2022 CBC, dynamic seismic lateral earth pressures need to be included in the design of retaining walls supporting more than 6 feet of backfill height. Because the height of retaining walls for this project will be limited to 5 feet or less, we conclude that seismic lateral earth pressures do not need to be included in the wall design.

11.3.2 Wall Drainage

Retaining walls higher than 2 feet should be either designed to resist hydrostatic pressures or be well-drained to reduce the potential for hydrostatic pressures to develop behind the walls. A typical drainage system for a cantilevered wall may consist of a 1- to 2-foot-wide zone of Caltrans Class 2 Permeable material immediately behind the wall with a perforated pipe at the base of the wall discharging to a storm drain or other appropriate discharge facility via gravity flow. As an alternative, a prefabricated drainage board may be used in lieu of the Class 2 Permeable material. Where conditions allow for the use of weep holes, they may be used in lieu of the perforated pipe. The holes should be a minimum of 2 inches in diameter and spaced at 4 feet or less on-center. Filter fabric or wire mesh should be placed over the holes at the backside of the wall to inhibit the permeable material, if used in lieu of a drainage board, from washing through the holes. **Unless the drainage zone behind retaining walls is protected by concrete flatwork or pavement, it should be capped with a minimum 12-inch-thick layer of properly compacted on-site clayey soil to reduce the risk of surface runoff discharging into the wall drain.**

11.3.3 Surcharge Loads

Surcharge loads caused by vehicular and/or construction traffic adjacent to the walls may be assumed to consist of a rectangular distributed uniform pressure of 100 psf acting over a depth of 10 feet below the ground surface of the retained soil. For other surcharge loads, a rectangular distribution with a uniform pressure equal to one-third and one-half of the surcharge pressure should be used for an unrestrained wall (active earth pressure condition) and for a restrained wall (at-rest earth pressure conditions),

respectively. The wall designer should evaluate whether this surcharge is appropriate for the expected traffic loading. Additional analyses during design may be needed to evaluate the effects of non-uniform surcharge loads such as point loads, line loads, or other such presently undefined surcharge loads. In that case, we should be consulted for supplemental geotechnical recommendations.

11.4 Slabs-on-Grade

Slabs-on-grade for this project may consist of concrete floor slabs and exterior flatwork/pavers. The near-surface soils have a moderate to high expansion potential and will be subject to shrink/swell cycles with fluctuations in moisture content. To reduce these potentially adverse effects, we recommend that interior concrete slabs and exterior flatwork/pavers be underlain by 24 inches and 12 inches of "non-expansive" engineered fill, respectively, placed on subgrade prepared as described in the "Site preparation and Grading" section of this report. The properties of this "non-expansive" fill should meet the criteria listed in the "Site Preparation and Grading" section of this report. See below for additional criteria for interior floor slabs. **As discussed in the "Interior Floor Slabs" section below, the upper 6 inches of the 24-inch "non-expansive" fill below interior slabs should consist of crushed drain rock.**

High calcium or dolomitic quicklime treatment of the in-situ soils can be used as an alternative to "non-expansive" fill. If this alternative is utilized, extensive quality control is needed as well as laboratory testing to evaluate the appropriate quicklime treatment mixture. For estimating purposes, approximately 18 and 12 inches of soil would need to be treated for interior slabs and exterior flatwork/pavers, respectively, provided that the moisture content of the soils below that is at least 3 percent over optimum moisture as discussed in the "Quicklime Treatment" section of this report.

The "non-expansive" fill or quicklime-treated soil should extend a minimum horizontal distance of 5 feet beyond all building areas, where feasible, including the outer edge of perimeter footings and footings extending beyond perimeter walls, where flatwork and pavers is planned. The horizontal limits of treatment can be reduced to 3 feet elsewhere, such as for exterior flatwork and pavers. The over-build of the "non-expansive" fill or quicklime-treatment can be eliminated where landscaping is planned; however, it is important that the "non-expansive" fill or quicklime-treatment extends to the edge of the structural improvements. Therefore, special care should be exercised during surveying and staking of the building limits during construction. Alternatively, the over-build of the "non-expansive" fill or quicklime-treatment could proceed as recommended and then be removed from within landscaping areas afterwards prior to planting. If "non-expansive" fill is used, it is important that placement of this material be done as soon as possible after compaction of the subgrade to prevent drying of the native subgrade soils and that slabs be constructed as soon as possible after "non-expansive" material is placed or quicklime-treatment is conducted, as subgrades will dry out even through "non-expansive" fills or quicklime-treated soil. A representative of BSK should be present to observe the condition of the subgrade, and observe and test the installation of the "non-expansive" engineered fill or quicklime-treatment prior to slab construction.

Where "non-expansive" fill or quicklime-treated soil is removed to install utilities within the limits of buildings, exterior flatwork, pavers, or pavement, this layer should be backfilled with new imported "non-expansive" fill and not the "non-expansive" fill or quicklime-treated soil that was removed from the trench. This is because it is difficult to keep "non-expansive" fill or quicklime-treated soil separated from other soil excavated from the trench.

11.4.1 Interior Floor Slabs

Concrete floor slabs should be supported on at least 6 inches of crushed drain rock to enhance subgrade support for the slab and provide a capillary moisture break. This material may be considered part of the required minimum of 24 inches of "non-expansive" fill. If moisture vapor through interior slabs is objectionable (i.e., moisture sensitive flooring or objects will be placed over slabs), a vapor barrier at least 15 mils thick (meeting the requirements of the "Floor Slab Moisture" section of this report) should be placed above the crushed drain rock layer and the crushed drain rock material should be ¾ inch maximum size with no more than 10 percent by weight passing the #4 sieve. It is important that placement of this material and concrete be done as soon as possible after compaction of the "non-expansive" fill or quicklime-treated subgrade materials to reduce drying of the subgrade.

A Structural Engineer should design reinforcing and slab thickness. The floor slab should be separated from footings, structural walls, and utilities and provisions made to allow for settlement or swelling movements at these interfaces. If this is not possible from a structural or architectural design standpoint, it is recommended that the slab connection to footings be reinforced such that there will be resistance to potential differential movement.

11.4.2 Floor Slab Moisture

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this subsurface moisture will collect. To reduce the impact of the subsurface moisture and potential impact of future introduced moisture (such as landscape irrigation or precipitation), **a vapor barrier should be incorporated into the floor slab design in all areas where moisture sensitive floor coverings, coating, underlayments, adhesives, moisture sensitive goods, humidity-controlled environments, or climate-cooled environments are anticipated initially or in the future**. The vapor barrier should consist of a minimum 15 mil extruded polyolefin plastic, such as 15 mil Stego® Wrap vapor barrier or equivalent. The vapor barrier material should not include any recycled or woven materials and should have a permeance (as tested before and after mandatory conditioning per ASTM E1745 Section 7.1, latest edition) of less than 0.01 perms and should comply with ASTM E1745 Class A requirements. The vapor barrier should also meet Sections 8.1 and 9.3 of ASTM E1745 and subsequent documentation should be provided by the vapor barrier manufacturer. The vapor barrier should be installed in accordance with ASTM E1643, latest edition, including proper perimeter seal, such as Stego® Crete Claw® tape.

The vapor barrier should be placed directly over the crushed rock layer recommended in the "Interior Floor Slabs" section of this report. **A sand layer should not be placed between the vapor barrier and the concrete slab or it could serve as a reservoir for trapped moisture that could lead to long-term vapor transmission through the slab.**

It should be noted that although vapor barrier systems are currently the industry standard, these systems may not be completely effective in preventing floor slab moisture problems. These systems typically will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels be appropriate to inhibit mold growth. The design and construction of such systems are dependent on the proposed use and design of the proposed building and all elements of building design and function should be considered in the interior slab-on-grade floor design. Building design and construction have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may produce excessive moisture in a building and affect indoor air quality.

Various factors such as surface grades, adjacent planters, the quality of slab concrete and the permeability of the on-site soils affect slab moisture and can control future performance. In many cases, floor moisture problems are the result of either improper curing of floors slabs or improper application of flooring adhesives. We recommend contacting a flooring consultant experienced in the area of concrete slab-on-grade floors for specific recommendations regarding your proposed flooring applications.

Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) manual.

It is emphasized that we are not floor moisture vapor proofing experts. We make no guarantee nor provide any assurance that use of capillary break/vapor retarder system will reduce concrete slab-on-grade floor moisture penetration to any specific rate or level, particularly those required by floor covering manufacturers. The builder and designers should consider all available measures for floor slab moisture protection.

Exterior grading will have an impact on potential moisture beneath the floor slab. Recommendations for exterior drainage are provided in the "Site Drainage" section of this report.

It should be noted that the purpose of vapor barrier systems is to mitigate floor moisture vapor. These systems should not be used for waterproofing against shallow groundwater or surface water.

11.5 Exterior Concrete Flatwork and Pavers

New exterior concrete flatwork and pavers will be constructed on soils subject to swell/shrink cycles. Some of the adverse effects of swelling and shrinking can be reduced with proper moisture treatment. The intent is to reduce the fluctuations in moisture content by moisture conditioning the soils, sealing the moisture in, and controlling it. Near-surface soils to receive exterior concrete flatwork and pavers should be moisture conditioned according to the recommendations in the "Site Preparation and Grading" section of this report. In addition, all exterior flatwork and pavers should be supported on a minimum of 12 inches of "non-expansive" fill or quicklime-treated on-site soils. Where concrete flatwork and pavers are to be exposed to vehicle traffic, the upper 6 inches of the "non-expansive" fill should consist of Caltrans Class 2 aggregate base.

Practices recommended by the Portland Cement Association (PCA) and the American Concrete Institute (ACI) for proper placement and curing of concrete, as well as for joint spacing and construction, should be followed during exterior concrete flatwork slab construction. Due to the presence of moderately to highly expansive soils near the site surface, flatwork should have control joints (i.e., weakened plane joints) spaced no more than 8 feet on centers. New pedestrian concrete flatwork should have a minimum thickness of 4 inches and minimum reinforcing of #4 bars at 18 inches on center (both ways). The rebar should be discontinued at expansion joints. Slip Dowels should be used at expansion joints. Vehicular concrete should be designed as discussed in the "Portland Cement Concrete Pavements" section of this report. Final design of exterior concrete flatwork is the responsibility of the civil or structural engineer for the project.

Exterior flatwork and pavers will be subjected to edge effects due to the drying out of subgrade soils. To protect against edge effects adjacent to unprotected areas, such as vacant or landscaped areas, lateral cutoffs, such as inverted curbs (i.e., turndown edges) that extend at least 2 inches below the aggregate base or "non-expansive" fill layer into the subgrade soils, are recommended. Alternatively, a moisture barrier at least 80 mils thick extending at least 6 inches below the aggregate base or "non-expansive" fill layer into the subgrade soils could be installed at the edge of the flatwork and pavers. If quicklime treatment is used in lieu of "non-expansive" fill, the cutoff can be eliminated where no aggregate base is used.

Prior to construction of the flatwork and pavers, the aggregate base should be moisture conditioned to near optimum moisture content. If the aggregate base is not covered within about 30 days after placement, the soils below this material will need to be checked to confirm that their moisture content is at least 2 percent over optimum. If the moisture is found to be below this level, the aggregate base layer over flatwork and paver areas will need to be soaked until the proper moisture content is reached. Where flatwork is adjacent to curbs, reinforcing bars should be placed between the flatwork and the curbs. Expansion joint material should be used between flatwork/pavers and buildings, including concrete driveways.

11.5.1 Pervious Pavers

Pervious pavers are typically underlain by several inches of an open-graded bedding course over a reservoir layer. We recommend that a filter fabric, such as Mirafi® 140N or equivalent, be installed between the open-graded bedding course and the reservoir layer to avoid migration of the open-graded bedding course material into the reservoir layer. The open-graded bedding course material should meet the requirements of the paver manufacturer.

We recommend that the reservoir layer have a minimum thickness of 12 inches and consist of durable, open graded coarse gravel reservoir layer underlain by Mirafi® RS280i geotextile fabric or equivalent. If desired, the thickness of the reservoir layer could be increased to 18 inches for added storage capacity. The reservoir layer typically consists of coarse aggregate No. 57 per ASTM C33/C33M-18, which is similar to crushed drain rock having a 1-inch maximum size with no more than 10 percent by weight passing the No 4 sieve.

Mirafi® RS280i geotextile fabric has a high flow rate (typically 85 gallons per minute per square feet), which should permit almost unobstructed water flow through it, while helping maintain stability of the underlying subgrade. The geotextile fabric seams should be overlapped a minimum of 1 foot or as required by the manufacturer, whichever results in the greatest overlap.

We recommend installing an underdrain system connected to nearby storm drains within the reservoir layer for pervious pavers. Typically, the underdrain consists of one or more 4-inch diameter perforated subdrain pipes spaced and sloping down to a collector nonperforated outfall pipe that drains by gravity to a nearby storm drain or bioswale area. The crown of the subdrain pipe(s) should be located a minimum vertical distance of 6 inches below the bottom of pervious pavers. The subdrain piping should consist of schedule 40 pipe having a minimum of two rows of perforations pointing down.

We recommend grading the surface of the subgrade soil (i.e., bottom of the reservoir layer) to be slightly sloped (2 percent or less) to provide positive drainage towards the underdrain system, so that water runoff discharged to the pervious pavers is evenly distributed over the subgrade surface, which should increase overall infiltration into the underlying subgrade.

If pervious pavers are located less than 5 feet laterally from the edge of new foundations or exterior concrete flatwork, an impermeable liner at least 15 mils thick should be installed along the sides of the reservoir layer. The impermeable liner should also extend underneath the outer edge of the reservoir layer for a distance of at least 5 feet laterally beyond the outer edge of the reservoir layer.

Pervious pavers require periodic maintenance to reduce the potential for debris to clog the voids in the open-graded bedding course and decrease the infiltration rate. As a minimum, we recommend that a high-performance vacuum sweeper be used to remove accumulated debris and sediment in pervious pavement areas at least twice a year (i.e., every 6 months or less), including immediately before the rainy season starts.

11.6 Pavements

11.6.1 Asphalt Concrete Pavements

The near surface soils at the Site have a moderate to very high expansion potential and are therefore expected to have a low R-Value. Based on our experience, we used an R-Value of 5 to develop the asphalt pavement sections provided in the table below, which may be used at this Site. The designer or owner will need to select the actual Traffic Index values that are representative to this project. Two alternative pavement sections are provided. Alternative 1 consists of asphalt concrete over aggregate base and Alternative 2 consists of asphalt concrete over aggregate base over quicklime-treated subgrade.

Pavement Design Recommendations (R-Value = 5)					
Traffic Index	Alternative 1		Alternative 2		
	AC[1] (inches)	AB[2] (inches)	AC[1] (inches)	AB[2] (inches)	LTS[3] (inches)
4.0	2.5	7.0	2.5	4.0	12.0
4.5	2.5	9.0	2.5	4.0	12.0
5.0	3.0	9.5	3.0	4.0	12.0
5.5	3.0	11.5	3.0	4.0	12.0
6.0	3.5	12.5	3.5	4.0	12.0
6.5	3.5	14.5	3.5	4.0	12.0
7.0	4.0	15.5	4.0	4.0	12.0

1. AC = Asphalt Concrete
2. AB = Caltrans Class 2 Aggregate Base (Minimum R-Value = 78)
3. LTS = Lime-Treated Subgrade (Minimum R-Value = 50), based on a quicklime content of 5 percent by dry unit weight of in-situ soil

If the quicklime treatment for the building pad and flatwork is considered, Alternative 2 may be the most cost-effective for the asphalt-paved areas. This alternative, shown above, would consist of quicklime treating the existing subgrade prior to placement of the pavement section. This would result in a reduced aggregate base section as shown in the above table.

11.6.2 Portland Cement Concrete Pavements

Portland Cement Concrete (PCC) pavement should have a minimum thickness of 6 inches supported over 6 inches of Caltrans Class 2 aggregate base. This section is equivalent to a Traffic Index of at least 6.0 to 6.5 based on our experience and is expected to support traffic loading from a fire engine, a delivery truck, or a maintenance truck. The aggregate base and subgrade for PCC pavements should be properly moisture conditioned and compacted. Construction joints should be located no more than 12 feet apart in both directions. Concrete compressive strength should be tested in lieu of third point loading for rupture strength. A minimum 28-day compressive strength of 3,000 pounds per cubic foot (psi) should be specified

for the concrete mix design. The PCC pavement should be continuously reinforced using No. 4 bars (or larger) spaced no more than 18 inches on center in both directions. Final design of the PCC pavement is the responsibility of the civil or structural engineer for the project.

11.6.3 Gravel Parking Stalls

We understand consideration is being given to using gravel as the wearing surface for most of the planned parking stalls for the project in order to increase the infiltration capacity for surface runoff at the Site. BSK takes no exception to this approach, but it should be noted that long-term maintenance of the parking stalls will be needed to fix rutting and depressions in the gravel layer cause by vehicular traffic and erosion. Also, periodic sweeping of the parking lot AC paved driveways will be needed to remove gravel particles originating from the gravel parking stalls.

We recommend that a minimum of 12 inches of Caltrans Class 2 aggregate base be used for the gravel-covered parking stalls. We recommend underlaying the aggregate base section with Mirafi® RS280i geotextile fabric or equivalent. Although this will result in decreased infiltration rates, the subgrade and aggregate base layer for the gravel parking stalls should be compacted per the requirements of areas to be exposed to vehicular traffic as discussed in the "Site Preparation and Grading" section of this report.

11.6.4 Additional Pavement Recommendations

Paved areas should be sloped and drainage gradients maintained to carry all surface water to appropriate collection points. Surface water ponding should not be allowed anywhere on the Site during or after construction. We recommend that the pavement section be isolated from non-developed areas and areas of intrusion of irrigation water from landscaped areas. **Concrete curbs should extend a minimum of 2 inches below the aggregate base and into the subgrade to provide a barrier against drying of the subgrade soils or reduction of migration of landscape water into the pavement section.** Weep holes spaced at 4 feet on centers should also be provided. In lieu of the weep holes, a more effective system is to install a subdrain behind the curbs.

11.7 Effect of Plants on Foundation, Flatwork, and Paver Performance

Because of the moderately to highly expansive nature of the on-site soils and bedrock, trees and other large plants can significantly contribute to differential settlement of a foundation, flatwork, pavers, and paved areas. The roots of trees and large plants can absorb the moisture from the soil, causing the soil to shrink much faster than other soil areas exposed to the weather. The soil where the moisture is lost more rapidly will sink lower than the surrounding soil, causing differential settlement in overlying or adjacent improvements. Certain trees and plants are known to be more water-consuming than others. Research studies indicate that a tree should be at least as far away from a building, flatwork, pavers, and pavement as the mature height of the tree to minimize the effect of drying caused by the tree. A plant and tree specialist should be consulted to avoid the issues described herein.

A root barrier should be considered between trees and adjacent improvements and should be designed and installed following the recommendations of a landscape architect.

If quicklime-treatment is used at the Site in lieu of imported "non-expansive" fill, consideration should be given to installing a vertical barrier, such as a moisture or root barrier, along the boundaries between quicklime-treated soil and landscaping to reduce the risk that quicklime-treated soil would have a long-term adverse effect on the nearby landscaping.

11.8 Landscaping Irrigation

Vegetation should not be planted immediately adjacent to structures. If planting adjacent to structures is desired, we recommend using plants that require very little moisture with drip irrigation systems. Sprinkler systems should not be installed where they may cause ponding or saturation of subgrade soils within 5 feet of structures, slabs, pavements, concrete flatwork, or pavers. Otherwise, such ponding could cause loss of soil strength and movement of foundations, slabs, pavements, concrete flatwork, and pavers.

Irrigation of landscaped areas should be strictly limited to that necessary to sustain vegetation. Excessive irrigation could result in saturation and weakening of foundation soil.

11.9 Site Drainage

Proper site drainage is important for the long-term performance of the planned improvements. The Site should be graded to provide positive drainage towards ditches, drain inlets, catch basins, bioretention areas, and similar drainage collection facilities, and away from slope faces. To help reduce the risk of erosion, consideration should be given to installing concrete lined ditches behind the crest of the planned cut and fill slopes. Ditches should have gradients of at least 1 percent, where feasible, and discharge into a storm drain or similar facility. Discharge of water directly onto slope faces should be avoided as this could cause erosion and possibly undermine the stability of the slopes affected.

The Site should be graded so as to carry surface water away from the restroom building and other structures at a minimum of 2 percent in flatwork areas and 5 percent in landscaped areas to a minimum of 10 feet laterally from a structure's perimeter foundations as required by the 2022 CBC. If used, roof gutters should be connected directly into the storm drainage system or drain onto impervious surfaces provided that a safety hazard is not created. Water should not be allowed to pond anywhere on-site.

11.10 Storm Water Runoff Mitigation

Storm runoff regulations require pretreatment of runoff and infiltration of storm water to the extent feasible. Typically, this results in the use of bioretention areas, vegetated swales, infiltration trenches, or permeable pavement near or within parking lots. These features are not well-suited to fine-grained soils (silts and clays) or sites with shallow sedimentary bedrock because these soils and bedrock have relatively low permeability and require significant time for infiltration to occur. In addition, allowing water to pond

on expansive soils will cause the soils to swell, which can cause distress to adjacent pavements, slabs, and lightly loaded structures.

Implementation of storm water infiltration criteria will likely result in increased distress and reduced service life of flatwork, pavers, and pavement if not carefully designed in fine-grained soils such as those covering the surface of the Site. Bioretention areas, vegetated swales, and infiltration areas should be located in landscaped areas and well away (typically 5 to 10+ feet laterally) from slopes, foundations, flatwork, pavers, and pavements. If it is not possible to locate these infiltration systems away from such improvements, alternatives that isolate the infiltrated water, such as flow-through planters, could be considered. When using an infiltration system in clay soils, underdrains should be used. Improvements should be located such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth. If this is not possible, then concrete curbs for pavements, lateral restraints for exterior flatwork and pavers, or footings located adjacent to a bioretention area should be adequately keyed into the native soil and should be engineered using the recommendations provided for retaining walls in the "Retaining Walls" section of this report to reduce the potential for rotation or lateral movement of these improvements. Due to the potential adverse effects on project performance, BSK should review the geotechnical aspects of the storm water infiltration system and its location before the project plans are finalized.

Based on our experience and our percolation test results presented in the "Percolation Test Results" section of this report, we expect the near surface clayey soils encountered at the Site to have low permeability. Therefore, **we classify the Site's surficial soils as predominantly hydrologic soil group D** per Chapter 7 of Part 630 Hydrology National Engineering Handbook (United States Department of Agriculture, 2007). Hydrologic soil group D soils have a saturated hydraulic conductivity of less than 0.14 inches/hour.

It should be noted that during periods of prolonged precipitation, the underlying soils and bedrock tend to become saturated to greater and greater depths/extents. Therefore, infiltration rates tend to decrease with prolonged rainfall. Also, denser soils have lower infiltration rates than less dense soils. Therefore, **it is important to not over-compact the bottom of bioretention areas and similar facilities beyond what is recommended in the "Site Preparation and Grading" section of this report**.

11.11 Corrosion Potential

A combined bulk soil sample was collected during our subsurface investigation from borings B-1, B-2, and B-3 within the upper 5 feet BGS and a sample of the bedrock was collected from a depth of approximately 30 feet at boring B-8. These samples were submitted for corrosion testing. The samples were tested by CERCO Analytical, a State-certified laboratory in Concord, California, for redox potential, pH, resistivity, chloride content, and sulfate content in accordance with ASTM test methods. The test results are presented at the end of Appendix B. Also included is the evaluation by CERCO Analytical of the corrosion test results.

Based upon the resistivity measurements, the samples tested were classified as "corrosive" by CERCO Analytical. The sulfate ion concentrations ranged from 25 to 110 mg/kg (ppm). These results are indicative of an exposure category S0 per Table 19.3.1.1 of ACI 318-19. For an S0 exposure class, Table 19.3.2.1 indicates that the minimum f'c of the concrete is 2,500 psi. CERCO Analytical recommends that all buried iron, steel, cast iron, ductile iron, galvanized steel, and dielectric coated steel or iron be properly protected against corrosion depending upon the critical nature of the structure. They also recommend that all buried metallic pressure piping, such as ductile iron firewater pipelines, should be protected against corrosion. Because we are not corrosion specialists, we recommend that a corrosion specialist be consulted for advice on proper corrosion protection for underground piping which will be in contact with the soils and other design details.

The above are general discussions. A more detailed investigation may include more or fewer concerns and should be directed by a corrosion expert. BSK does not practice corrosion engineering. Consideration should also be given to soils in contact with concrete that will be imported to the Site during construction, such as topsoil and landscaping materials, which typically contain fertilizers and other chemicals that can be highly corrosive to metals and concrete. Any imported soil or landscaping materials should not be any more corrosive than the on-site soils and should not be classified as being more corrosive than "moderately corrosive." Also, on-site cutting and filling may result in soils contacting concrete that were not anticipated at the time of this investigation.

11.12 Plan Review and Construction Observation

We understand that BSK will be retained by the Client to review the geotechnical aspects of the project plans and specifications before they go out to bid. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings of our recommendations prior to the start of construction.

Variations in soil and bedrock types and conditions are possible and may be encountered during construction. To permit correlation between the soil data obtained during this investigation and the actual subsurface conditions encountered during construction, we recommend that BSK be retained to provide observation and testing services during site earthwork. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to provide supplemental recommendations if warranted by the exposed conditions. Earthwork should be performed in accordance with the recommendations presented in this report, or as recommended by BSK during construction. BSK should be notified at least two weeks prior to the start of construction and prior to when observation and testing services are needed.

12. ADDITIONAL SERVICES AND LIMITATIONS

12.1 Additional Services

The review of plans and field observation and testing during construction by BSK are an integral part of the conclusions and recommendations made in this report. If BSK is not retained for these services, the Client will be assuming BSK's responsibility for any potential claims that may arise during or after construction due to the misinterpretation of the recommendations presented herein. The recommended tests, observations, and consultation by BSK during construction include, but are not limited to:

- review of plans and specifications,
- observation of site demolition,
- observations of site grading, including stripping, engineered fill construction, and backfill of excavations resulting from the demolition of existing improvements to be removed,
- observation of overexcavated cut areas,
- observation of cut slope conditions by a qualified registered geologist,
- observation of fill slope keyways, back cuts, and subdrains prior to placement for fill slopes by a qualified registered geologist,
- observation of lime treatment operation (if applicable),
- observation of foundation construction, and
- in-place density testing of fills, backfills, finished subgrades, and aggregate base.

12.2 Limitations

The findings, conclusions, and recommendations contained in this report are based on our field observations and subsurface exploration, seismic refraction survey, limited field and laboratory tests, and our present knowledge of the proposed construction. It is possible that subsurface conditions could vary between or beyond the points explored. If subsurface conditions are encountered during construction that differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction changes from that described in this report, our recommendations should also be reviewed.

We prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the Site area at the time of our study. No warranty, either express or implied, is made. The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be conducted by BSK during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the Client and only for the purposes stated within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report, or if conditions at the

Site have changed. If this report is used beyond this period, BSK should be contacted to evaluate whether site conditions have changed since the report was issued.

Also, land or facility use, on and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, BSK may recommend that additional work be performed and that an updated report be issued.

The scope of services for this report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the air, soil, surface water, or groundwater at this Site.

BSK conducted subsurface exploration and provided recommendations for this project. We understand that BSK will be given an opportunity to perform a formal geotechnical review of the final project plans and specifications. In the event BSK is not retained to review the final project plans and specifications to evaluate if our recommendations have been properly interpreted, we will assume no responsibility for misinterpretation of our recommendations.

We recommend that all foundation excavations and earthwork during construction be monitored by a representative from BSK, including site preparation, overexcavation and recompaction of cut areas, excavation for keyways, subdrain placement, excavations for back cuts, cut slope conditions, lime treatment operation (if applicable), foundation excavations, and placement of engineered fill, trench backfill, and aggregate base. The purpose of these services would be to provide BSK the opportunity to observe the actual soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

12. CLOSURE

BSK appreciates the opportunity to provide our services to you and trust this report meets your needs at this time. If you have any questions concerning the information presented, please contact us at 925-315-3151.

Respectfully submitted,
BSK Associates

Omar K. Khan, GIT
Project Geologist

Cristiano Melo, PE, GE #2756
Livermore Branch Manager

Carrie L. Foulk, PE, GE #3016
Geotechnical Group Manager

FIGURES

References: 1. https://www.arcgis.com/apps/mapviewer/index.html 2023
Note: Location is approximate

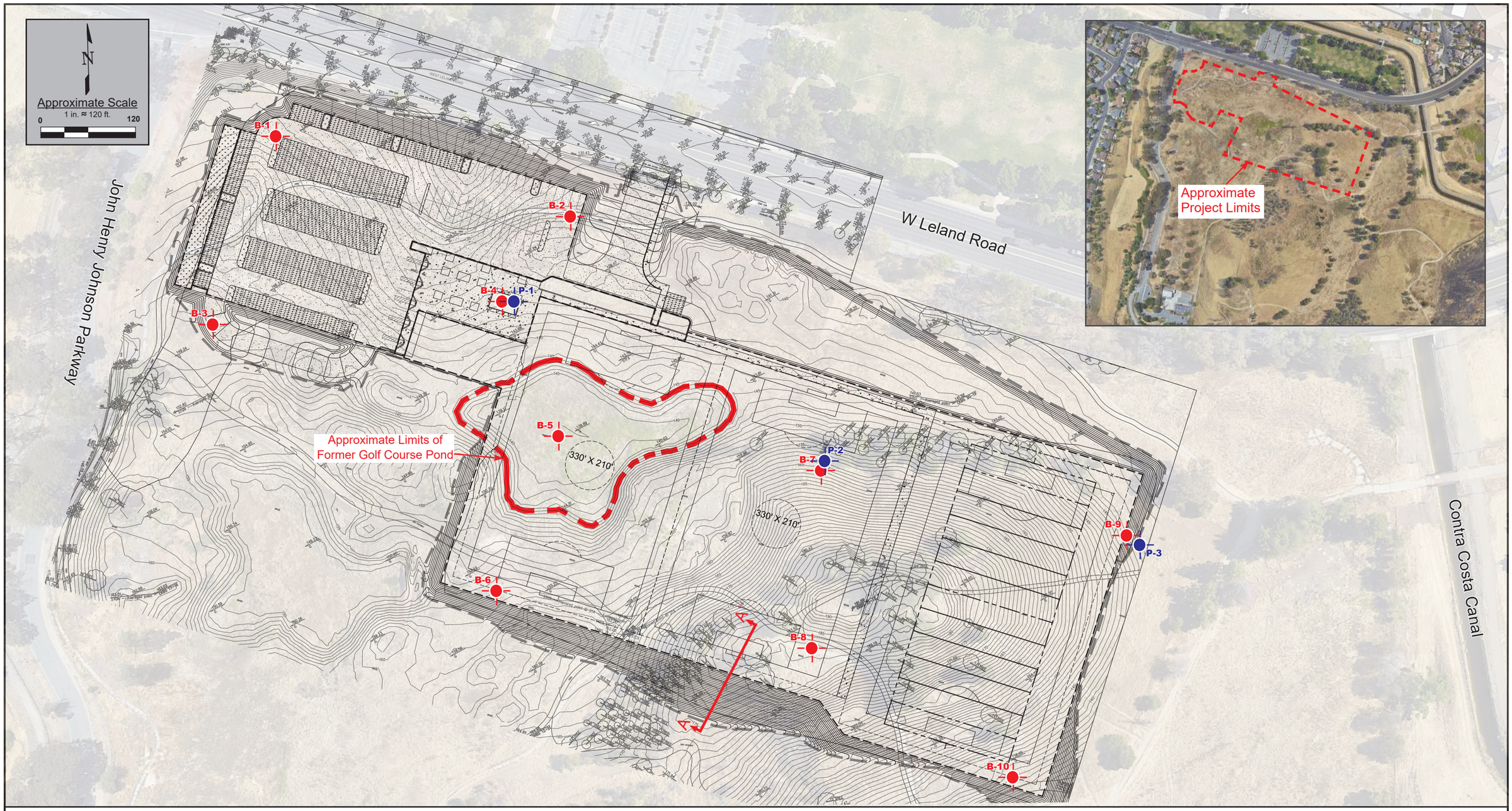
BSK ASSOCIATES

PROJECT NO. G00000268	
DRAWN: 02/09/23	
DRAWN BY: D. Tower	
CHECKED BY: C. Melo	
FILE NAME: Figures.indd	

VICINITY MAP

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
1



References: 1. http://earth.google.com, 2023
2. "Grading Plan Feasibility, Pittsburg Premier Fileds, California" Sheet C-2.0 by Sandis, undated

Legend

- B-1 — Approximate Boring Location (By BSK, 2023)
- P-1 — Approximate Location of Percolation Test Holes
- A A` — Subsurface Cross Section (see figure 3)

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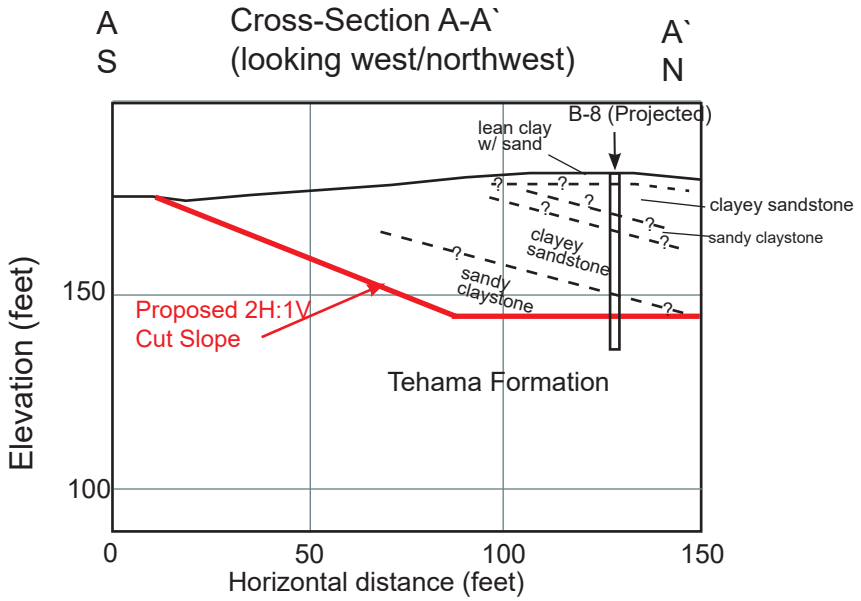
PROJECT NO.	G00000268
DRAWN:	02/09/23
DRAWN BY:	D. Tower
CHECKED BY:	C. Melo
FILE NAME:	SitePlan.indd

SITE PLAN

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
2



Scale 1 inch : 50 feet

Notes:
1. Locations are approximate.
2. See Figure 2 for location of cross section.
3. The cross section shown here is for illustrative purposes only and is based on extrapolation and interpolation between and beyond the borings performed at the Site. As such, the cross section should be considered approximate and should not be used for construction. Actual subsurface conditions may vary and will need to be confirmed by the Geotechnical Engineer-of-Record during construction.

LEGEND

Soil boring location

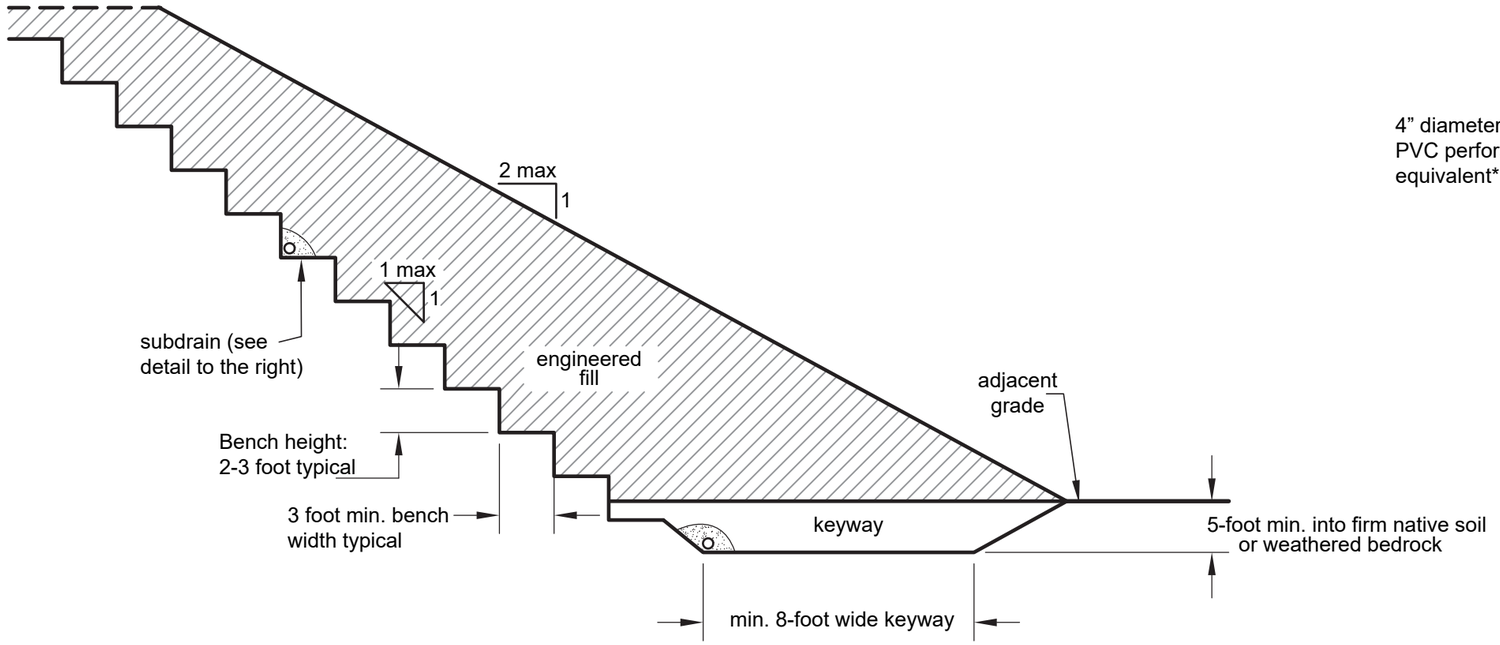
Unit contact

Proposed Grade

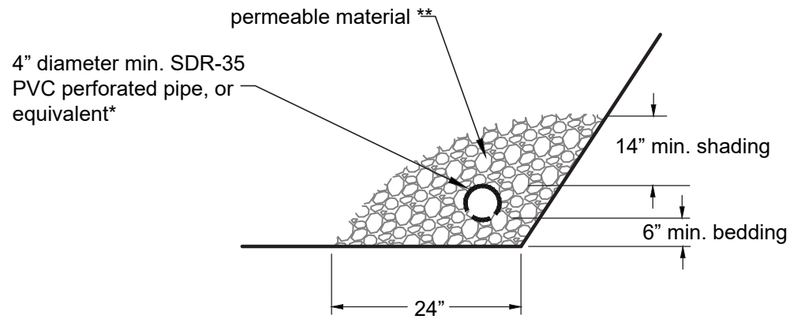
BSK ASSOCIATES

PROJECT NO. G00000268	**SUBSURFACE CROSS SECTION A-A`**	FIGURE
DRAWN: 03/08/23		
DRAWN BY: MJR		3
CHECKED BY: CM	**Premier Fields** **W Leland Road** **Pittsburg, California**	
FILE NAME: Figure 4 Cross Section.indd		

FILL SLOPE AND KEYWAY DETAIL
(not to scale)



SUBDRAIN DETAIL
(not to scale)



* Perforations point downward.
** Permeable material should be clean, free draining, and meet the requirements for Class 2 permeable material Section 68 of the 2018 Caltrans Standard Specifications.

Notes:
1. Final benching and keyway excavation depths and details subject to evaluation of field conditions.
2. Dimensions and location of subdrain line are approximate. Actual installation to be based on field conditions. In addition to the subdrain at the back of the keyway, additional subdrain lines should be installed at 15-foot vertical intervals (if applicable).
3. Grade pipes to drain by gravity flow to an appropriate discharge facility.
4. Install cleanouts at ends, angles, and junctions of pipe.
5. Slope bottom of keyway a minimum of 2% towards subdrain line.

BSK ASSOCIATES

PROJECT NO. G00000268	TYPICAL FILL SLOPE, KEYWAY, AND SUBDRAIN DETAIL	FIGURE
DRAWN: 02/21/2023	Premier Fields W Leland Road Pittsburg, California	4
DRAWN BY: D. Tower		
CHECKED BY: C. Melo		

APPENDIX A

Boring Logs

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487/2488)

MAJOR DIVISIONS				GRAPHIC LOG		TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH <5% FINES	Cu ≥4 and 1≤ Cc≤3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/or 1>Cc >3		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5 to 12% FINES	Cu ≥4 and 1≤ Cc≤3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/or 1>Cc >3		GP-GM	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH >12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤ Cc≤3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/or 1>Cc >3		SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5 to 12% FINES	Cu ≥6 and 1≤ Cc≤3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/or 1>Cc >3		SP-SM	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH >12% FINES			SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)				ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY,
					CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
					CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
					OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

BSK ASSOCIATES

PROJECT NO. G00000268	**UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487/2488)**
DRAWN: 02/20/23	
DRAWN BY: D. Tower	
CHECKED BY: C. Melo	**Premier Fields** **W Leland Road** **Pittsburg, California**
FILE NAME: Legend.indd	

FIGURE **A-1**

SOIL DESCRIPTION KEY

MOISTURE CONTENT

DESCRIPTION	ABBR	FIELD TEST
Dry	D	Absence of moisture, dusty, dry to the touch
Moist	M	Damp but no visible water
Wet	W	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

PLASTICITY

DESCRIPTION	ABBR	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm) thread cannot be rolled at any water content.
Low (L)	LP	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	MP	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	HP	It takes considerable time rolling and kneeding to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4 in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4 in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CONSISTENCY - FINE-GRAINED SOIL

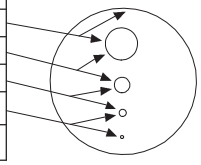
CONSISTENCY	ABBR	FIELD TEST
Very Soft	VS	Thumb will penetrate soil more than 1 in. (25 mm)
Soft	S	Thumb will penetrate soil about 1 in. (25 mm)
Firm	F	Thumb will indent soil about 1/4 in. (6 mm)
Hard	H	Thumb wil not indent soil but readily indented with thumbnail
Very Hard	VH	Thumbnail will not indent soil

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3 - 12'	3 - 12"	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3"	3/4 -3"	Thumb-sized to fist-sized
	fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19"	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock salt-sized
	fine	#200 - #10	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029	Flour-sized and smaller

REACTION WITH HCL

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately



ANGULARITY

DESCRIPTION	ABBR	CRITERIA
Angular	A	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	SA	Particles are similar to angular description but have rounded edges
Subrounded	SR	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	R	Particles have smoothly curved sides and no edges

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	ABBR	SPT (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	VL	<4	<4	<5	0 - 15	Easily penetrated with 1/2-inch reinforcing rod by hand
Loose	L	4 - 10	5 - 12	5 - 15	15 - 35	Difficult to penetrate with 1/2-inch reinforcing rod pushed by hand
Medium Dense	MD	10 - 30	12- 35	15 - 40	35 - 65	Easily penetrated a foot with 1/2-inch reinforcing rod driven with 5-lb. hammer
Dense	D	30 - 50	35 - 60	40 - 70	65 - 85	Difficult to penetrate a foot with 1/2-inch reinforcing rod driven with 5-lb. hammer
Very Dense	VD	>50	>60	>70	85 - 100	Penetrated only a few inches with 1/2-inch reinforcing rod driven with 5-lb. hammer

BSK ASSOCIATES

PROJECT NO. G00000268	**SOIL DESCRIPTION KEY**
DRAWN: 02/20/23	
DRAWN BY: D. Tower	
CHECKED BY: C. Melo	**Premier Fields** **W Leland Road** **Pittsburg, California**
FILE NAME: Legend.indd	

FIGURE

A-2

LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	SPLIT BARREL SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	SPLIT BARREL SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (EM 1110-1-1906)/ASTM Test Method D 2850
	SHELBY TUBE	EI	EXPANSION INDEX (UBC STANDARD 18-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	GROUNDWATER LEVEL (encountered at time of drilling)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	GROUNDWATER LEVEL (measured after drilling)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

Boring log data represents a data snapshot.

This data represents subsurface characteristics only to the extent encountered at the location of the boring.

The data inherently cannot accurately predict the entire subsurface conditions to be encountered at the project site relative to construction or other subsurface activities.

Lines between soil layers and/or rock units are approximate and may be gradual transitions.

The information provided should be used only for the purposes intended as described in the accompanying documents.

In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods.

Where laboratory tests were performed, the designations reflect the laboratory test results.

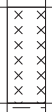
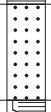
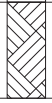
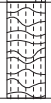
The Responsible Geotechnical Engineer, Professional Engineer, or Professional Geologist uses professional judgement and visual-manual procedures in general conformance with ASTM D2488 to classify soil when the full classification suite of tests per ASTM D2487 is not conducted.

BSK ASSOCIATES

PROJECT NO. G00000268	**LOG KEY**
DRAWN: 02/20/23	
DRAWN BY: D. Tower	
CHECKED BY: C. Melo	**Premier Fields** **W Leland Road** **Pittsburg, California**
FILE NAME: Legend.indd	

FIGURE

A-3

SYMBOL	ROCK TYPE	SYMBOL	ROCK TYPE	SYMBOL	ROCK TYPE
	BRECCIA		SILTSTONE		PHYLLITE
	CLAYSTONE		MUDSTONE		SANDSTONE
	CONGLOMERATE		SHALE		GREENSTONE
	GRANITE		BEDROCK		VOLCANIC

WEATHERING

Designation	Criteria
Fresh	No visible sign of rock material weathering; perhaps slight discoloration on major discontinuity surfaces.
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuos frame or as corestones.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

FRACTURE SPACING

Designation	Criteria
Intensely Fractured	Spacing <2 inches
Highly Fractured	Spacing 2 inches to 8 inches
Moderately Fractured	Spacing 8 inches to 2 feet.
Slightly Fractured	Spacing 2 feet to 6 feet.
Unfractured	Spacing greater than 6 feet.

HARDNESS/STRENGTH

Designation	Criteria
Extremely Weak Rock	Indented by thumbnail.
Very Weak Rock	Crumbles under firm blows with point of geological hammer; can be peeled by pocket knife.
Weak Rock	Can be peeled with a pocket knife; shallow indentations made by firm blow with point of geological hammer.
Medium Weak Rock	Cannot be scraped or peeled with a pocket knife; specimen can be fractured with single firm blow of geological hammer.
Strong Rock	Specimen requires more than one blow with a geological hammer to fracture it.
Very Strong Rock	Specimen requires many blows of geological hammer to fracture it.
Extremely Strong Rock	Specimen can only be chipped with geological hammer.

Reference:
Wyllie, D.C. and Mah, C.W. (2004), Rock Slope Engineering Civil and Mining, 4th Edition, Taylor & Francis Group, London and New York, 431p.

BSK ASSOCIATES

PROJECT NO. G00000268
DRAWN: 02/20/23
DRAWN BY: D. Tower
CHECKED BY: C. Melo
FILE NAME: Legend.indd

ROCK CLASSIFICATION

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
A-4

BSK Associates
399 Lindbergh Avenue
Livermore, CA 94551
Telephone: (925) 315-3151

LOG OF BORING NO. B-1

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **140 feet**
Location: **38.013498, -121.919237**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, medium to high plasticity, fine grained sand								48	19	29
		firm to hard		1A	6	2.0						
				1B	12							
				1C	22	4.5	74	111	18			
5		hard, calcium carbonate nodules, blocky structure		2A	9	4.5						
				2B	18							
				2C	21			103	14			
		increased sand content										
		Boring terminated at approximately 6.5 feet. No free groundwater was observed. Boring was backfilled with soil cuttings.										
10												
15												
20												

Completion Depth: 6.5
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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Telephone: (925) 315-3151

LOG OF BORING NO. B-2

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **138 feet**
Location: **38.013248, -121.918004**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		**Lean CLAY with Sand (CL):** dark grayish brown, moist, hard, medium to high plasticity, fine sand								48	19	29
				1A	9							
				1B	10							
				1C	12	3.5	72	108	19			
5		light yellowish brown, hard, medium plasticity, blocky structure		2A	11	>4.5						
				2B	17							
				2C	19			94	14			
		Boring terminated at approximately 6.5 feet. No free groundwater was observed. Boring was backfilled with soil cuttings.										
10												
15												
20												

Completion Depth: 6.5
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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Livermore, CA 94551
Telephone: (925) 315-3151

LOG OF BORING NO. B-3

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **150 feet**
Location: **38.012859, -121.919485**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, medium to high plasticity, fine sand										
		dark yellowish brown, firm		1A	3	2.0						
				1B	7							
				1C	10	2.5		103	22			
5				2A	4							
				2B	7							
		Sandy Lean CLAY (CL): yellowish brown, moist, hard, medium plasticity, fine sand, trace rootlets		2C	15	4.5	62	93	16			
10				3A	17							
		Clayey SANDSTONE: dry to moist, completely to highly weathered, very weak, fine to medium sand		3B	23							
				3C	23	>4.5						
		Boring terminated at approximately 11.5 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
15												
20												

Completion Depth: 11.5
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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Telephone: (925) 315-3151

LOG OF BORING NO. B-4

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **141 feet**
Location: **38.012922, -121.918229**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, medium to high plasticity, fine sand								48	19	29
				1A	5	>4.5						
				1B	12							
		Sandy Lean CLAY (CL): yellow, moist, hard, low to medium plasticity, fine to medium sand		1C	22		57	106	19			
5		**Sandy CLAYSTONE:** yellow, dry to moist, very weak, highly weathered, fine sand		2A	17	>4.5						
				2B	22							
				2C	32		52	100	13			
				3A	10	>4.5						
				3B	21							
10		**Clayey SANDSTONE:** yellow, dry to moist, very weak, highly weathered, fine sand		3C	30	>4.5						
		light yellowish brown		4	10 13 15							
15		Boring terminated at approximately 15 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
20												

Completion Depth: 15.0
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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LOG OF BORING NO. B-5

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **139 feet**
Location: **38.012499, -121.918067**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, firm, medium to high plasticity, fine sand (FILL)		1A	2							
				1B	10							
		Poorly Graded SAND (SP): yellow, medium dense, fine to medium sand, trace clay (possibly fill)		1C	14							
5		**Sandy Lean CLAY (CL):** yellow, moist, firm, medium plasticity, fine sand		2A	6	2.0-						
				2B	9							
		TXUU: C= 2,005 psf (see figure B-5)		2C	12	3.0		103	21			
		increased sand content, interbedded with silty sand										
10				3A	6	2.0-						
				3B	8	3.0						
		Silty SAND (SM): yellow, moist, medium dense, fine to sand (possibly highly to completely weathered sandstone)		3C	10							
		Boring terminated at approximately 11.5 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
15												
20												

Completion Depth: 11.5
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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Livermore, CA 94551
Telephone: (925) 315-3151

LOG OF BORING NO. B-6

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **156 feet**
Location: **38.012017, -121.918356**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		FILL: approximately 12 inches of wood chips										
		Lean CLAY with Sand (CL): yellowish brown mottled with dark grayish brown, moist, firm, medium plasticity, fine sand (FILL)		1A 1B 1C	3 5 8	1.8						
5		**Lean CLAY with Sand (CL):** dark yellowish brown to brown, moist, firm, medium plasticity, fine sand Staged TXCU w/ PP: C= 700 psf, Ø= 15°; C'= 500 psf, Ø'= 23° (see figure B-6)		2A 2B 2C	4 7 10	2.5		106	20			
				3A	6	>4.5						
		Sandy CLAYSTONE: yellow to light yellowish brown, dry to moist, very weak, completely to highly weathered, low plasticity, fine to medium sand		3B 3C	25 45	>4.5	65	95	17			
10												
				4	8 9 11							
15		Boring terminated at approximately 15 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
20												

Completion Depth: 15.0
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

GEO_TARGET BORING LOGS- PREMIER FILEDS.GPJ GEOTECHNICAL 08.GDT 3/17/23

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LOG OF BORING NO. B-7

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **161 feet**
Location: **38.012406, -121.916952**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
0		**Fat CLAY with SAND (CH):** yellowish brown, moist, firm to hard, medium to high plasticity, fine sand		1A 1B 1C	3 5 8	2.0- 3.0	76	100	22	53	18	35
5		dark yellowish brown, calcium carbonate nodules		2A 2B 2C	5 7 15	3.5 4.5						
				3A	10							
10		**Sandy CLAYSTONE:** light grayish brown, dry to moist, weak, highly weathered, weakly cemented, fine to medium sand		3B 3C	22 42	>4.5						
		Clayey SANDSTONE: yellowish brown to pale brown, slightly moist, highly weathered, weak, fine to medium sand		4A 4B 4C	11 28 38	>4.5						
15		Boring terminated at approximately 15 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
20												

Completion Depth: 15.0
Date Started: 1/27/23
Date Completed: 1/27/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

GEO_TARGET BORING LOGS- PREMIER FILEDS.GPJ GEOTECHNICAL 08.GDT 3/17/23

LOG OF BORING NO. B-8

BSK Associates
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Livermore, CA 94551
Telephone: (925) 315-3151

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **183 feet**
Location: **38.01184, -121.917013**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, medium plasticity, fine sand										
		Clayey SANDSTONE: yellow, moist, very weak, highly weathered, calcium carbonate veins, weakly cemented, fine sand		1A 1B 1C	4 11 25	>4.5						
5		Staged TXCU w/ PP: C= 800 psf, Ø= 23°; C'= 500 psf, Ø'= 30° (see figure B-7)		2A 2B 2C	10 15 23	>4.5		101	24			
10		**Sandy CLAYSTONE:** yellow, moist, very weak, highly weathered, calcium carbonate veins, weakly cemented, fine sand		3	6 9 14		53			35	19	16
15		**Clayey SANDSTONE:** yellow, moist, moderately to strongly cemented, weak to medium weak, highly weathered, trace subrounded gravel, coarse sand Staged TXCU w/ PP: C= 150 psf, Ø= 26°; C'= 200 psf, Ø'= 34° (see figure B-8)		4A 4B 4C	14 15 20	>4.5		101	9			
20		fine sand										

Completion Depth: 46.5
Date Started: 1/27/23
Date Completed: 1/27/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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399 Lindbergh Avenue
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Telephone: (925) 315-3151

LOG OF BORING NO. B-8

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **183 feet**
Location: **38.01184, -121.917013**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Clayey SANDSTONE: yellow, moist, moderately to strongly cemented, weak to medium weak, highly weathered, trace subrounded gravel, coarse sand *(continued)*		5	8 18 28							
25					13							
		SANDSTONE: yellow to light yellowish brown, dry to moist, weak, highly weathered, fine sand		6	18 20							
30		**Sandy CLAYSTONE:** light olive brown, moist, weak, highly to moderately weathered, trace gravel, medium plasticity, calcium carbonate		7	10 14 19							
35		yellowish brown, decreased sand content		8	9 12 19		81			64	21	43
40		light olive brown to grayish brown										

Completion Depth: 46.5
Date Started: 1/27/23
Date Completed: 1/27/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

GEO_TARGET BORING LOGS- PREMIER FILEDS.GPJ GEOTECHNICAL 08.GDT 3/17/23

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LOG OF BORING NO. B-8

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **183 feet**
Location: **38.01184, -121.917013**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Sandy CLAYSTONE: light olive brown, moist, weak, highly to moderately weathered, trace gravel, medium plasticity, calcium carbonate *(continued)*		9	7 11 20							
45				10	11 20							
		Clayey SANDSTONE: pale olive to yellowish brown, weak, highly to moderately weathered, fine sand			41							
		Boring terminated at approximately 46.5 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
50												
55												
60												

Completion Depth: 46.5
Date Started: 1/27/23
Date Completed: 1/27/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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399 Lindbergh Avenue
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Telephone: (925) 315-3151

LOG OF BORING NO. B-9

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **138 feet**
Location: **38.012186, -121.915684**

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, medium to high plasticity, fine sand		1A	4	1.8						
				1B	6							
		Sandy Lean CLAY (CL): yellow to light yellowish brown, moist, firm to hard, medium plasticity, fine sand		1C	9	4.5						
5				2A	9							
				2B	23							
		Sandy CLAYSTONE: yellow, dry to moist, very weak, highly weathered, calcium carbonate veins, fine sand		2C	33	>4.5	65	100	15			
		Boring terminated at approximately 6.5 feet. No free groundwater was observed. Boring was backfilled with soil cuttings.										
10												
15												
20												

Completion Depth: 6.5
Date Started: 1/26/23
Date Completed: 1/26/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

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Telephone: (925) 315-3151

LOG OF BORING NO. B-10

Project Name: **Premier Fields**
Project Number: **G00000268**
Project Location: **W Leland Road, Pittsburg, CA**
Logged by: **O. Khan**
Checked by: **M. Romero**

Surface El.: **136 feet**
Location: **38.011409, -121.916168**

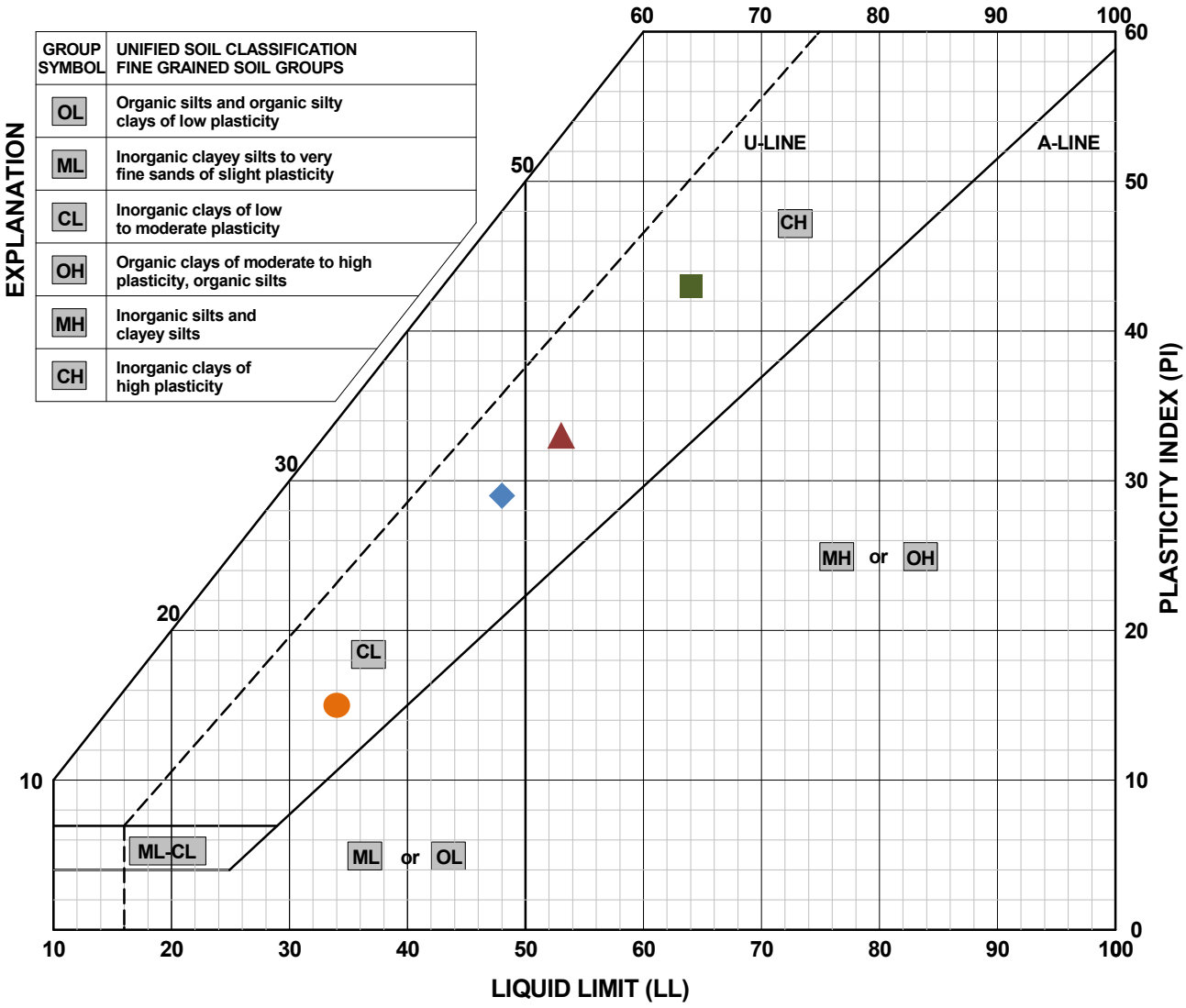
Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / 6 inches	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		Lean CLAY with Sand (CL): dark grayish brown, moist, firm to hard, medium to high plasticity, fine sand, trace gravel		1A	3	2.0						
				1B	6							
				1C	10	3.0						
5		very hard, calcium carbonate		2A	5	>4.5						
				2B	15							
		TXUU: C= 6,530 psf (see figure B-5)		2C	17			109	15			
10		**Sandy CLAYSTONE:** yellowish brown, extremely weak, weakly cemented, completely to highly weathered, low plasticity, fine to medium sand, trace coarse subrounded chert gravel, mottled with calcium carbonate		3A	9	>4.5						
				3B	15							
				3C	20							
				4A	8	>4.5						
				4B	12							
15				4C	16							
		Boring terminated at approximately 15 feet. No free groundwater was observed. Boring was backfilled with cement grout.										
20												

Completion Depth: 15.0
Date Started: 1/27/23
Date Completed: 1/27/23
California Sampler: 2.5-in inner diameter
SPT Sampler: 1.4-in inner diameter

Drilling Equipment: Taber Drilling CME 55 Track Rig
Drilling Method: Solid Auger
Drive Weight: 140 lbs
Hole Diameter: 4-in
Drop: 30-in
Remarks: Auto Hammer

APPENDIX B

Laboratory Test Results



LEGEND:	SOURCE	DEPTH (ft)	LL	PL	PI	DESCRIPTION
◆	B-1/B-2/B-4	1-5	48	19	29	Lean Clay with Sand (CL)
▲	B-7	3.0	53	18	35	Fat Clay with Sand (CH)
●	B-8	10.0	34	19	15	Sandy Claystone
■	B-8	35	64	21	43	Sandy Claystone

BSK ASSOCIATES®

PROJECT NO. G00000268
DRAWN: 02/16/23
DRAWN BY: D. Tower
CHECKED BY: C. Melo
FILE NAME: Figures.indd

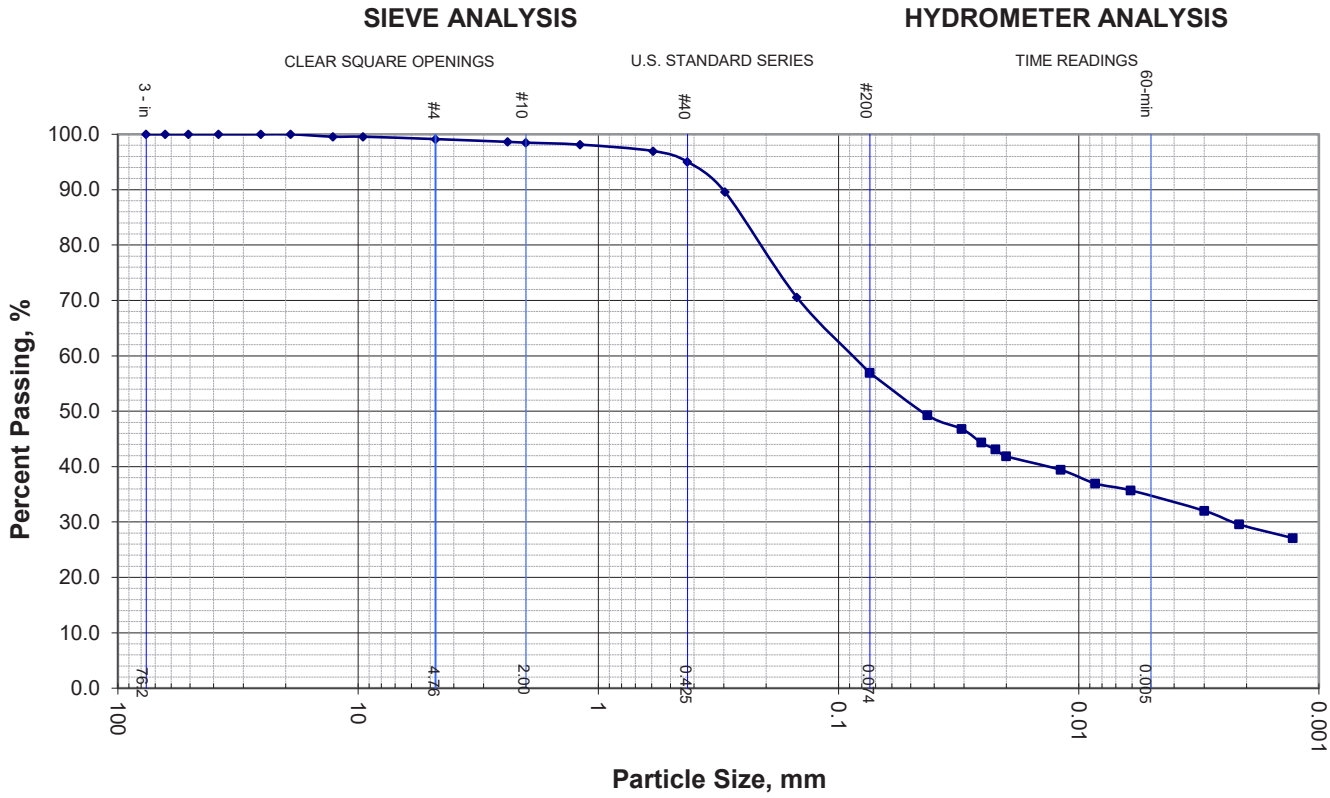
ATTERBERG LIMITS

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
B-1

GRAIN SIZE ANALYSIS OF SOILS
(ASTM D 422)

Client:	Gates + Associates	Project No.:	G00000268
Project:	City of Pittsburg Premier Fields	Boring Number:	B-4
Tested By:	NS	Sample ID:	1C
Reviewed By:	RC	Sample Depth:	3'
		Date Tested:	2/9/2023



PARTICLE SIZE DISTRIBUTION

Cobbles	Gravel	Sand			Silt (non-plastic)	Clay (Plastic)
		Coarse	Medium	Fine		
0	1	1	3	38	23	34

Specific Gravity, G_s - 2.65

Description of Soil: Sandy Lean Clay (CL)

BSK ASSOCIATES

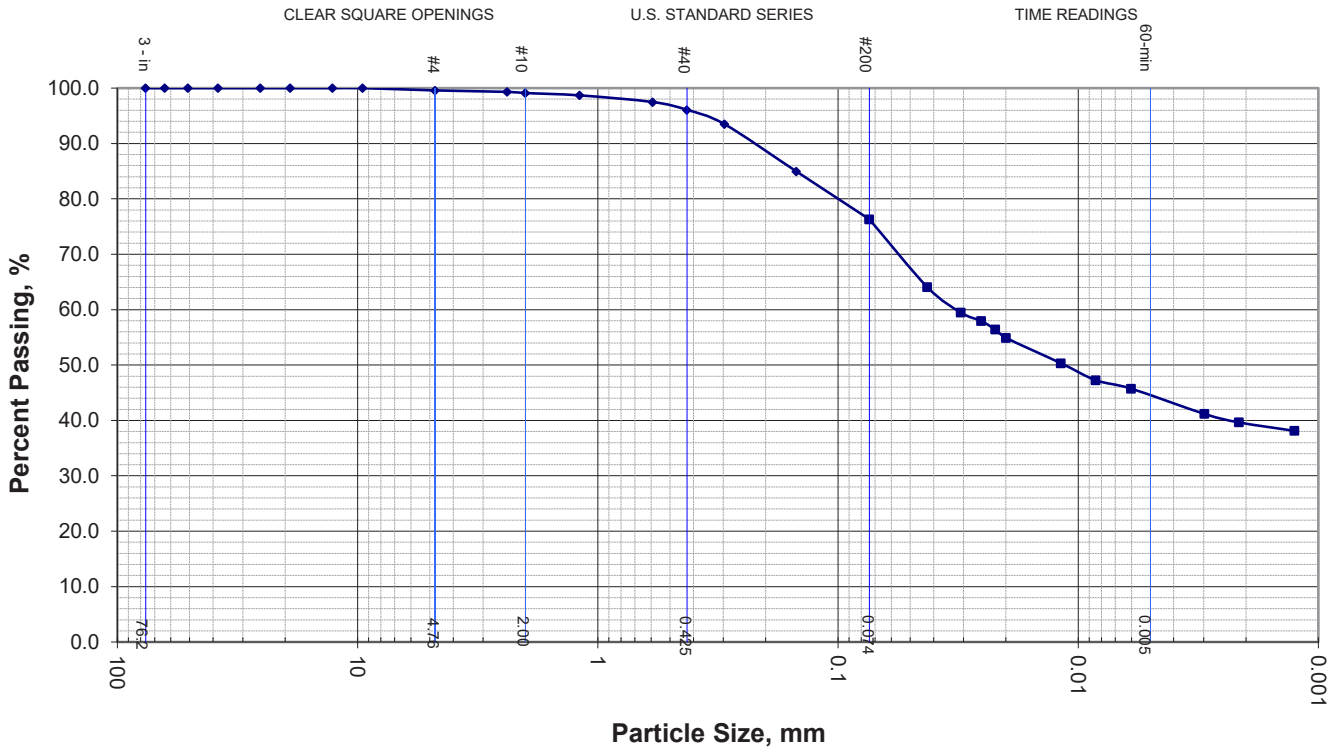
PROJECT NO. G00000268	GRAIN SIZE ANALYSIS OF SOILS
DRAWN: 02/16/23	
DRAWN BY: D. Tower	
CHECKED BY: C. Melo	Premier Fields W Leland Road Pittsburg, California
FILE NAME: Figures.indd	

FIGURE **B-2**

GRAIN SIZE ANALYSIS OF SOILS
(ASTM D 422)

Client:	Gates + Associates	Project No.:	G00000268
Project:	City of Pittsburgh Premier Fields	Boring Number:	B-7
Tested By:	NS	Sample ID:	1C
Reviewed By:	RC	Sample Depth:	3'
		Date Tested:	2/10/2023

SIEVE ANALYSIS **HYDROMETER ANALYSIS**



PARTICLE SIZE DISTRIBUTION

Cobbles	Gravel	Sand			Silt (non-plastic)	Clay (Plastic)
		Coarse	Medium	Fine		
0	0	1	3	20	32	44

Specific Gravity, G_s - 2.65

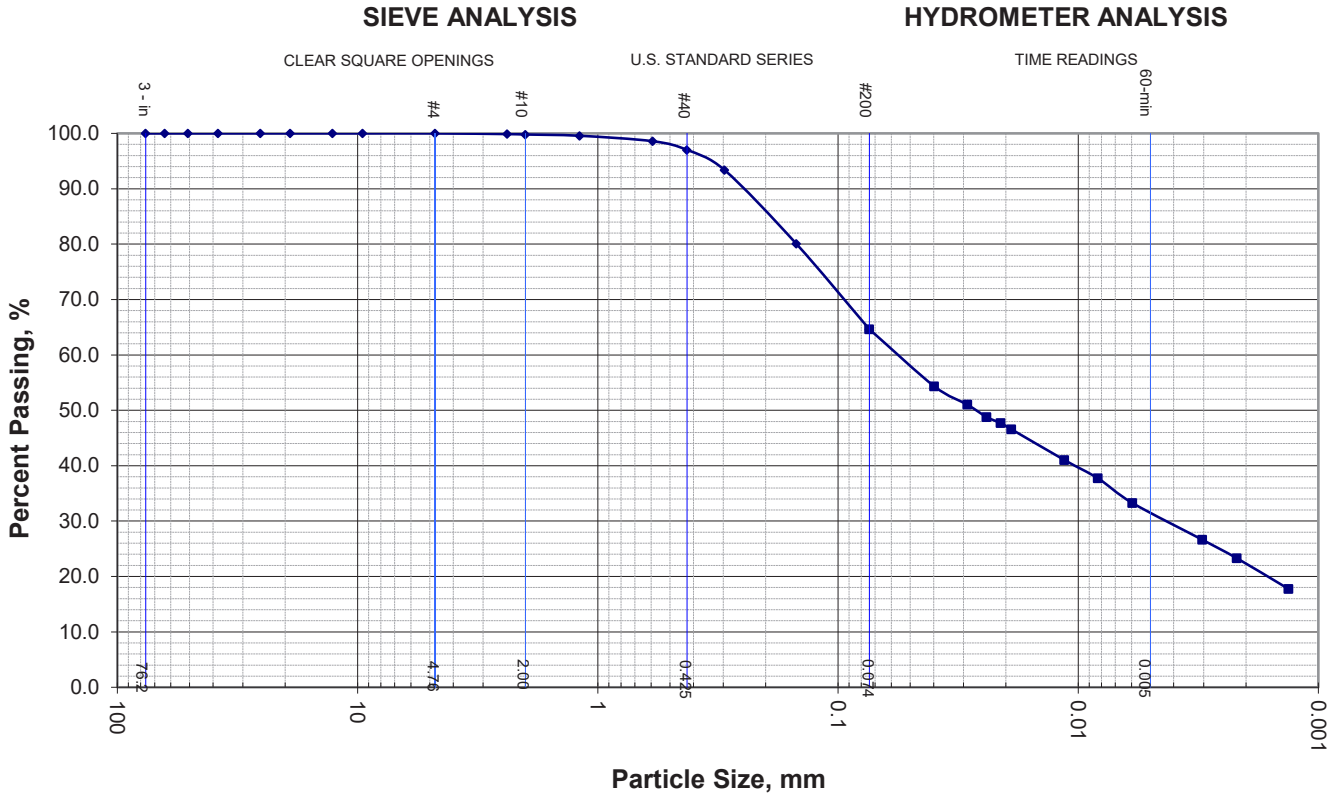
Description of Soil: Fat Clay With Sand (CH)

BSK ASSOCIATES

PROJECT NO. G00000268	GRAIN SIZE ANALYSIS OF SOILS	FIGURE
DRAWN: 02/16/23		
DRAWN BY: D. Tower		B-3
CHECKED BY: C. Melo	Premier Fields W Leland Road Pittsburg, California	
FILE NAME: Figures.indd		

GRAIN SIZE ANALYSIS OF SOILS
(ASTM D 422)

Client:	Gates + Associates	Project No.:	G00000268
Project:	City of Pittsburg Premier Fields	Boring Number:	B-9
Tested By:	NS	Sample ID:	2C
Reviewed By:	RC	Sample Depth:	6'
		Date Tested:	2/10/2023



PARTICLE SIZE DISTRIBUTION

Cobbles	Gravel	Sand			Silt (non-plastic)	Clay (Plastic)
		Coarse	Medium	Fine		
0	-	0	3	32	34	31

Specific Gravity, G_s - 2.65

Description of Soil: Sandy Claystone

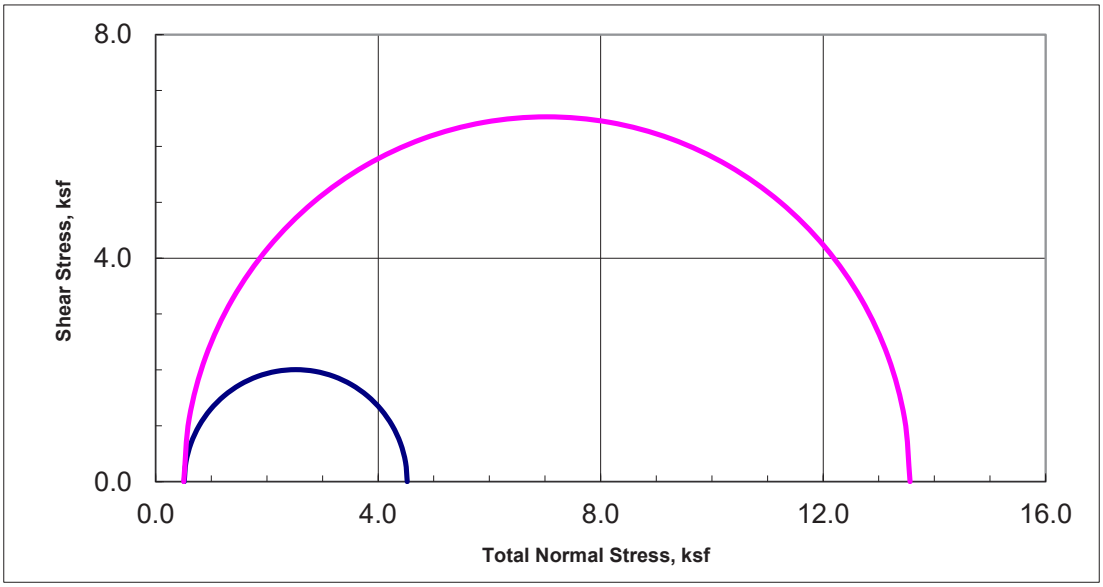
*atterberg values used in classification were estimated by Geotechnical Engineer

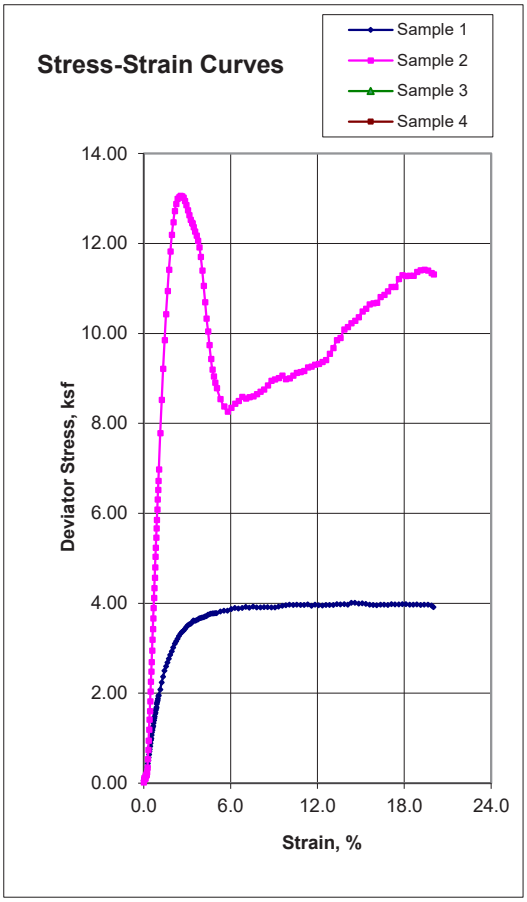
BSK ASSOCIATES

PROJECT NO. G00000268	GRAIN SIZE ANALYSIS OF SOILS	FIGURE
DRAWN: 02/16/23		
DRAWN BY: D. Tower		B-4
CHECKED BY: C. Melo	Premier Fields W Leland Road Pittsburg, California	
FILE NAME: Figures.indd		

COOPER TESTING LABORATORY

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	21.3	15.2		
Dry Den,pcf	102.6	108.5		
Void Ratio	0.642	0.553		
Saturation %	89.7	74.2		
Height in	5.01	5.01		
Diameter in	2.40	2.40		
Cell psi	3.6	3.5		
Strain %	14.59	2.53		
Deviator, ksf	4.009	13.058		
Rate %/min	1.00	1.00		
in/min	0.050	0.050		
Job No.:	664-471			
Client:	BSK Associates			
Project:	G00000268			
Boring:	B-5	B-10		
Sample:	2C	2C		
Depth ft:	6	6		

Visual Soil Description	
Sample #	
1	Sandy Lean Clay (CL)
2	Lean Clay with Sand (CL)
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

BSK ASSOCIATES®

PROJECT NO.	G00000268
DRAWN:	03/13/23
DRAWN BY:	D. Tower
CHECKED BY:	C. Melo
FILE NAME:	Figures.indd

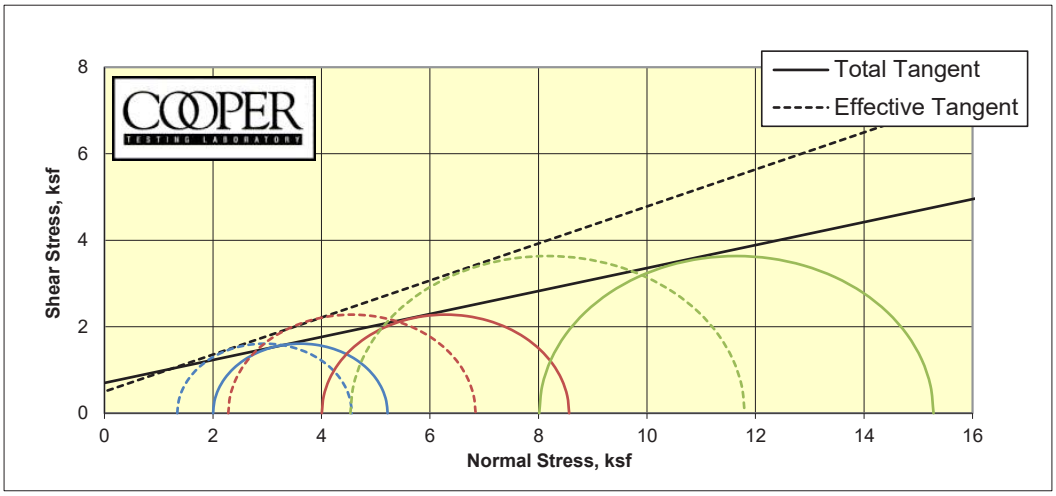
UNCONSOLIDATED-UNDRAINED TRIAXIAL TEST

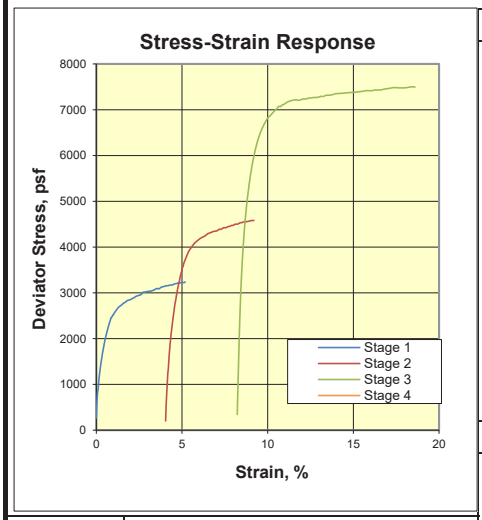
Premier Fields
W Leland Road
Pittsburg, California

FIGURE

B-5

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m





CTL Number:	664-471
Client Name:	BSK Associates
Project Name:	Pittsburg Premier Fields
Project Number:	G00000268
Date:	2/15/2023 By: MD/DC
Total C	0.700 ksf
Total phi	14.9 degrees
Eff. C	0.500 ksf
Eff. Phi	23.2 degrees ©

Stage	1	2	3	4
Boring	B-6			
Sample	2C			
Depth	6			
Visual Description	Lean Clay with Sand (CL)			
MC (%)	20.1			
Dry Density (pcf)	105.5			
Saturation (%)	88.3			
Void Ratio	0.627			
Diameter (in)	2.39			
Height (in)	5.00			
	Final			
MC (%)	21.2	20.4	19.2	
Dry Density (pcf)	108.4	109.9	112.3	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.583	0.562	0.528	
Diameter (in)	2.40	2.43	2.46	
Height (in)	4.82	4.63	4.43	
Cell Pressure (psi)	93.9	107.7	135.5	
Back Pressure (psi)	80.0	79.8	79.9	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.216	4.559	7.269	
Excess PP (psi)	4.6	12.0	24.2	
Sigma 1 (ksf)	4.558	6.841	11.801	
Sigma 3 (ksf)	1.342	2.282	4.533	
P (ksf)	2.950	4.561	8.167	
Q (ksf)	1.608	2.280	3.634	
Stress Ratio	3.396	2.998	2.604	
Rate (in/min)	0.0005	0.0005	0.0005	

BSK ASSOCIATES®

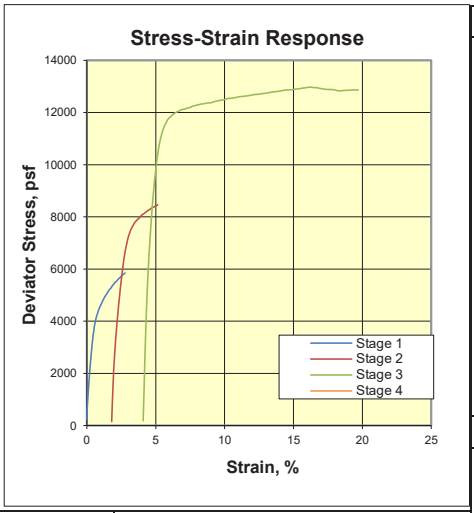
PROJECT NO. G00000268
DRAWN: 03/13/23
DRAWN BY: D. Tower
CHECKED BY: C. Melo
FILE NAME: Figures.indd

STAGED CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESION WITH PORE PRESSURE

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
B-6

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m



CTL Number:	664-471
Client Name:	BSK Associates
Project Name:	Pittsburg Premier Fields
Project Number:	G00000268
Date:	2/23/2023 By: MD/DC
Total C	0.800 ksf
Total phi	22.6 degrees
Eff. C	0.500 ksf
Eff. Phi	29.8 degrees ©

Remarks: Strengths picked at the peak effective stress ratios.

Stage	1	2	3	4
Boring	B-8			
Sample	2C			
Depth	6.0			
Visual Description	Clayey Sandstone			
MC (%)	24.1			
Dry Density (pcf)	100.5			
Saturation (%)	96.1			
Void Ratio	0.676			
Diameter (in)	2.42			
Height (in)	5.01			
	Final			
MC (%)	28.0	27.4	26.7	
Dry Density (pcf)	96.0	96.9	98.0	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.755	0.740	0.720	
Diameter (in)	2.49	2.50	2.52	
Height (in)	4.94	4.85	4.74	
Cell Pressure (psi)	114.0	127.8	156.4	
Back Pressure (psi)	99.9	100.0	100.9	
	Effective Stresses At:			
Strain (%)	1.2	1.9	3.8	
Deviator (ksf)	4.880	7.875	12.251	
Excess PP (psi)	2.5	5.8	17.6	
Sigma 1 (ksf)	6.550	11.047	17.714	
Sigma 3 (ksf)	1.670	3.172	5.463	
P (ksf)	4.110	7.109	11.588	
Q (ksf)	2.440	3.938	6.125	
Stress Ratio	3.922	3.483	3.243	
Rate (in/min)	0.0005	0.0005	0.0005	

BSK ASSOCIATES®

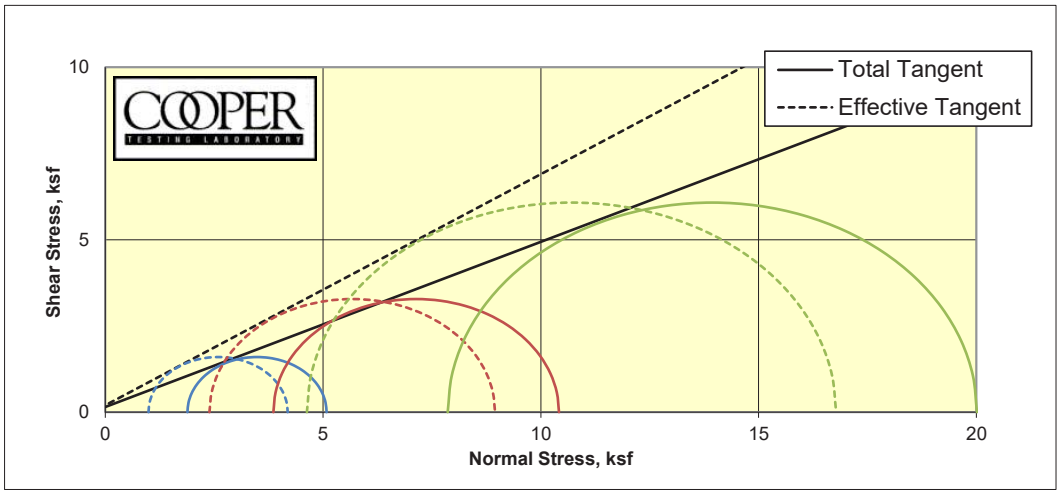
PROJECT NO. G00000268
DRAWN: 03/13/23
DRAWN BY: D. Tower
CHECKED BY: C. Melo
FILE NAME: Figures.indd

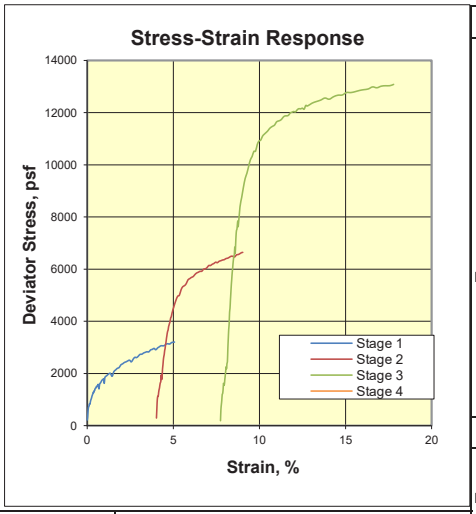
STAGED CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESION WITH PORE PRESSURE

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
B-7

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m





CTL Number:	664-471
Client Name:	BSK Associates
Project Name:	Pittsburg Premier Fields
Project Number:	G00000268
Date:	2/27/2023 By: MD/DC
Total C	0.150 ksf
Total phi	25.6 degrees
Eff. C	0.200 ksf
Eff. Phi	33.8 degrees ©

Stage	1	2	3	4
Boring	B-8			
Sample	4C			
Depth	16			
Visual Description	Clayey Sandstone			
MC (%)	8.5			
Dry Density (pcf)	101.0			
Saturation (%)	35.2			
Void Ratio	0.638			
Diameter (in)	2.41			
Height (in)	5.03			
	Final			
MC (%)	21.4	20.1	18.9	
Dry Density (pcf)	105.5	107.9	110.2	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.568	0.534	0.501	
Diameter (in)	2.37	2.40	2.42	
Height (in)	4.96	4.76	4.58	
Cell Pressure (psi)	114.1	127.7	155.5	
Back Pressure (psi)	101.0	100.9	100.9	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.196	6.558	12.152	
Excess PP (psi)	6.2	10.2	22.5	
Sigma 1 (ksf)	4.187	8.949	16.780	
Sigma 3 (ksf)	0.992	2.391	4.628	
P (ksf)	2.590	5.670	10.704	
Q (ksf)	1.598	3.279	6.076	
Stress Ratio	4.222	3.743	3.626	
Rate (in/min)	0.0005	0.0005	0.0005	

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PROJECT NO. G00000268
DRAWN: 03/13/23
DRAWN BY: D. Tower
CHECKED BY: C. Melo
FILE NAME: Figures.indd

STAGED CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESION WITH PORE PRESSURE

Premier Fields
W Leland Road
Pittsburg, California

FIGURE
B-8

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

16 February, 2023

Job No. 2302004
Cust. No. 12667

Mr. Michael Romero
BSK Associates Engineers & Laboratories
399 Lindbergh Avenue
Livermore, CA 94551

Subject: Project No.: G00000268
Project Name: City of Pittsburg Premier Fields
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Romero:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on February 03, 2023. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, both samples are classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are 28 mg/kg and 130 mg/kg. Both samples are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations are 25 mg/kg and 110 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils are 7.82 and 7.89, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials are 250-mV and 300-mV. Both samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

Sherri Moore
for J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: BSK Associates Engineers & Laboratories
Client's Project No.: G00000268
Client's Project Name: City of Pittsburg Premier Fields
Date Sampled: 26-Jan-23
Date Received: 3-Feb-23
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 16-Feb-2023

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2302004-001	B-4/B-1/B-2 @ 1-5'	300	7.89	-	690	-	130	110
2302004-002	B-8/~~B-7~~ @ 30-31.5'	250	7.82	-	1,500	-	28	25

7

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	13-Feb-2023	13-Feb-2023	-	13-Feb-2023	-	13-Feb-2023	13-Feb-2023

Sherri Moore
Chemist

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

APPENDIX C

Seismic Refraction Survey

ADVANCED GEOLOGICAL SERVICES

1605 School Street, #4
Moraga CA 94556
445-866-1171

February 12, 2023

Omar K Khan, PGIT
Project Geologist
BSK Associates
399 Lindbergh Avenue, Livermore, CA 94551

Subject: Report
Seismic Refraction Survey
Premier Fields,
Pittsburg, California

1.0 INTRODUCTION

This letter presents the results of Advanced Geological Services, Inc. (AGS) seismic refraction survey in support of a grading project for the construction of Premier Fields (Figures 1 and 2). The survey objective was to assess the depth and excavation characteristics (rippability) of the bedrock. The survey was performed on January 30, 2023, by AGS senior geophysicist Pierre Armand and geophysicist Kyle Young with field oversight by Omar K Khan of BSK Engineers. Due to the tree trimming activities going on SL-1 was reshot on February 16, 2023.

Figure 1- General Location of Seismic Survey, Pittsburg, California

2.0 SUMMARY OF FINDINGS

The P-wave arrival times for the three seismic lines were inverted into a 3-layer velocity model 1,000 ft/s (soil to compact soil), 3,000 ft/s (very weathered bedrock), 5,000 ft/s (lightly weathered bedrock). On SL-1 lightly weathered bedrock was found about 35 feet below very weathered bedrock (Figure 3). SL-2 and SL-3 show approximately 40 feet of softer rock overlying slightly weathered bedrock (Figures 4 and 5). Based on the rippability chart in Table 2, these sedimentary rocks are still rippable at least down to 40 feet deep, possibly deeper.

3.0 SITE DESCRIPTION

Three seismic lines 184 feet long, were draped over a mount that is to be excavated down about 40 feet (see Figures 1 and 2).

4.0 SEISMIC REFRACTION METHOD OVERVIEW

The seismic refraction method uses compressional (P-) wave energy to delineate seismic velocity layers within the subsurface. Interpretation entails correlating the velocity layers to geologic features such as soil and various types of bedrock. To perform a refraction survey, an elastic wave (compressional, or P-wave) is generated at certain locations (shotpoints) along a survey line. The P-wave energy is usually produced by striking the ground with a sledgehammer. As the P-wave propagates through the ground it is refracted along boundaries between geologic layers with different seismic velocities.

Part of the refracted P-wave energy returns to the ground surface where it is detected by vibration-sensitive devices called geophones, which are placed in a co-linear array along the seismic survey line. The geophone data are fed to a seismograph, where they are recorded, and then to a computer, where they are analyzed to determine the depth and velocities of subsurface seismic layers. Key data for refraction analysis are the positions of the geophones and shotpoints along a seismic line, and the amount of time it takes for the refracted wave to travel from the shotpoint to each geophone location. Because the P-wave is the fastest traveling of all types of seismic waves, it can be readily identified as the first deflection ("first break") on a seismic trace.

Additional discussion of the refraction method, its limitations, and the relationship between seismic velocity and geologic materials is presented in Appendix A.

5.0 FIELD PROCEDURES

Guided by the BSK representative, AGS laid out a fiberglass tape measure along the various seismic lines and placed an array of 24 geophones on the ground at 8-foot intervals to form a 184-foot-long geophone array. The geophones were coupled to the ground by means of 3-inch metal spikes attached to the geophone base. Shotpoints were approximately 20 feet and 5 feet beyond each end of the geophone array, ¼ of the way through the geophone array, and at the array midpoint. Ten shots were stacked at each shotpoint using a 16-lb sledgehammer against a metal plate placed on the ground surface. The P-waves produced by the hammer impacts were detected using 4.5 Hz geophones. The detected seismic signals were recorded using a Geode seismograph by Geometrics, connected to a laptop computer. After seismic data acquisition was completed for each line, AGS performed a hand-level survey to measure the relative elevation changes along the line so that the ground surface topography could be incorporated into the data analysis.

6.0 DATA PROCESSING AND ANALYSIS

The seismic refraction data quality for this project was good and the "first beaks" could be readily identified and picked on the seismic records. Data quality was enhanced by "stacking," which entailed using multiple hammer blows at each shotpoint location to improve the signal-to-noise ratio. The additive affect of stacking of multiple hammer blows at the same location enhances or increases the amplitude of the signal (i.e., the P-wave arrival) while amplitude of the background noise, which, being random in nature, tends to cancel itself on successive hammer blows and remains largely unchanged.

Seismic data were transferred from the seismograph to a desktop computer where they were processed using the *SeisImager* software package by Geometrics, Inc. Briefly, *SeisImager* is a computer inversion program that generates an initial velocity layer model, produces synthetic data from the model, and then adjusts the model so that the synthetic data better matches the observed field data. The agreement between the synthetic and observed data provides an indication of how well the model represents the actual subsurface conditions.

First, AGS used the *SeisImager* module *PickWin* to interpret ("pick") the P-wave arrivals ("first breaks") for each of the shotpoint data sets ("shot gathers") per line. *PickWin* was also used to check (against the geophysicist's field log) that the proper locations were assigned to the geophones and shotpoints. Next, the first break files were fed to the SeisImager module *PlotRefra*, which was used to review time-distance (TD) plots for the seismic lines and assign a seismic layer to each arrival time. For the refraction analysis, each P-wave arrival is considered to have refracted from a distinct seismic layer. The number of layers resolved by the seismic survey, and their thickness and average velocity, is indicated by straight line segments on the TD plot; because these straight-line segments represent a constant velocity condition within the subsurface, they tend to represent a distinct geologic layer. The topographic elevation files were incorporated into the analysis at this point. Next, a time-term inversion was performed to produce layered velocity models presented on Figures 3 and 4. Time-term inversion is a linear least-squares technique that uses the layer assignments and the distances and travel times between the shotpoints and the geophones to develop a velocity layer model that best fits the observed data.

7.0 RESULTS

The results of the seismic refraction survey are summarized below in Table 1 and presented in Figures 3 through 5, which show the seismic line locations and the subsurface velocity layer models that were calculated from the refraction data. Seismic data was somewhat noisy due to the tree-trimming activities going on simultaneously. SL-1 was reshot at a later date, and great data was obtained on this line. The data was inverted into three layers, to be able to compare the thicknesses across the three seismic lines. This is done by creating a tomographic image from the P-Wave travel times curves and then converting the tomography into a layered velocity

model.

Table 1 Velocity Summary (feet per second) from Layer Models

Seismic Line (184 ft)	Layer V_1 (topsoil)	Layer V_1 Thickness (ft)	Layer V_2 (Highly weathered bedrock)	Layer V_2 Thickness (ft)	Layer V_3 (little-weathered bedrock)	Layer V_3 Depth to Bedrock
SL-1	1000 ft/s	10-25’	3000 ft/s	10-40’	5000 ft/s	35’
SL-2	1000 ft/s	25’	3000 ft/s	10-20’	5000 ft/s	36’
SL-3	1000 ft/s	28’	3000 ft/s	10’	5000 ft/s	40’

8.0 EXCAVATION CHARACTERISTICS (RIPPABILITY)

The geologic formation mapped in this area is the Pliocene age (5.3 to 2.6 Ma), Tehama Formation which is made up of poorly consolidated nonmarine siltstones, sandstones, tuffs, and conglomerate (Graymer R.W. et al., 2022). Mostly low P-wave velocities were obtained on the seismic refraction velocity models, however little weathered bedrock is found at about 35 to 40 feet below the ground (velocity of 5,000 ft/s). The velocity of 5,000 ft/s is considered rippable for a D9R tractor based on the Catipilar Rippability chart shown in Table 2. This information should only be used as a general guide, however, as many other factors should also be considered. These factors include rock jointing and fracture patterns. The refraction results should be combined with a complete and thorough analysis of geotechnical boring data, as well as local ripping experience (if available) to make a final assessment.

References:

Graymer, R.W., D.L. Jones, E. E. Brabb, 2002, Geologic Map and Map Database of Northeastern San Francisco Bay Region, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2403.

9.0 CLOSING

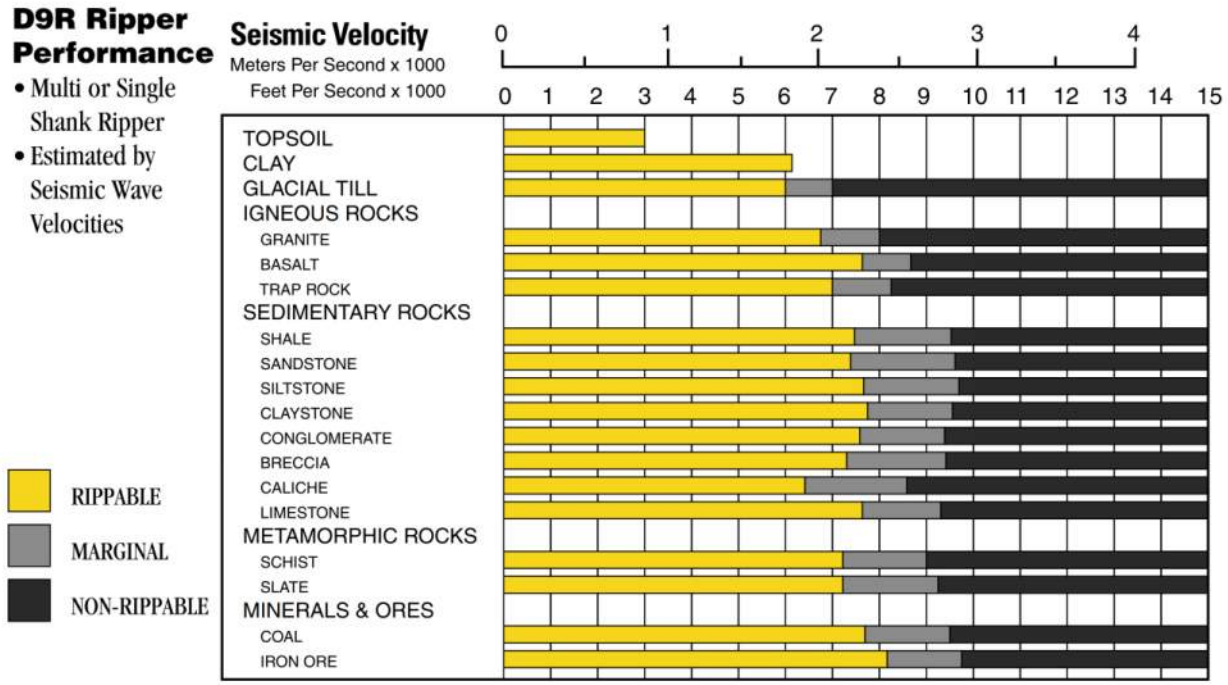
All geophysical data and field notes collected as a part of this investigation will be archived at the AGS office. The data collection and interpretation methods used in this investigation are consistent with standard practices applied to similar geophysical investigations. The correlation of geophysical responses with probable subsurface features is based on the past results of similar surveys although it is possible that some variation could exist at this site. Intrusive field activities, such as soil borings and/or rock coring, would be needed to further investigate and confirm the presence or absence of identified and interpreted features. Due to the nature of geophysical data, no guarantees can be made or implied regarding the presence or absence of additional objects or targets beyond those identified.

If you have any questions regarding the results of this field investigation, please contact me at 445-866-1171. It was a pleasure working with you on this project, and we look forward to being able to provide you with sub-surface imaging services in the future.

Sincerely,

Pierre Armand GP 1021
Senior Geophysicist
Advanced Geological Services, Inc.
1605 School St.
Moraga, California

Table 2 Caterpillar Rippability Chart for D9R Ripper.



Figures: Figure 1 Seismic Refraction Survey Area (imbedded in Report text, above)
Figure 2 Seismic Refraction Line Locations
Figure 3 P-wave Velocity Layer Model, SL-1
Figure 4 P-wave Velocity Layer Model, SL-2
Figure 5 P-wave Velocity Layer Model, SL-3

Attachments: Appendix A: Seismic Velocity and Limitations of the Refraction Method

APPENDIX A

SEISMIC VELOCITY AND LIMITATIONS OF THE REFRACTION METHOD

The physical properties of earth materials (fill, sediment, rock) such as compaction, density, hardness, and induration dictate the corresponding seismic velocity of the material. Additionally, other factors such as bedding, fracturing, weathering, and saturation can also affect seismic velocity. In general, low velocities indicate loose soil, poorly compacted fill material, poorly to semi-consolidated sediments, deeply weathered, and highly fractured rock. Conversely, high velocities are indicative of competent rock or dense and highly compacted sediments and fill. The highest velocities are measured in unweathered and little fractured rock.

There are certain limitations associated with the seismic refraction method as applied for this investigation. These limitations are primarily based on assumptions that are made by the data analysis routine. The data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer. The data analysis routine also assumes that the velocity of subsurface materials increases with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected.

The quality of the field data is critical to the construction of an accurate depth and velocity profile. Strong, clear “first-break” information from refracted interfaces will make the data processing, analysis, and interpretation much more accurate and meaningful. Vibrational noise or poor subsurface conditions can decrease the ability to accurately locate and pick seismic waves from the interfaces.

Due to these and other limitations inherent to the seismic refraction method, resultant velocity cross-sections should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally.

Aerial Photo From Google Earth

ADVANCED GEOLOGICAL SERVICES

1605 School Street, Suite 4
Moraga, CA 94556
(Offices in PA, OH, and CA)

Location of 3 Seismic Lines

Location: Premier Fields
Pittsburg, California

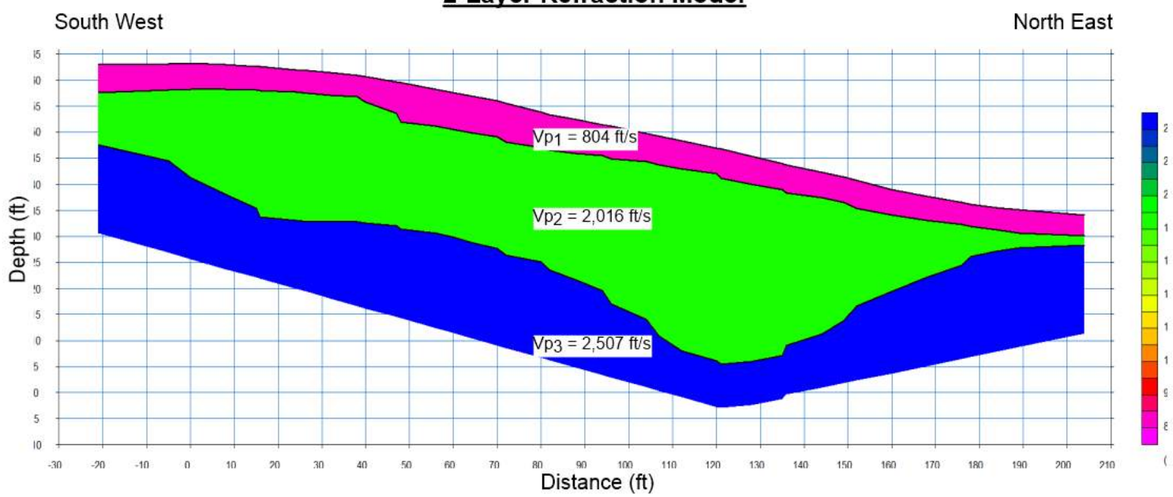
Client: BSK Engineers

PROJECT #: 23-010-1CA

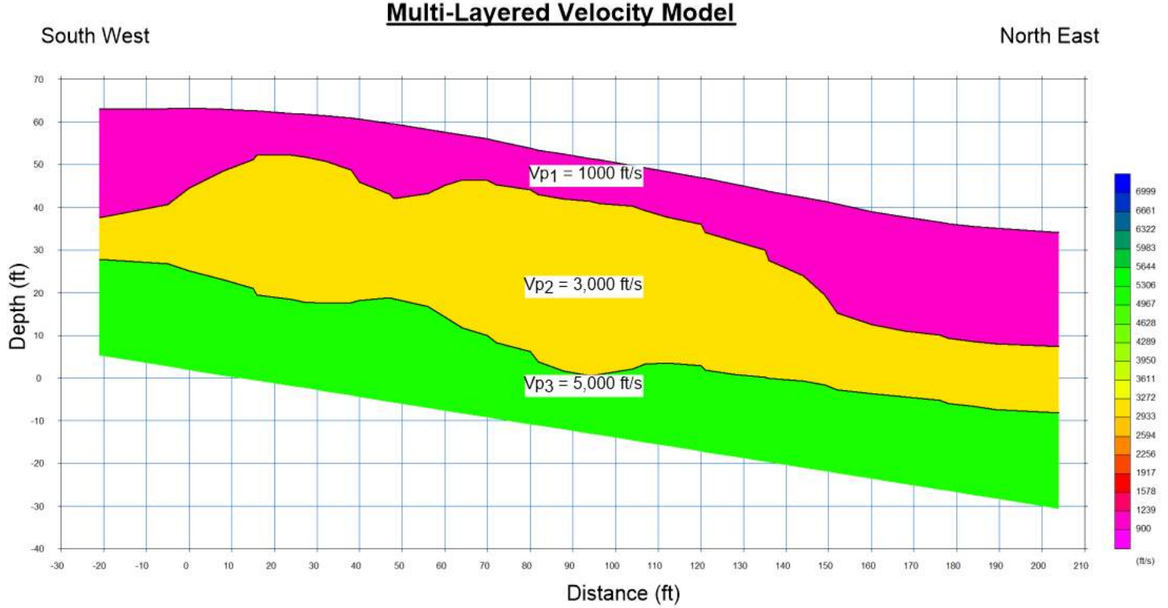
DATE: February 12, 2023 | DRAWN BY: P. Armand

FIGURE
2

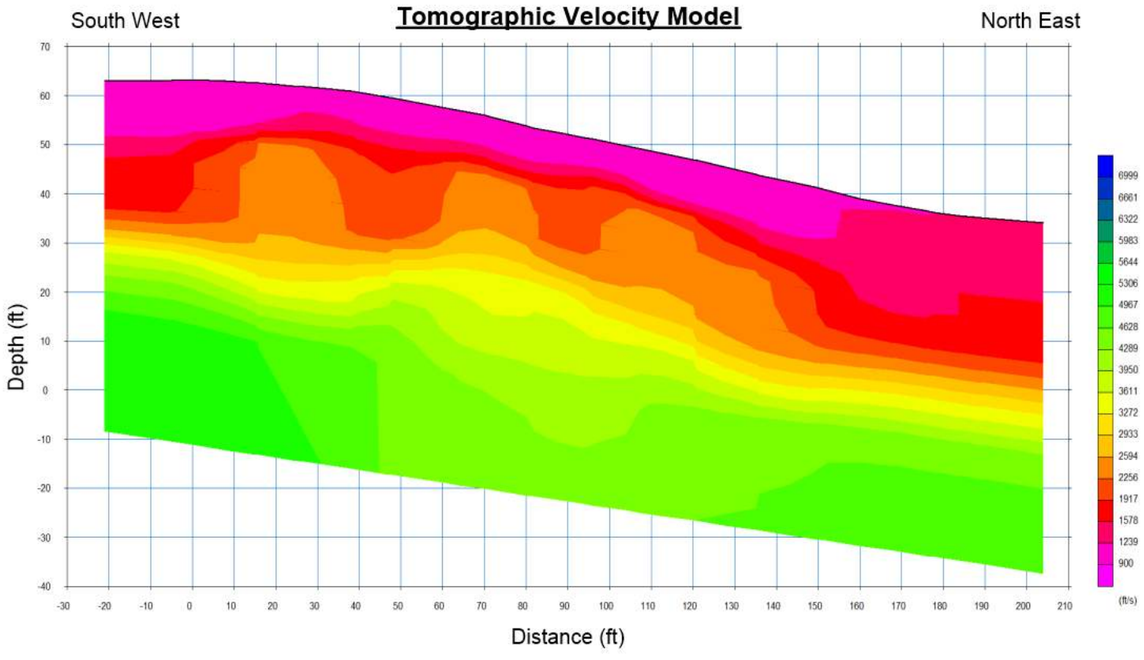
2-Layer Refraction Model

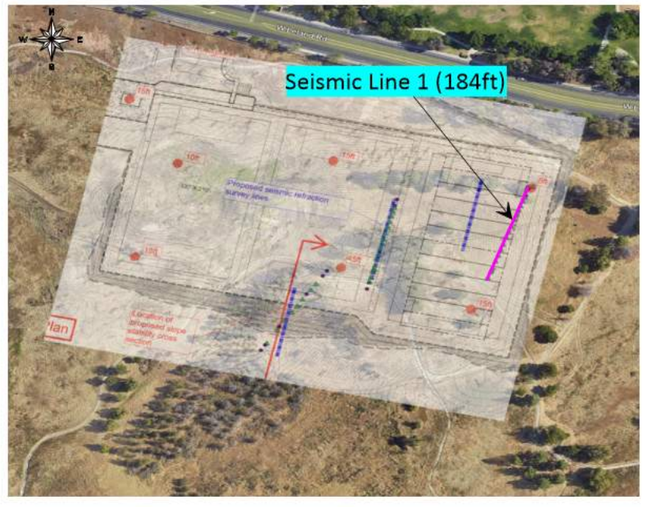


Multi-Layered Velocity Model



Tomographic Velocity Model





NOTES:

1) A Geode 24-channel engineering seismograph and 24 4.5-Hz geophones were used for seismic refraction data collection. A 16-lb sledge hammer and metal strike plate was used for the seismic source. Refraction and MASW Data was processed using SeisImager processing software.
2) Identified subsurface features should be further investigated using direct sampling methods, such as drilling, to further characterize the nature of these features.The items shown on this figure may not be all inclusive. AGS does not warrant the fact that additional buried features/utilities may be present which could not be identified by AGS personnel during this investigation.

ADVANCED GEOLOGICAL SERVICES

1605 School Street, Suite 4
Moraga, CA 94556
(Offices in PA, OH, and CA)

Seismic Refraction Results For SL-1

Location: Premier Fields
Pittsburg, California

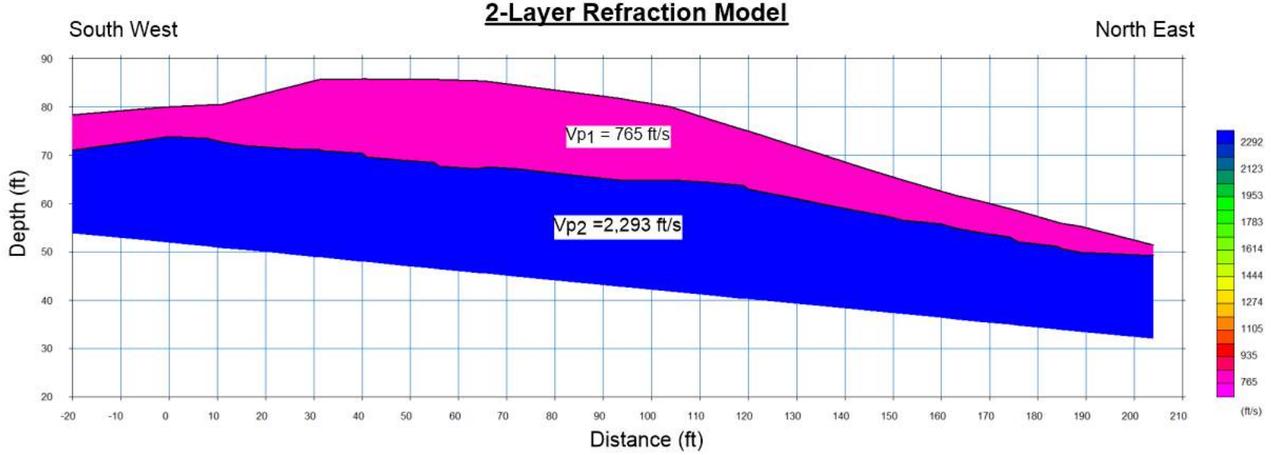
Client: BSK Engineers

PROJECT #: 23-010-1CA

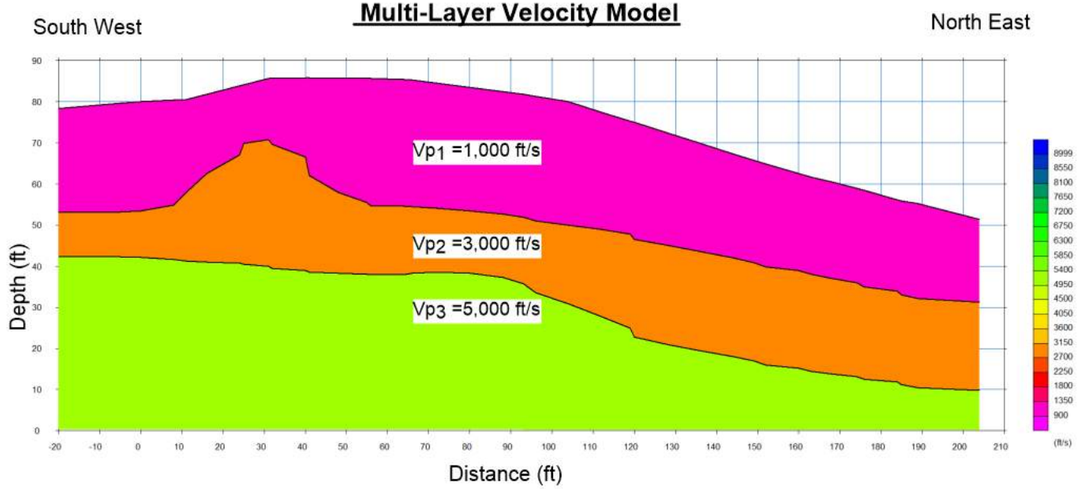
DATE: February 12, 2023 | DRAWN BY: P. Armand

FIGURE 3

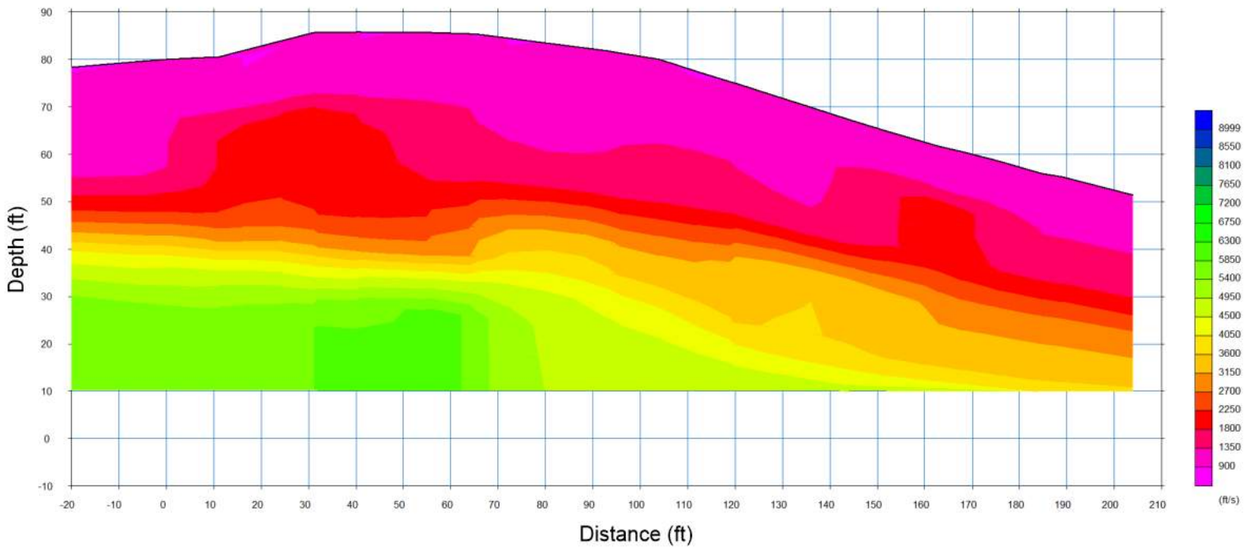
2-Layer Refraction Model

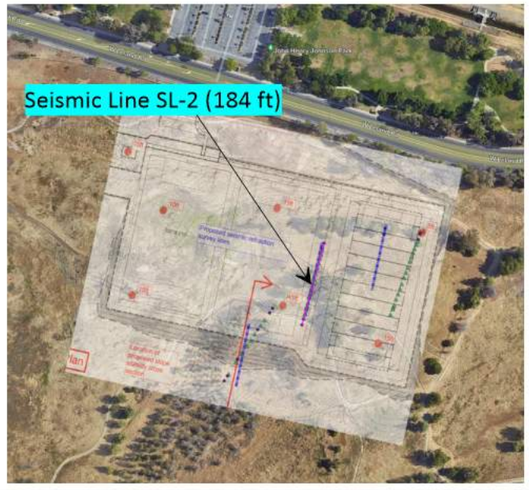


Multi-Layer Velocity Model



Tomographic Velocity Model





NOTES:

1) A Geode 24-channel engineering seismograph and 24 4.5-Hz geophones were used for seismic refraction data collection. A 16-lb sledge hammer and metal strike plate was used for the seismic source. Refraction and MASW Data was processed using SeisImager processing software.
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ADVANCED GEOLOGICAL SERVICES

1605 School Street, Suite 4
Moraga, CA 94556
(Offices in PA, OH, and CA)

Premier Fields Seismic Refraction Results
SL-2

Location:
Pittsburg, California

Client: BSK Engineers

PROJECT #: 23-010-1CA

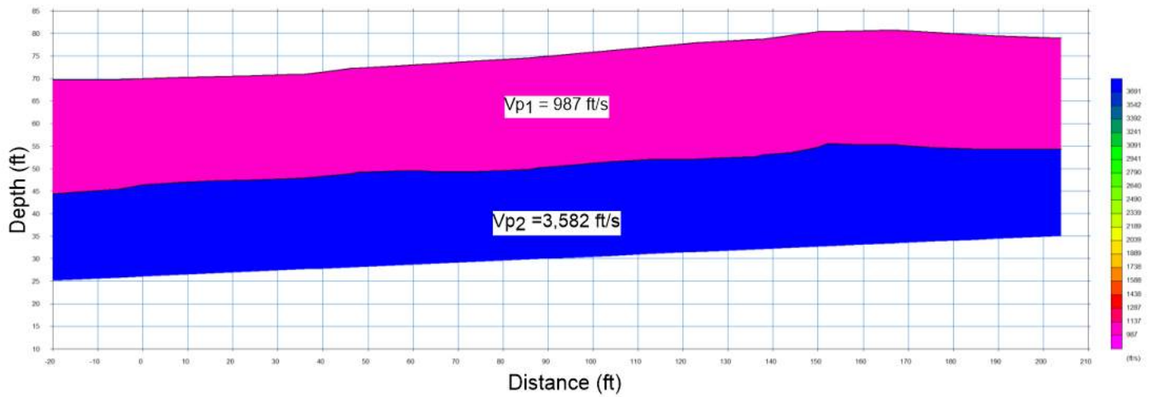
DATE: February 12, 2023 | DRAWN BY: P. Armand

FIGURE 4

South East

2-Layer Refraction Model

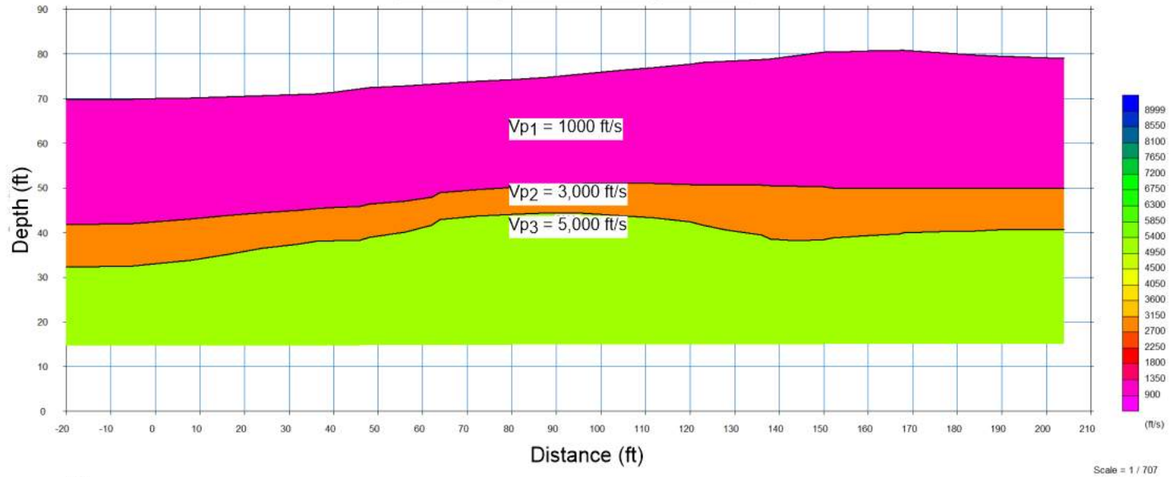
North West



South East

Multi-Layered Velocity Model

North West



sl3.vs

Scale = 1 / 707

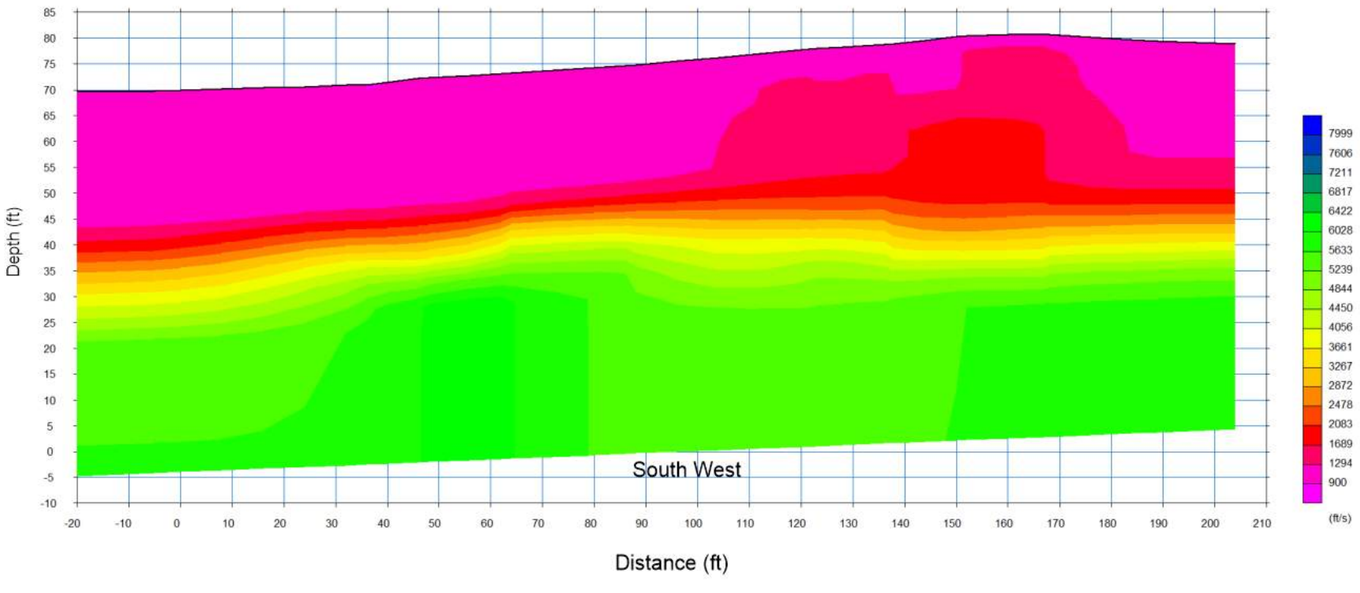
NOTES:

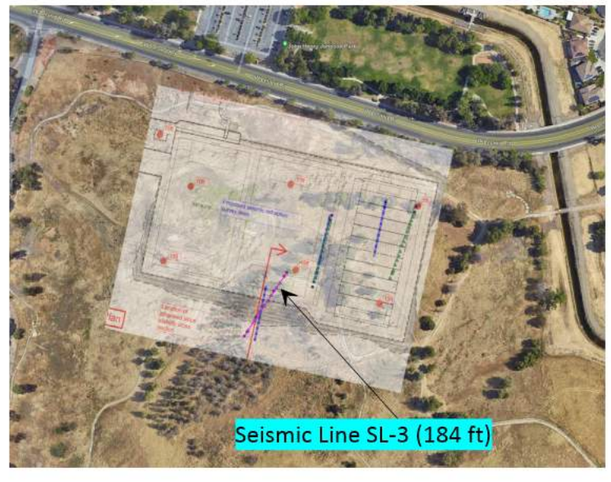
1) A Geode 24-channel engineering seismograph and 24 4.5-Hz geophones were used for s ata collection. A 16-lb sledge hammer anc was used for the seismic source. Refraction and MASW Data was processed using Seislmager processing software.
2) Identified subsurface features should be further investigated using direct sampling methods, such as drilling, to further characterize the nature of these features.The items shown on this figure may not be all inclusive. AGS does not warrant the fact that additional buried features/utilities may be present which could not be identified by AGS personnel during this investigation.

South East

Tomographic Velocity Model

North West





North East

ADVANCED GEOLOGICAL SERVICES

1605 School Street, Suite 4
Moraga, CA 94556
(Offices in PA, OH, and CA)

Seismic Refraction Results For SL-3

Location: Premier Fields
Pittsburg, California

Client: BSK Engineers

PROJECT #: 23-010-1CA

DATE: February 12, 2023

DRAWN BY: P. Armand

FIGURE 5

APPENDIX D

Important Information About This Geotechnical-Engineering Report

Important Information about This

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.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include 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 personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

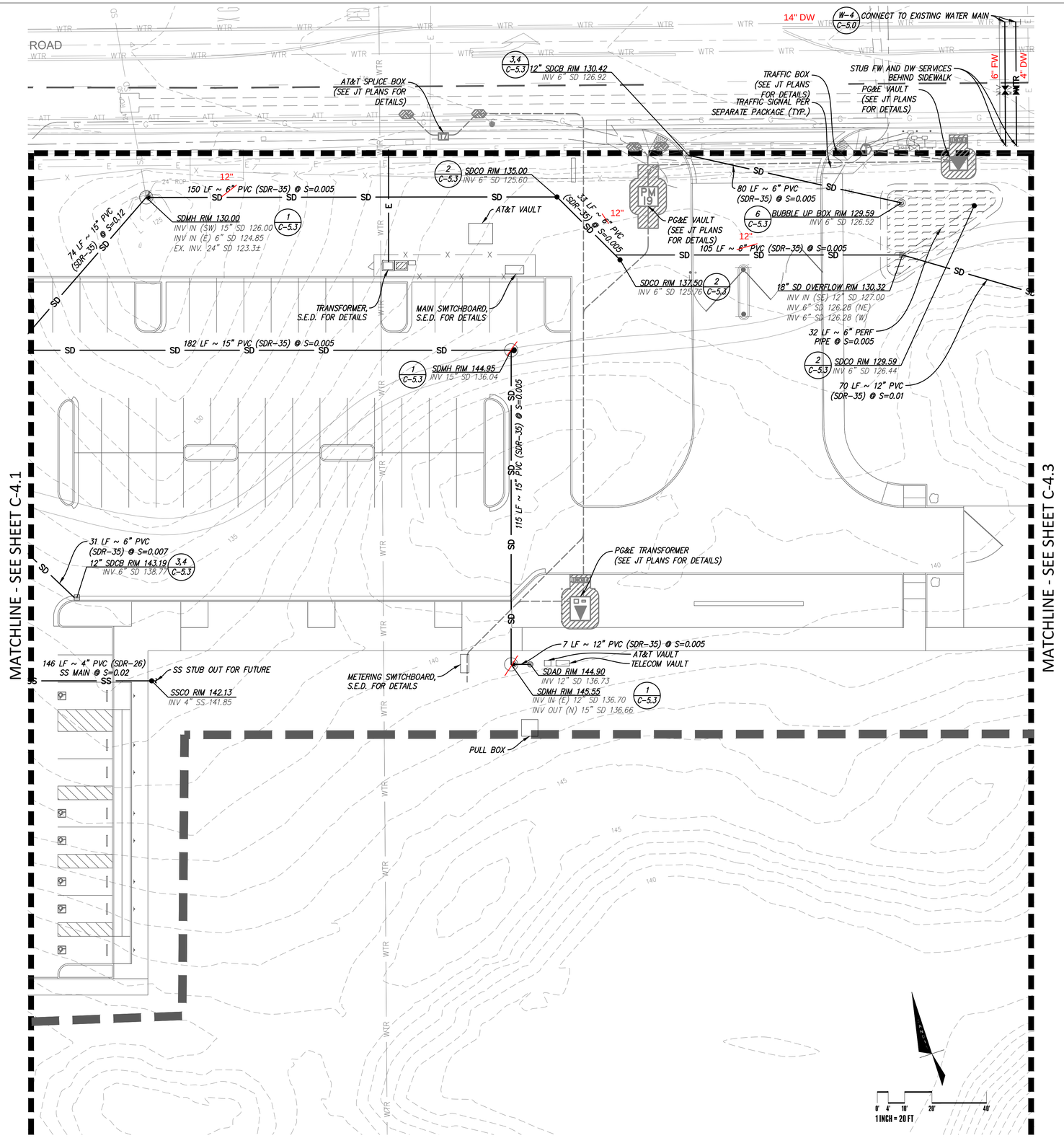
Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

REVISED PLANS



LEGEND

PROPERTY LINE

PERFORATED PIPE 3 C-5.4

BIORETENTION AREA 1 C-5.4

ABBREVIATION

N.I.C – NOT IN CONTRACT

STORM DRAIN NOTES

1. PRIVATE STORM DRAIN LINE 4–INCH THROUGH 12–INCH WITH A MINIMUM OF TWO (2) FEET OF COVER IN NON–TRAFFIC AREAS SHALL BE POLYVINYL CHLORIDE (PVC) SDR 35 GREEN PIPE AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 3034–73 WITH BELLS AND SPIGOT CONNECTIONS. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, 22.5° ELBOWS, 45° ELBOWS OR LONG SWEEP ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
2. PRIVATE STORM DRAIN LINE 6–INCH THROUGH 12–INCH WITH LESS THAN THREE (3) FEET OF COVER IN VEHICULAR TRAFFIC AREAS SHALL BE POLYVINYL CHLORIDE (PVC) C900, RATED FOR 150 PSI CLASS PIPE. PROVIDE AND INSTALL "STORM DRAIN" MARKER TAPE FOR THE ENTIRE LENGTH OF PIPE TRENCH. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, OBTUSE ELBOWS OR LONG SWEEP ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
3. ALL AREA DRAINS AND CATCH BASINS GRATES WITHIN PEDESTRIAN ACCESSIBLE AREAS SHALL MEET ADA REQUIREMENTS.
4. ALL TRENCHES SHALL BE BACK FILLED PER THE SPECIFICATIONS WITH APPROPRIATE TESTS BY THE GEOTECHNICAL ENGINEER TO VERIFY COMPACTION VALUES.
5. FOR GRAVITY FLOW SYSTEMS CONTRACTOR SHALL VERIFY (POTHOLE IF NECESSARY) SIZE, MATERIAL, LOCATION AND DEPTH OF ALL SYSTEMS THAT ARE TO BE CONNECTED TO OR CROSSED PRIOR TO THE TRENCHING OR INSTALLATION OF ANY GRAVITY FLOW SYSTEM.
6. DRAINS SHOWN ON CIVIL PLANS ARE NOT INTENDED TO BE THE FINAL NUMBER AND LOCATION OF ALL DRAINS. PLACEMENT AND NUMBER OF LANDSCAPING DRAINS ARE HIGHLY DEPENDENT ON GROUND COVER TYPE AND PLANT MATERIAL. CONTRACTOR SHALL ADD ADDITIONAL AREA DRAINS AS NEEDED AND AS DIRECTED BY THE LANDSCAPE ARCHITECT.
7. ALL DOWN SPOUTS SHALL DISCHARGE DIRECTLY ON TO ADJACENT PERVIOUS SURFACES OR SPLASH BLOCKS UNLESS OTHERWISE NOTED ON PLANS. SEE ARCHITECTURE PLANS FOR EXACT LOCATION OF THE DOWN SPOUTS.

SANITARY SEWER NOTES

1. ALL SEWER WORK SHALL BE IN CONFORMANCE WITH THE COUNTY ENVIRONMENTAL HEALTH DEPARTMENT STANDARDS.
2. PRIVATE SANITARY SEWER MAIN AND SERVICE LINE 4–INCH THROUGH 8–INCH SHALL BE POLYVINYL CHLORIDE (PVC) SDR 26 GREEN SEWER PIPE AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 3034–73 WITH BELL AND SPIGOT CONNECTIONS. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, 22.5° ELBOWS OR 45° ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
3. ALL LATERALS SHALL HAVE A TWO WAY CLEANOUT AT FACE OF BUILDING AND AS SHOWN ON PLANS.
4. IF (E) SEWER LATERAL IS TO BE USED, CONTRACTOR SHALL VIDEO INSPECT, PERFORM PRESSURE TEST ON (E) SEWER LATERAL, AND SHALL PERFORM ANY NEEDED REPAIRS.

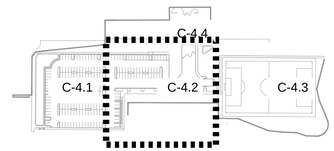
WATER SYSTEM NOTES

1. MAINTAIN WATER MAIN LINES 10' AWAY FROM SANITARY SEWER MAIN LINES. LATERALS SHALL BE SEPARATED PER PLAN DIMENSIONS.
2. WHERE WATER LINES HAVE TO CROSS SANITARY SEWER LINES, DO SO AT A 90 DEGREE ANGLE AND WATER LINES SHALL BE MINIMUM OF 12" ABOVE TOP OF SANITARY SEWER LINES.
3. ALL WATER SERVICE CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE WATER DISTRICT STANDARDS.
4. ALL WATER LINES SHALL BE INSTALLED WITH 36" MINIMUM COVER.
5. THRUST RESTRAINTS SHALL BE DESIGNED AND INSTALLED AT ALL TEES, CROSSES, BENDS (HORIZONTAL AND VERTICAL), AT SIZE CHANGES AND AT FIRE HYDRANTS.
6. ALL BURIED METALLIC PRESSURE PIPING SHALL BE PROTECTED AGAINST CORROSION.

GENERAL UTILITY NOTES

1. WHERE UTILITY TRENCHES EXTEND FROM THE EXTERIOR TO THE INTERIOR LIMITS OF THE RESTROOM BUILDING OR PAVEMENT, A 1–SACK SAND–CEMENT SLURRY MIX SHALL BE USED AS BACKFILL MATERIAL FOR A DISTANCE OF 2 FEET LATERALLY ON EACH SIDE OF THE BUILDING OR PAVEMENT LIMITS TO REDUCE THE POTENTIAL FOR THE TRENCH TO ACT AS A CONDUIT FOR EXTERIOR SURFACE WATER. UTILITY TRENCHES LOCATED IN LANDSCAPED AREAS SHALL BE CAPPED WITH A MINIMUM OF 12 INCHES OF COMPACTED ON–SITE CLAYEY SOIL.

KEY MAP



REGISTERED PROFESSIONAL ENGINEER CHAD J. BROWNING No. C68315 Exp. 9/30/25 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF: CHAD J. BROWNING R.C.E. NO. 68315 EXPIRES 9-30-25 DATE: 11/03/23

SANDIS

ACCEPTED FOR USE: JOHN SAMUELSON City Engineer Date:

City of Pittsburg

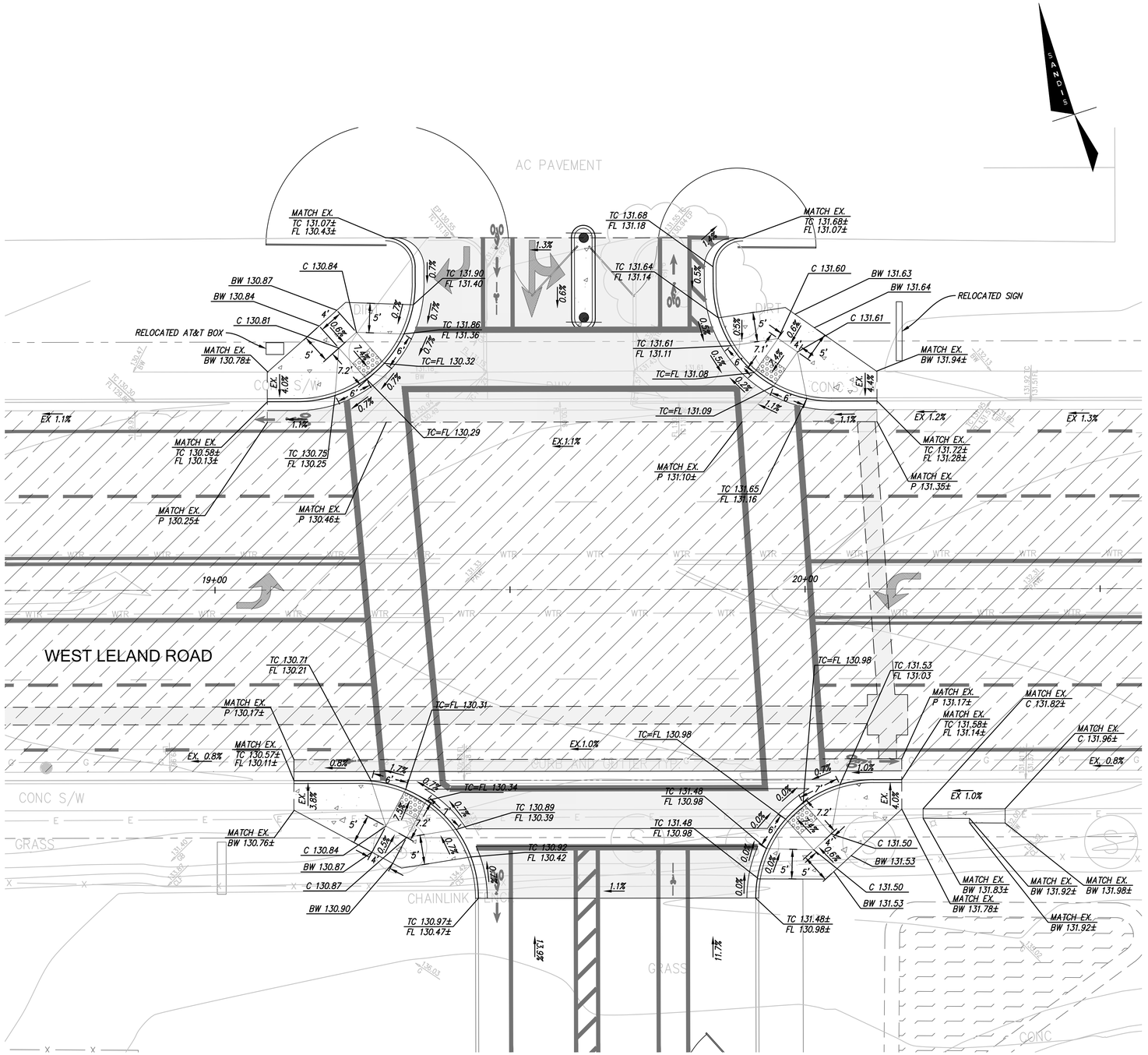
PITTSBURG PREMIER FIELDS
UTILITY PLAN

DRAWN: LS	CHECKED: SC	REVIEWED: DL	DATE: 10/07/24	SCALE: AS NOTE

BY	DESCRIPTION	REV	DATE

SHEET NO. 19 OF 78

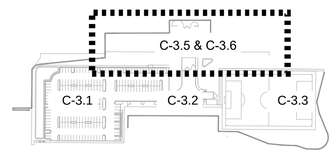
DWG. NO. C-4.2



LEGEND

- PROPERTY LINE
- SAWCUT LINE
- DIRECTION OF STEEP SLOPE
- FLOW LINE
- GRADE BREAK
- 194 / 195 — CONTOURS
- AC PAVEMENT (2 / C-5.2)
- DEEP LIFT (11 / C-5.2)
- ~~SLURRY SEAL~~
- CONCRETE SIDEWALK (CA70 / C-5.5)

KEY MAP



REGISTERED PROFESSIONAL ENGINEER
CHAD J. BROWNING
No. C68315
Exp. 9/30/25
CIVIL
STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF: CHAD J. BROWNING R.C.E. NO. 68315 EXPIRES 9-30-25 — DATE: 11/03/23

SANDIS

ACCEPTED FOR USE:
JOHN SAMUELSON
City Engineer
Date:

City of Pittsburg

PITTSBURG PREMIER FIELDS
OFFSITE GRADING PLAN

DRAWN: LS	CHECKED: SC	REVIEWED: DL	DATE: 11/17/23	SCALE: 1" = 10'

BY	DESCRIPTION	REV	DATE

SHEET NO.
15 OF 78

DWG. NO.
C-3.5

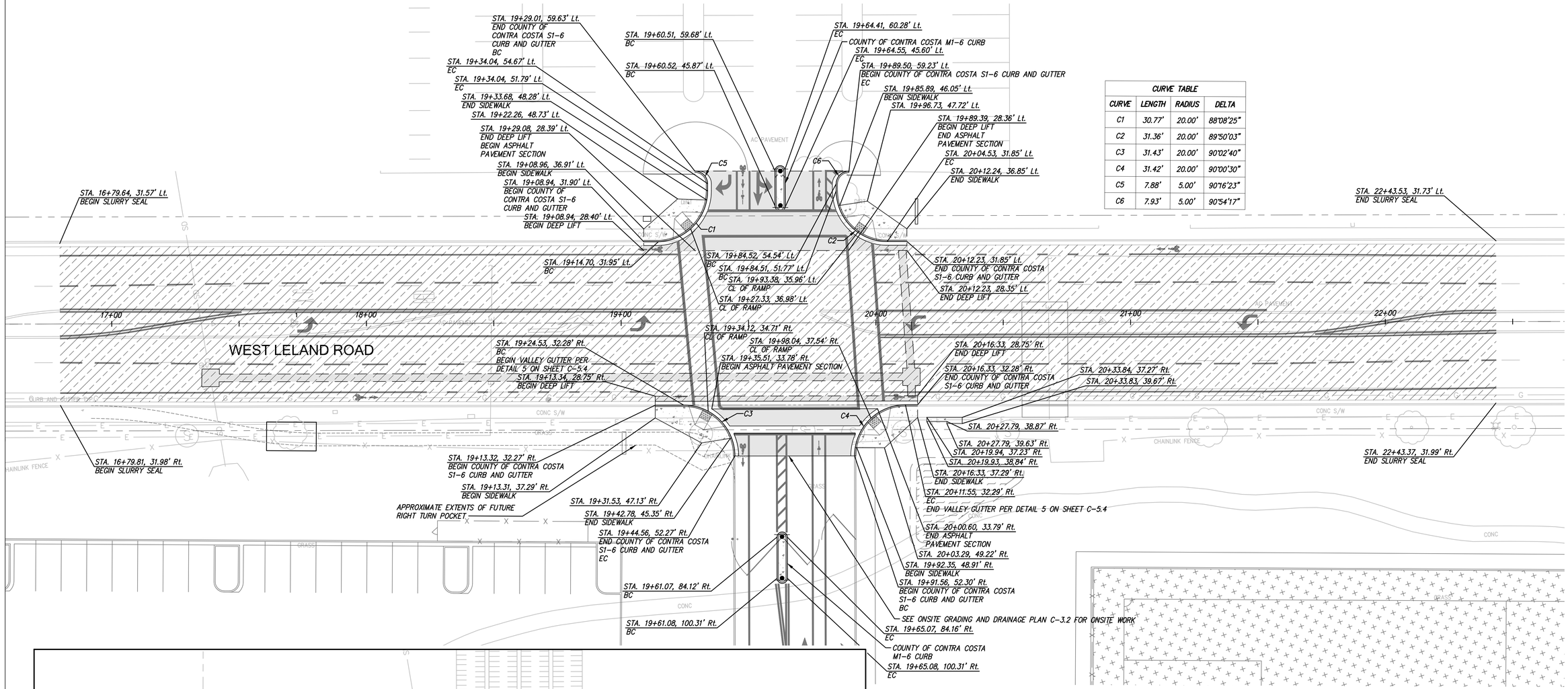
GENERAL NOTES

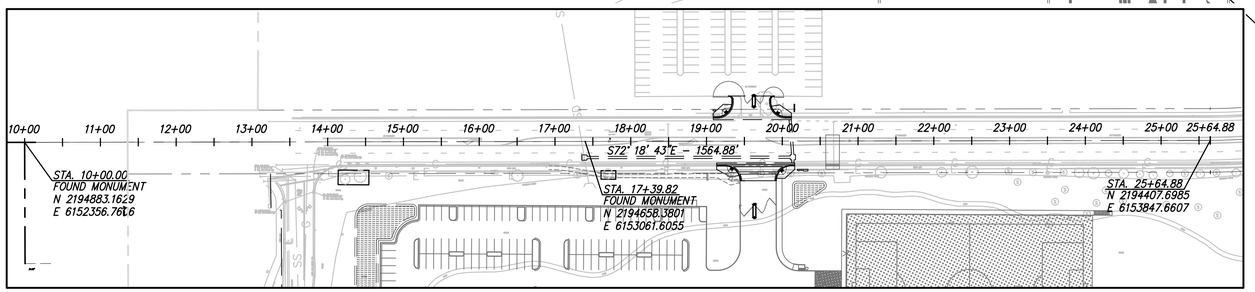
1. SEE SHEET C-5.5 CONSTRUCTION DETAILS, FOR COUNTY DETAILS

LEGEND

- AC PAVEMENT (2 / C-5.2)
- DEEP LIFT (11 / C-5.2)
- SLURRY SEAL
- CONCRETE SIDEWALK (CA70 / C-5.5)

CURVE TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	30.77'	20.00'	88°08'25"
C2	31.36'	20.00'	89°50'03"
C3	31.43'	20.00'	90°02'40"
C4	31.42'	20.00'	90°00'30"
C5	7.88'	5.00'	90°16'23"
C6	7.93'	5.00'	90°54'17"

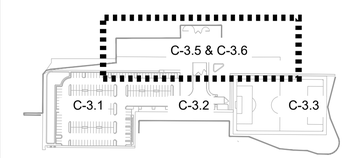




PROJECT CONTROL

SCALE: 1"=100'

KEY MAP



1 INCH = 20 FT

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DATE: 11/03/23

SANDIS

ACCEPTED FOR USE:
JOHN SAMUELSON
City Engineer
Date:

City of Pittsburg

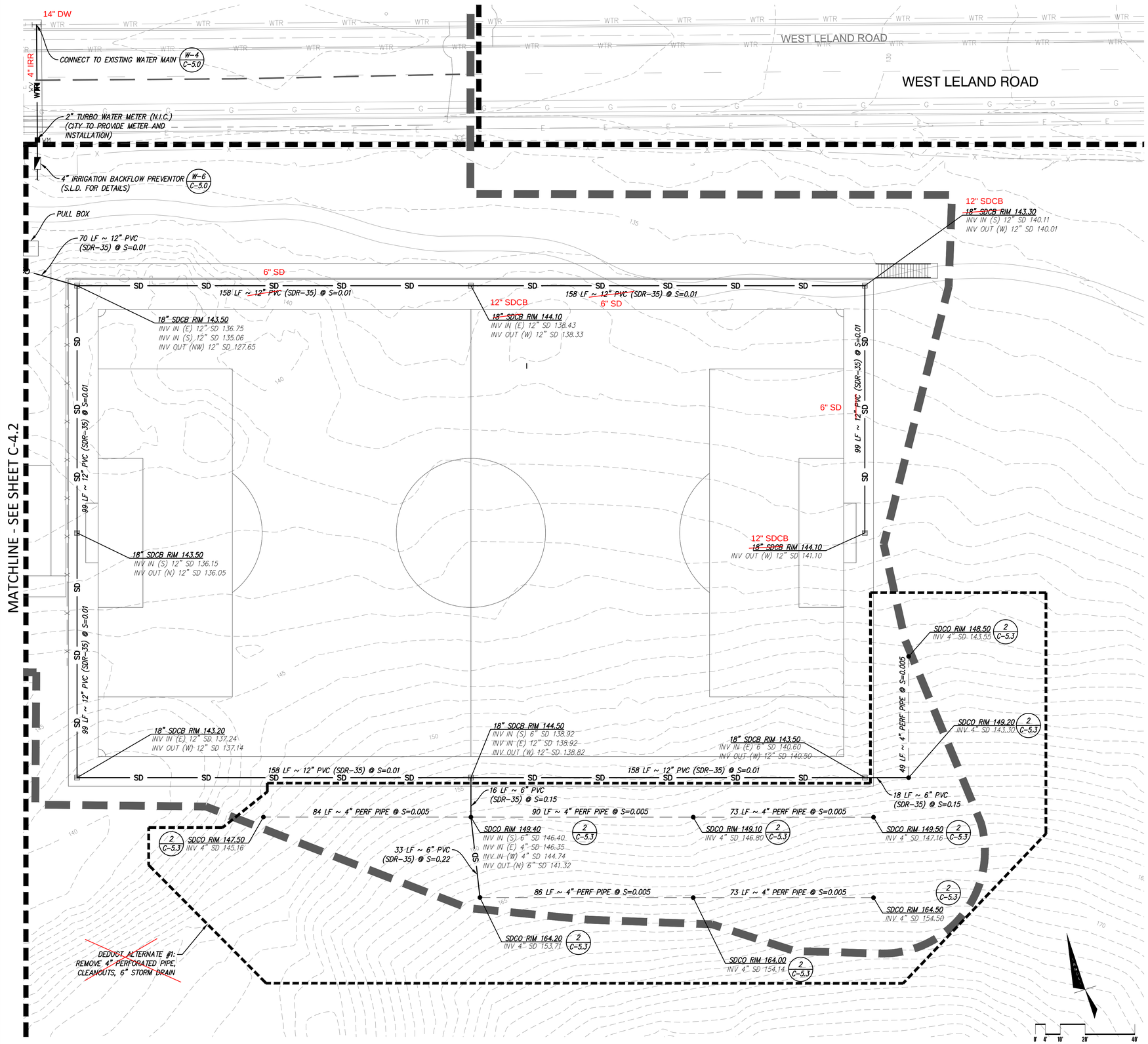
PITTSBURG PREMIER FIELDS
OFFSITE HORIZONTAL CONTROL AND SITE PLAN

BY	DESCRIPTION	DATE

DRAWN: LS
CHECKED: SC
REVIEWED: DL
DATE: 11/17/23
SCALE: 1"=20'

SHEET NO.
16 OF 78

DWG. NO.
C-3.6



LEGEND

PROPERTY LINE

PERFORATED PIPE (3 / C-5.4)

BIORETENTION AREA (1 / C-5.4)

ABBREVIATION

N.I.C – NOT IN CONTRACT

STORM DRAIN NOTES

1. PRIVATE STORM DRAIN LINE 4–INCH THROUGH 12–INCH WITH A MINIMUM OF TWO (2) FEET OF COVER IN NON–TRAFFIC AREAS SHALL BE POLYVINYL CHLORIDE (PVC) SDR 35 GREEN PIPE AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 3034–73 WITH BELLS AND SPIGOT CONNECTIONS. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, 22.5° ELBOWS, 45° ELBOWS OR LONG SWEEP ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
2. PRIVATE STORM DRAIN LINE 6–INCH THROUGH 12–INCH WITH LESS THAN THREE (3) FEET OF COVER IN VEHICULAR TRAFFIC AREAS SHALL BE POLYVINYL CHLORIDE (PVC) C900, RATED FOR 150 PSI CLASS PIPE. PROVIDE AND INSTALL "STORM DRAIN" MARKER TAPE FOR THE ENTIRE LENGTH OF PIPE TRENCH. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, OBTUSE ELBOWS OR LONG SWEEP ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
3. ALL AREA DRAINS AND CATCH BASINS GRATES WITHIN PEDESTRIAN ACCESSIBLE AREAS SHALL MEET ADA REQUIREMENTS.
4. ALL TRENCHES SHALL BE BACK FILLED PER THE SPECIFICATIONS WITH APPROPRIATE TESTS BY THE GEOTECHNICAL ENGINEER TO VERIFY COMPACTION VALUES.
5. FOR GRAVITY FLOW SYSTEMS CONTRACTOR SHALL VERIFY (POTHOLE IF NECESSARY) SIZE, MATERIAL, LOCATION AND DEPTH OF ALL SYSTEMS THAT ARE TO BE CONNECTED TO OR CROSSED PRIOR TO THE TRENCHING OR INSTALLATION OF ANY GRAVITY FLOW SYSTEM.
6. DRAINS SHOWN ON CIVIL PLANS ARE NOT INTENDED TO BE THE FINAL NUMBER AND LOCATION OF ALL DRAINS. PLACEMENT AND NUMBER OF LANDSCAPING DRAINS ARE HIGHLY DEPENDENT ON GROUND COVER TYPE AND PLANT MATERIAL. CONTRACTOR SHALL ADD ADDITIONAL AREA DRAINS AS NEEDED AND AS DIRECTED BY THE LANDSCAPE ARCHITECT.
7. ALL DOWN SPOUTS SHALL DISCHARGE DIRECTLY ON TO ADJACENT PERVIOUS SURFACES OR SPLASH BLOCKS UNLESS OTHERWISE NOTED ON PLANS. SEE ARCHITECTURE PLANS FOR EXACT LOCATION OF THE DOWN SPOUTS.

SANITARY SEWER NOTES

1. ALL SEWER WORK SHALL BE IN CONFORMANCE WITH THE COUNTY ENVIRONMENTAL HEALTH DEPARTMENT STANDARDS.
2. PRIVATE SANITARY SEWER MAIN AND SERVICE LINE 4–INCH THROUGH 8–INCH SHALL BE POLYVINYL CHLORIDE (PVC) SDR 26 GREEN SEWER PIPE AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 3034–73 WITH BELL AND SPIGOT CONNECTIONS. ALL DIRECTION CHANGES SHALL BE MADE WITH WYE CONNECTIONS, 22.5° ELBOWS OR 45° ELBOWS, 90° ELBOWS AND TEE'S ARE PROHIBITED.
3. ALL LATERALS SHALL HAVE A TWO WAY CLEANOUT AT FACE OF BUILDING AND AS SHOWN ON PLANS.
4. IF (E) SEWER LATERAL IS TO BE USED, CONTRACTOR SHALL VIDEO INSPECT, PERFORM PRESSURE TEST ON (E) SEWER LATERAL, AND SHALL PERFORM ANY NEEDED REPAIRS.

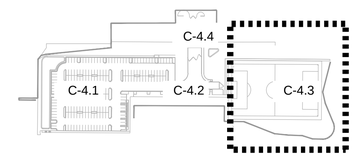
WATER SYSTEM NOTES

1. MAINTAIN WATER MAIN LINES 10' AWAY FROM SANITARY SEWER MAIN LINES. LATERALS SHALL BE SEPARATED PER PLAN DIMENSIONS.
2. WHERE WATER LINES HAVE TO CROSS SANITARY SEWER LINES, DO SO AT A 90 DEGREE ANGLE AND WATER LINES SHALL BE MINIMUM OF 12" ABOVE TOP OF SANITARY SEWER LINES.
3. ALL WATER SERVICE CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE WATER DISTRICT STANDARDS.
4. ALL WATER LINES SHALL BE INSTALLED WITH 36" MINIMUM COVER.
5. THRUST RESTRAINTS SHALL BE DESIGNED AND INSTALLED AT ALL TEES, CROSSES, BENDS (HORIZONTAL AND VERTICAL), AT SIZE CHANGES AND AT FIRE HYDRANTS.
6. ALL BURIED METALLIC PRESSURE PIPING SHALL BE PROTECTED AGAINST CORROSION.

GENERAL UTILITY NOTES

1. WHERE UTILITY TRENCHES EXTEND FROM THE EXTERIOR TO THE INTERIOR LIMITS OF THE RESTROOM BUILDING OR PAVEMENT, A 1–SACK SAND–CEMENT SLURRY MIX SHALL BE USED AS BACKFILL MATERIAL FOR A DISTANCE OF 2 FEET LATERALLY ON EACH SIDE OF THE BUILDING OR PAVEMENT LIMITS TO REDUCE THE POTENTIAL FOR THE TRENCH TO ACT AS A CONDUIT FOR EXTERIOR SURFACE WATER. UTILITY TRENCHES LOCATED IN LANDSCAPED AREAS SHALL BE CAPPED WITH A MINIMUM OF 12 INCHES OF COMPACTED ON–SITE CLAYEY SOIL.

KEY MAP



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SANDIS

ACCEPTED FOR USE:

JOHN SAMUELSON
City Engineer
Date: ____

City of Pittsburg

PITTSBURG PREMIER FIELDS
UTILITY PLAN

BY	DESCRIPTION	REV	DATE

DRAWN: LS
CHECKED: SC
REVIEWED: DL
DATE: 10/07/24
SCALE: AS NOTE

SHEET NO.
20 OF 78

DWG. NO.
C-4.3