Project No.
9769.000.000

April 4, 2019
Revised April 23, 2019

Mr. Mike O'Hara
North Waterfront Cove LLC
3500 Douglas Boulevard, Suite 270
Roseville, CA 95661

Subject: Encinal Terminals
Alameda, California

RESPONSE TO BCDC ECRB COMMENTS – FIRST APPROVED MOTION

Dear Mr. O'Hara:

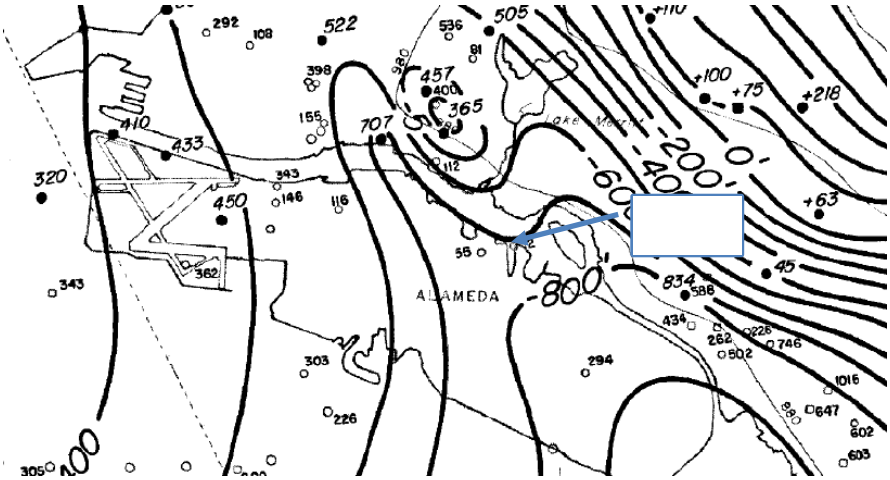
We prepared this letter to respond to comments orally provided to us at the January 24, 2019, meeting of the Bay Conservation and Development Commission (BCDC) Engineering Criteria Review Board (ECRB) regarding review of the proposed redevelopment of Encinal Terminals in Alameda, California. We received a draft of the meeting minutes that are not yet approved. In this letter, we address the first approved motion and discussion related to that motion. We introduce the topics below (in plain text) then quote the comments from the draft minutes (in italics), followed by our response (in bold).

1. There was discussion by Board Chair Borcherdt and Board Member French regarding the approach taken to perform the site response analysis and concern that the analysis was not performed by inputting the ground motions at bedrock in the seismic response models.

   Committee Member French noted that there will be a contribution in the soil response if you look at it from the point of view of input motions at the base of the rock, and *Committee Member French asked if there had been a lot of response coming up through fairly thick Old Bay Clay.* And *Chair Borcherdt stated that the thicker sections will contribute to the longer periods, and that is of interest with respect to this project: because of the extent of the wharf, some of these longer periods are going to come into play. And the Board's approved motion requires the designers to ensure that site responses down to 500 feet are taken into account.*

   We performed our site-specific ground motion response analyses in accordance with the American Society of Civil Engineers Standard ASCE 7-10, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures." In particular, we point out Section 21.1.2 which states, "Where very deep soil profiles make the development of a soil model to bedrock impractical, the model is permitted to be terminated where the soil stiffness is at least as great as the values used to define Site Class D in Chapter 20." According to "Engineering Geologic Site Characterization of the Greater Oakland-Alameda Area, Alameda and San Francisco Counties, California," by Rogers/Pacific Inc. (1991), the depth of bedrock at the site is approximately 700 feet or more (Figure 1 of 7). Therefore, in accordance with ASCE 7-10, we created a site-specific target spectrum for a Site Class D, including basin effects due to 600 feet of soil above the bedrock and matched our selected earthquake time histories to this target before inputting them at the base of our ground response and Plaxis models.

EXHIBIT 1: Excerpt of Figure 1 from Rogers/Pacific Inc. (1991)
Contours of the depth to bedrock in feet below Sea Level



2. There was a question by Board Member French about the assumption of the liquefaction state of fill to the waterside of the DSM in the development of p-y springs provided to Moffatt & Nichol for analysis of kinematic loads.

   Committee Member French asked them to consider what could happen when some of the fill is not liquefied and is sitting on top of the liquefied material.

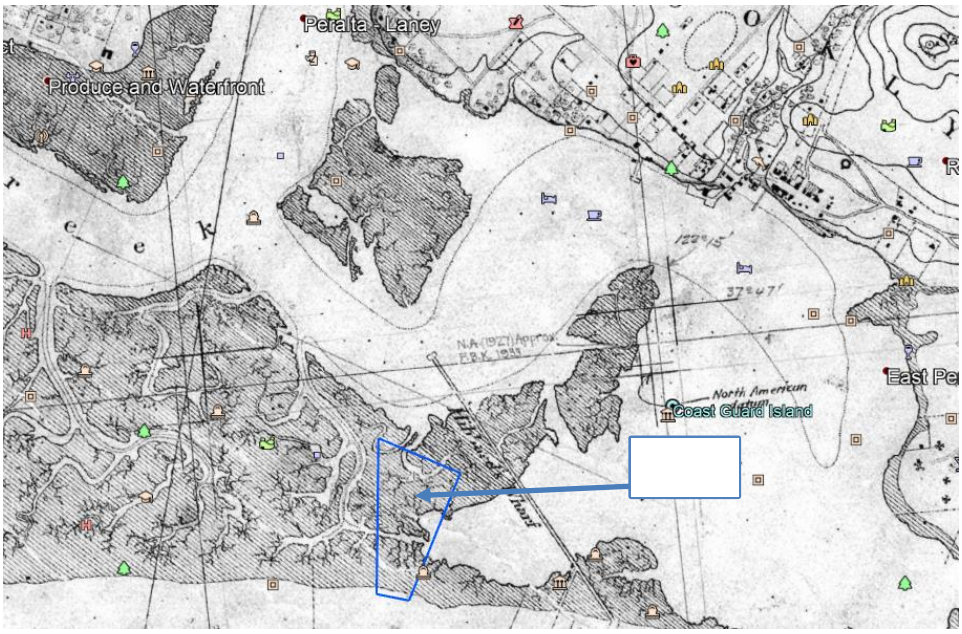
   This question applies to our Section 2-2' where the wharf was constructed above an area where significant fill was placed. In this area, we developed our p-y springs assuming non-liquefied soil parameters (see Table 8). We judged this to be a conservative assumption as the non-liquefied springs are stiffer than those of liquefied soil; so the estimated kinematic loads are higher with this assumption.

3. There was concern by Board Member Gilpin regarding the site characterization and the geomorphology of the site matching the analysis cross sections. In particular, there was question regarding the accuracy of the Cone Penetration Tests and Young Bay Mud in relation to the historic mapped shoreline.

   Committee Member Gilpin requested to see a contour map. Committee Member French agreed that it would be good to make sure that the stratigraphy makes sense geomorphologically. And the Board's approved motion requires the designers *to provide a geotechnical contour map with thicknesses and elevations.*

   For the purposes of clarity, the majority of the site was mapped as a marsh prior to development. The following image shows an overlay of the site boundaries (in blue) over the 1856 US Coast Survey of the San Francisco Bay. Exhibit 2 shows an excerpt of the shoreline map with the Encinal Terminals site added.

EXHIBIT 2: Map of 1956 Historic Shoreline with Site Boundary Overlay



The shoreline shown in our report is the intertidal shoreline with the marsh terminating near the southern end of the site. The majority of the existing site boundaries were created by dredging into the marsh. As can be seen in the "Contours of the Bottom of the Younger Bay Mud," Plate 3 in Special Report 97 (SR97) by the California Division of Mines and Geology, there is a known "Bay Mud Trough" that runs East to West through the Northern portion of Alameda Island. The mapping in SR97 indicates the trough terminates to the West of The Encinal Terminals site. Exhibit 3 shows an excerpt of the map in SR97. This same Bay Mud Trough is shown in less detail in Figure 7 of 7 from Rogers/Pacific Inc. (1991) as shown in Exhibit 4.

EXHIBIT 3: Excerpt from SR97
Contours of the depth to bottom of Young Bay Mud below Sea Level

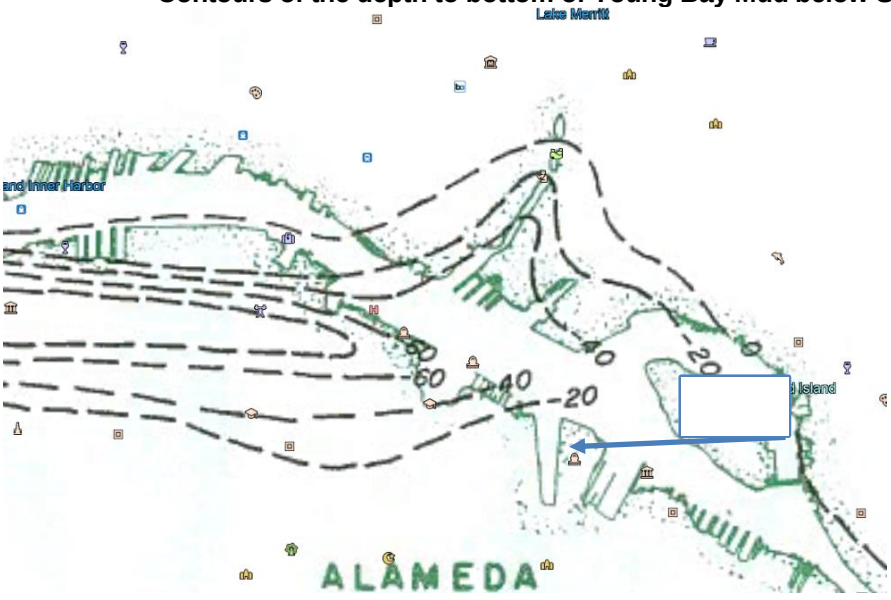
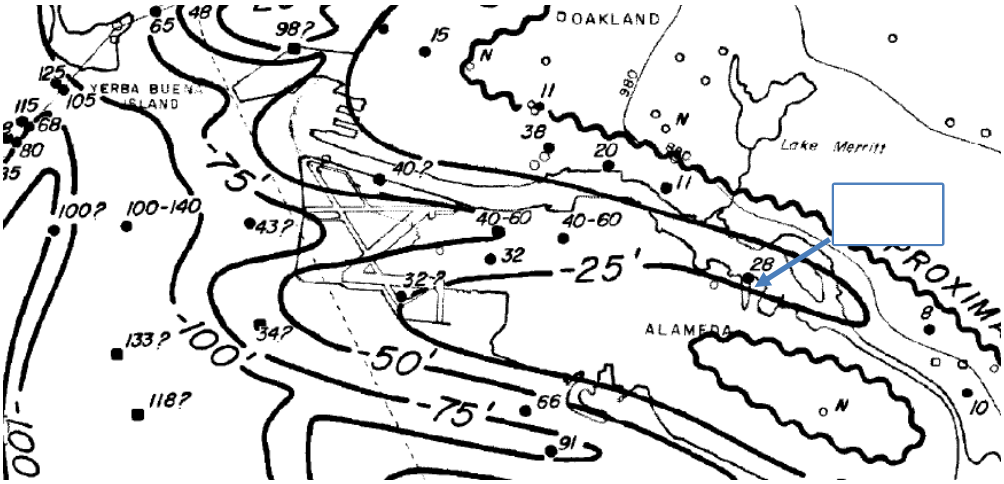


EXHIBIT 4: Excerpt of Figure 7 from Rogers/Pacific Inc. (1991)
Contours of the of the bottom of Young Bay Mud layer in feet below Sea Level



Our site-specific information indicates that the contour map in the Rogers/Pacific Inc. is relatively correct for the -25-foot contour but that at the northern end of the Encinal Terminals site, the increase in thickness of Young Bay Mud is greater than indicated by the contours. As discussed at the ECRB meeting, we believe we have sufficient amount and distribution of subsurface information to characterize the site for analysis. The primary layers of importance for our analysis are the fill and Young Bay Mud. While a large percentage of our explorations are cone penetration tests (CPTs), we are able to calibrate the soil layering using the matched pairs (borings and CPTs in proximity) at Boring B1-4 and CPT 2-CPT03 and Boring B1-5 and CPT 4-CPT05. We are comfortable that the CPTs are appropriate for determining the thicknesses of the fill and YBM layers. As requested and based on our site characterization, Figures 1, 2, and 3, attached, show our maps of contours of fill thickness, Young Bay Mud thickness, and elevation of the bottom of Young Bay Mud (in project datum), respectively.

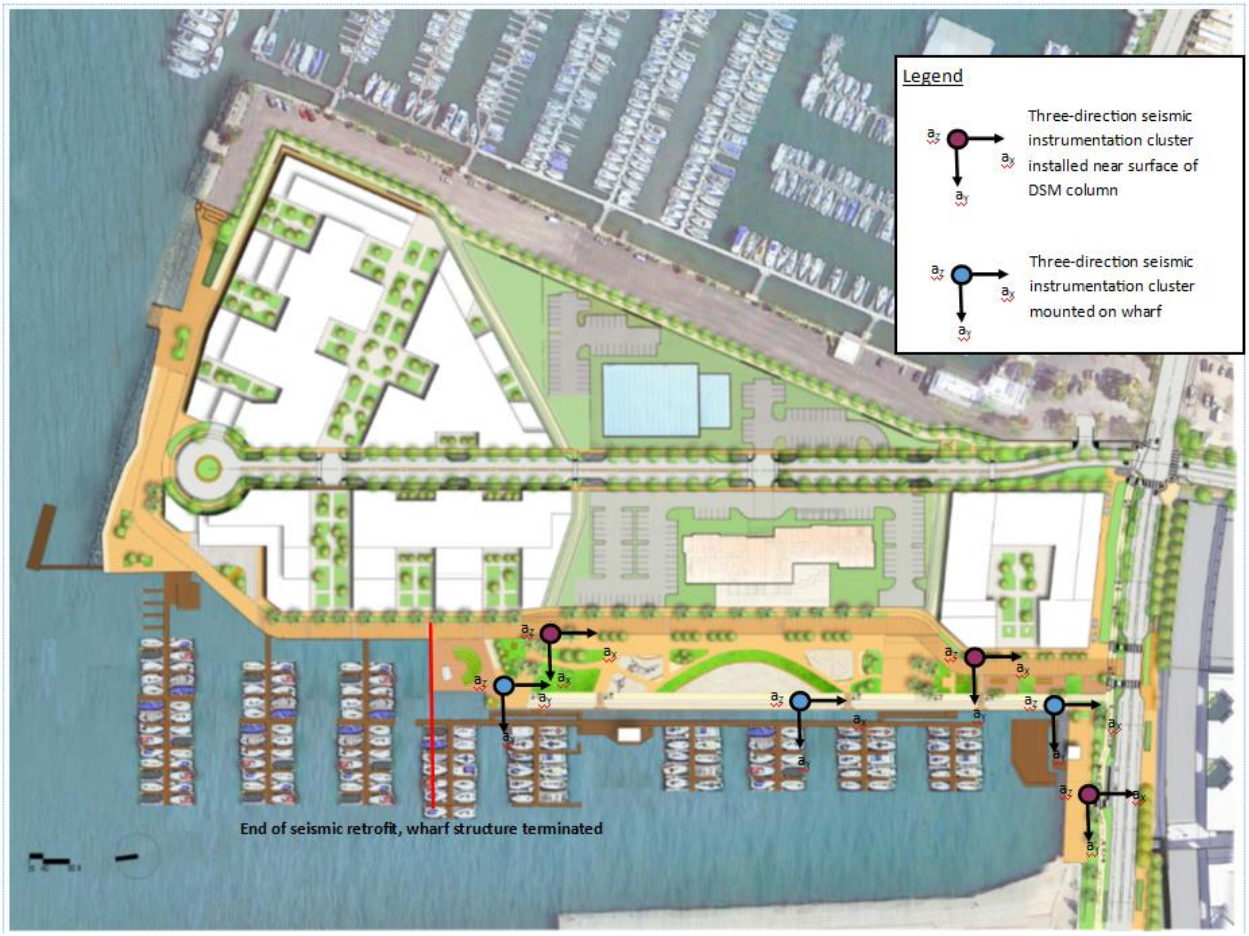
4. There was a request by Board Member Borcherdt related to an Instrumentation Plan.

   He noted that this seems like an ideal opportunity to put in some instrumentation in a cost-effective way. He requested the applicant to come back with an instrumentation plan.

   Based on the similarity of the projects and conversation during the meeting, we understand the approach of the instrumentation plan for the Alameda Landing project is considered appropriate by the board for the Encinal Terminals project. The Alameda Landing wharf is approximately 1,435 feet in length and has an angle. The wharf will have Deep Soil Mixing performed similarly to Encinal Terminals for the purpose of seismic slope stability. At the Encinal Terminals project, approximately 1,100 lineal feet of wharf will be retrofit, along with approximately 230 lineal feet of steel sheetpile bulkhead along the southern terminus.

   Similarly to Alameda Landing, we recommend mounting three-direction strong ground accelerometer clusters at three locations on the wharf, two locations near the top of the Deep Soil Mixed soil behind the wharf and one location near the top of the Deep Soil Mixed soil behind the steel sheetpile bulkhead. Exhibit 5 shows this program conceptually. Depending on resolution of the approach to the northern portion of the wharf, we may recommend an instrument on this portion of wharf. We will work with staff at the California Strong Motion Instrumentation Program to finalize this instrumentation plan.

EXHIBIT 5: Conceptual Seismic Instrumentation Plan



5. The final portion of the approved Motion says:

and to clarify for staff the public access criteria for the wharf.

Based on discussions with BCDC staff, we understand that this comment should be interpreted to apply to the retrofit portion of the wharf, as the first approved motion related to the retrofit portion of the wharf. Exhibit 5 shows the approximate boundary of the retrofit portion of the wharf as the location of the red line; beyond that point, the wharf will be terminated. Within the retrofit portion of the project, the engineering criteria for the wharf include the use of the BES-2 level earthquake (per ASCE 41) developed using site-specific site response analysis as the seismic input. We provided estimates of seismic lateral deformation of the soil below the wharf based on numerical modeling with recorded time histories scaled to the site. The wharf performance under inertial and kinematic loading at the BSE-2 level earthquake was evaluated using the structural performance guidelines in ASCE 61. We are in communications with BCDC staff regarding response to the second approved motion.

If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Jeff Fippin, GE

Pedro Espinosa, GE

J. Brooks Ramsdell, CEG

Bahareh Heidarzadeh, PhD, PE

David Teague, PhD, PE

Uri Eliahu, GE

jf/pe/jbr/bh/dt/ue/cjn

Attachments: List of Selected References
Figure 1 – Base of Young Bay Mud Elevation Contours
Figure 2 – Thickness of Young Bay Mud
Figure 3 – Thickness of Existing Fill

LIST OF SELECTED REFERENCES

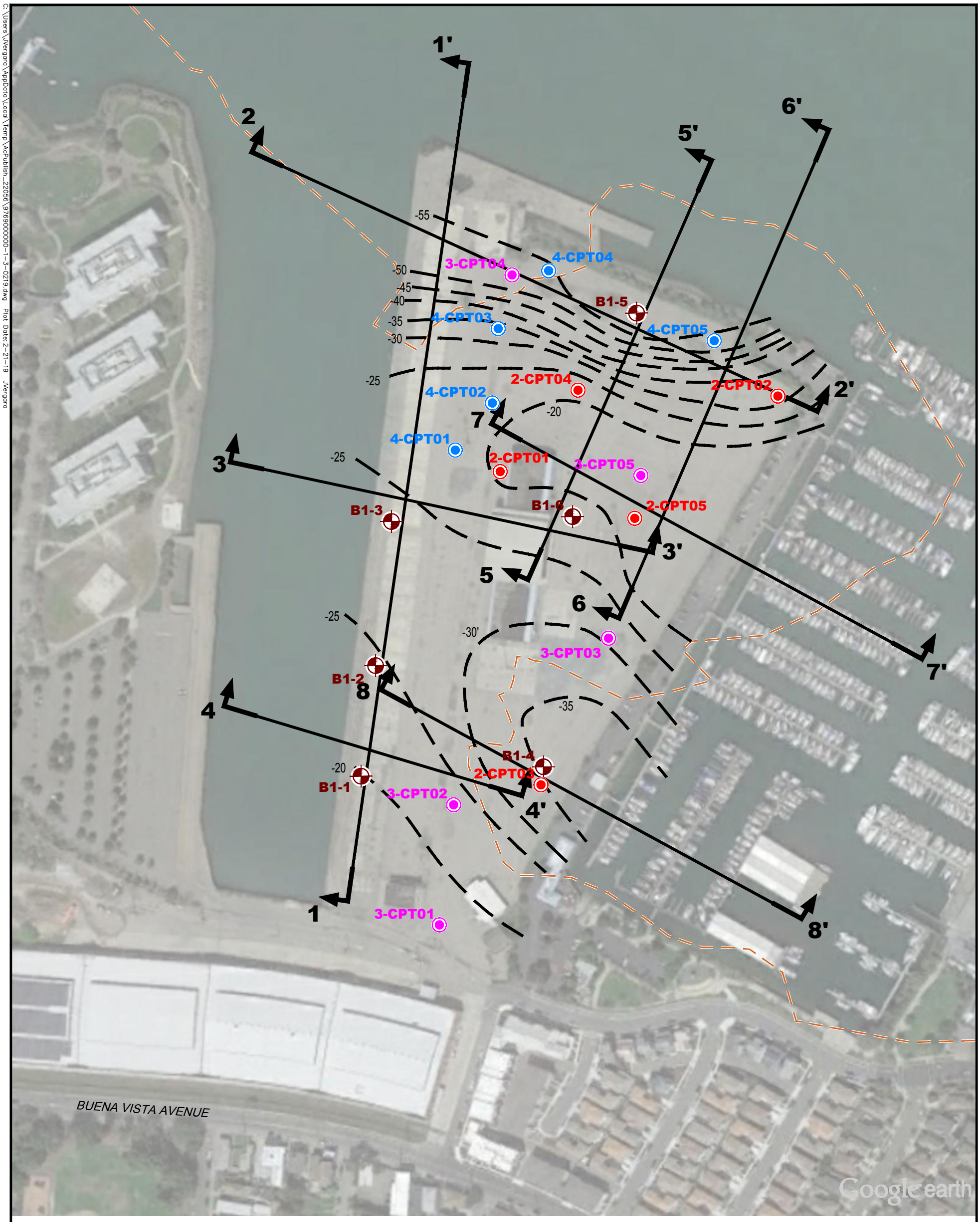
California Division of Mines and Geology, 1969, Special Report 97, Geologic and Engineering Aspects of San Francisco Bay Fill.

ENGEO, 2017, Updated Geotechnical Report, Encinal Terminals, Alameda County, California, Project No. 9769.000.000, October 2, 2017.

ENGEO, 2018a, Slope Stability Analysis with Ground Improvement, Encinal Terminals, Alameda, California, Project No. 9760.000.000, Revised November 15, 2018.

ENGEO, 2018b, Supplemental Geotechnical Exploration, Alaska Basin Bulkhead, Alameda, California, Project No. 9769.000.001, Revised November 15, 2018.

Rogers/Pacific, Inc., 1991, Engineering Geologic Site Characterization of the Greater Oakland-Alameda Area, Alameda and San Francisco Counties, California, Grant No. BCS – 9003785, December 30, 1991.



N

0 200
FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 4-CPT05 — CONE PENETRATION TEST (ENGEO, JULY 2013)
- 3-CPT05 — CONE PENETRATION TEST (ENGEO, JANUARY 2013)
- 2-CPT05 — CONE PENETRATION TEST (ENGEO, NOVEMBER 2012)
- B1-6 — BORING (ENGEO, JANUARY 2013)
- HISTORIC SHORELINE (1885)
- -55 — BASE OF YOUNG BAY MUD ELEVATION
- 8 — 8' — CROSS SECTION LOCATION

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

NOTE: DATUM BASED ON CITY OF ALAMEDA

ENGEO — Expect Excellence

BASE OF YOUNG BAY MUD ELEVATION CONTOURS

ENCINAL TERMINALS

ALAMEDA, CALIFORNIA

PROJECT NO.: 9769.000.000	FIGURE NO. 1
SCALE: AS SHOWN	
DRAWN BY: JV	CHECKED BY: JAF

ORIGINAL FIGURE PRINTED IN COLOR

1' 2 2' 3 3' 4 4' 5 5' 6 6' 7 7' 8 8'

55 45 35 25 15 25 25 15 0

3-CPT04 4-CPT04 B1-5 4-CPT03 4-CPT05 2-CPT04 2-CPT02 4-CPT02 4-CPT01 2-CPT01 3-CPT05 B1-3 B1-6 2-CPT05 3-CPT03 B1-2 B1-4 2-CPT03 B1-1 3-CPT02 3-CPT01

BUENA VISTA AVENUE

Google earth

N

0 200
FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 4-CPT05 — CONE PENETRATION TEST (ENGEO, JULY 2013)
- 3-CPT05 — CONE PENETRATION TEST (ENGEO, JANUARY 2013)
- 2-CPT05 — CONE PENETRATION TEST (ENGEO, NOVEMBER 2012)
- B1-6 — BORING (ENGEO, JANUARY 2013)
- HISTORIC SHORELINE (1885)
- -55 — ISOPACH OF YOUNG BAY MUD
- 8 8' — CROSS SECTION LOCATION

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

NOTE: DATUM BASED ON CITY OF ALAMEDA

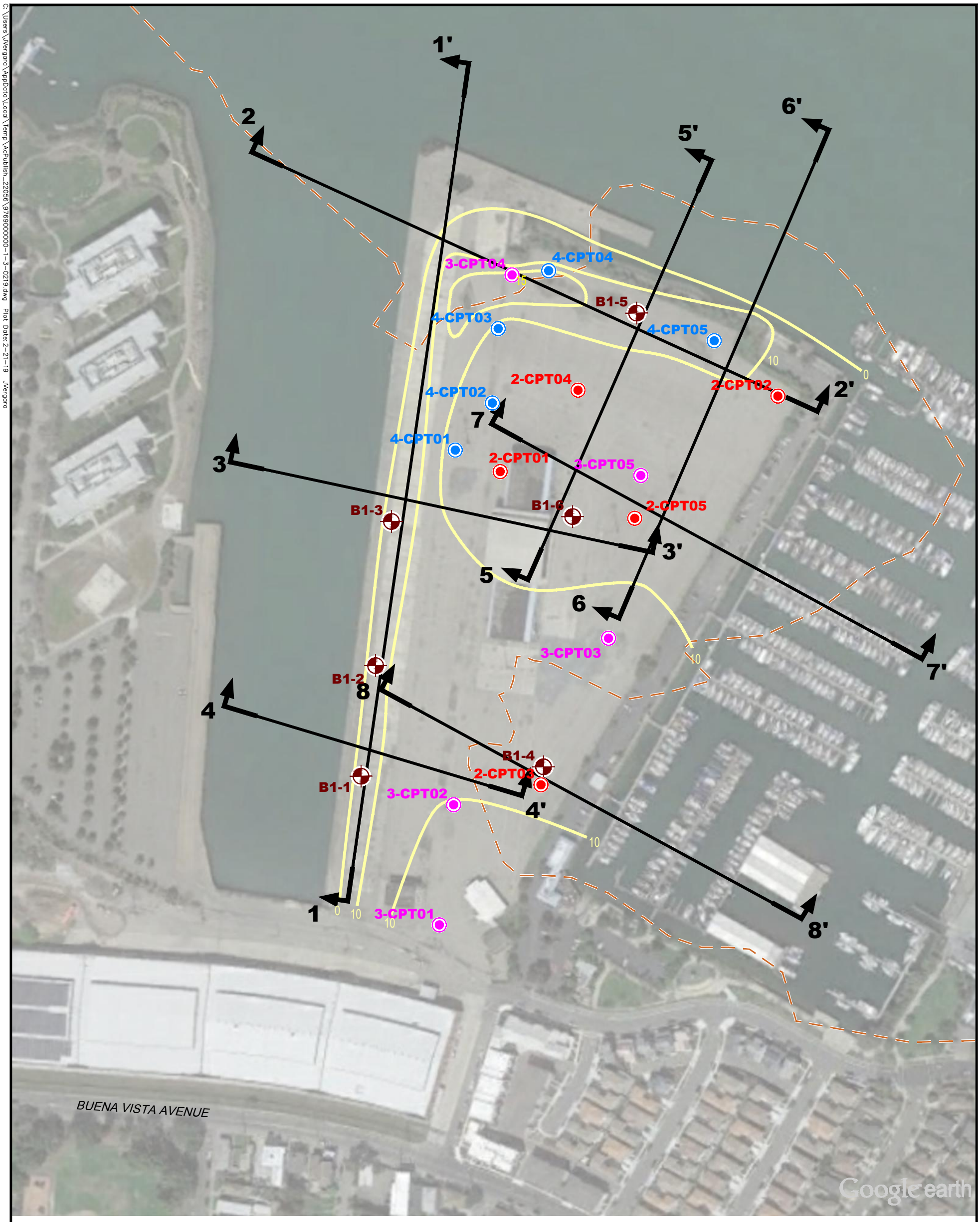
ENGEO — Expect Excellence

THICKNESS OF YOUNG BAY MUD
ENCINAL TERMINALS
ALAMEDA, CALIFORNIA

PROJECT NO.: 9769.000.000
SCALE: AS SHOWN
DRAWN BY: JV
CHECKED BY: JAF

FIGURE NO. 2

ORIGINAL FIGURE PRINTED IN COLOR



N

0 200
FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 4-CPT05 — CONE PENETRATION TEST (ENGEO, JULY 2013)
- 3-CPT05 — CONE PENETRATION TEST (ENGEO, JANUARY 2013)
- 2-CPT05 — CONE PENETRATION TEST (ENGEO, NOVEMBER 2012)
- B1-6 — BORING (ENGEO, JANUARY 2013)
- HISTORIC SHORELINE (1885)
- 15 — ISOPACH OF EXISTING FILL
- 8 — 8' — CROSS SECTION LOCATION

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

NOTE: DATUM BASED ON CITY OF ALAMEDA

ENGEO — Expect Excellence

THICKNESS OF EXISTING FILL
ENCINAL TERMINALS
ALAMEDA, CALIFORNIA

PROJECT NO.: 9769.000.000
SCALE: AS SHOWN
DRAWN BY: JV
CHECKED BY: JAF

FIGURE NO. 3

ORIGINAL FIGURE PRINTED IN COLOR