

June 13, 2022
Project No. 403215002

Mr. Jesse Walker
2035 North Pacific Avenue
Santa Cruz, California 95060

Subject: Response to City of Santa Cruz Comments
Proposed Office/Residential Building
2035 North Pacific Avenue
Santa Cruz, California

Dear Mr. Walker:

Based on the information provided by you, we understand that the City of Santa Cruz (City) has requested additional information regarding the removal of the buried gas holder tank foundation that underlies the northern portion of the subject site. Their concerns are summarized in a letter prepared by Barg, Coffin, Lewis & Trapp (BCLT), LLP, dated June 10, 2021. This letter report presents our response to the City's comments regarding the geotechnical and environmental aspects of removing the concrete gas holder tank foundation.

Background Information

The subject gas holder tank was part of the Santa Cruz Manufactured Gas Plant (MGP) site that was in operation between 1867 and 1930 (Terra Pacific Group [TPG], 2016). The above-ground portion of the tank was removed many years ago and the concrete foundation was left in-place. According to maps included in reports prepared by the TPG (2013 and 2016), the subject tank foundation is located in the northern portion of the subject property below the asphalt paved parking lot, and extends north of the northern property line into 201-217 River Street (Figure 1). According to the TPG (2013) report, the concrete foundation is approximately 50 feet in diameter with 1.5 feet thick concrete walls, and the top of the foundation walls are buried approximately 0.5 to 2 feet below the ground surface. They also state that the bottom of the tank slopes toward the perimeter of the tank, with the center of the tank lying at a depth of about 8.5 feet and the perimeter at a depth of about 14 feet below the ground surface. The approximate location and subsurface conditions surrounding the tank foundation are shown on Cross-Sections A-A' and B-B' (Figures 2 and 3).

According to the TPG (2013 and 2016) maps, the northern perimeter of the tank foundation lies very close to the building footprint at 201-217 River Street (Figure 1). Based on the information provided in the TPG report, the tank foundation underlying 201-217 River Street was not removed during construction of the current building. In addition, we do not know the type of foundation that supports the building at 201-217 River Street.

According to the TPG (2013) report, dewatering activities to remove the groundwater inside the holder tank were performed between December 18, 2012 and January 18, 2013. Prior to the dewatering program, soil was removed along the southern perimeter of the tank to depths of about 3 to 13 feet (see Figure 1). The dewatering program included the installation of nine dewatering wells (RW series on Figure 1) varying in depth from approximately 8 to 14 feet within the walls of the tank. The depth to water prior to dewatering was measured at approximately 5 feet below ground surface (bgs), and approximately 7 bgs after two phases of pumping. Based on the pumping rates measured during the dewatering program, TPG (2013) concluded that dewatering of the remaining groundwater from the tank could take several months.

Summary of Subsurface Conditions

The northern end of the subject property is underlain by fill and alluvium overlying sedimentary bedrock of the Santa Cruz Mudstone. The surficial deposits of fill and alluvium thicken to the east toward North Pacific Avenue (Figure 2). Shoring along the northern end of the excavation for the proposed underground parking garage will transition from shallow bedrock conditions at the west end to surficial deposits of fill and alluvium at the eastern end next to North Pacific Avenue (Figures 1 and 2). The shoring wall will also encounter the buried gas holder tank foundation (Figures 2 and 3).

Groundwater depths measured from onsite monitoring wells (TPG, 2012 and 2013) and soil borings and CPTs (Ninyo & Moore, 2018), indicate that the depth to groundwater varies across the property from about 7 to 16 feet. Groundwater measurements in monitoring wells MW-4 and MW-5, which are located southeast of the buried tank (Figure 1), varied in depth from about 7.2 to 11.0 feet and 13.4 to 14.3 feet, respectively, between October 2008 and April 2012 (TPG, 2012). Depths to groundwater estimates in the two CPT soundings from our previous report (Ninyo & Moore, 2018) were both approximately 16 feet.

According to TPG (2013), perched groundwater was present inside the buried tank and varied in depth from about 5 to 7 feet below the ground surface at the time of their evaluation in December 2012 and January 2013. It is our understanding that the RW series of monitoring wells (RW-1 through RW-9) within the limits of the tank have been destroyed (TPG, 2013), but monitoring wells MW-4 and MW-5 are still present onsite (Figure 1).

Geotechnical and Environmental Concerns

Based on our correspondence with you and the information provided in the BCLT (2021) letter, it is our understanding that the City has requested additional geotechnical and environmental information regarding the following issues:

1. Geotechnical evaluation that addresses removal of the gas holder tank foundation, including a description of how the concrete tank will be removed.
2. Anticipated area and volume of excavation to remove the gas holder tank.
3. Stability of the ascending natural slope along the western property boundary.
4. Sequencing of environmental analytical testing (soil profiling) prior to or during removal operations.

Item 1 – Gas Holder Tank Foundation Removal

Based on our review and the results of our previous 2018 site evaluation (Ninyo & Moore, 2018), it is our opinion that removal of the buried concrete tank foundation is geotechnically feasible provided that the recommendations provided herein are incorporated into the shoring and dewatering designs for the excavation of the proposed underground parking garage. Geotechnical design parameters provided in Section 10.4 of our 2018 evaluation remain applicable.

The following should be considered:

- Design and installation of a cutoff wall along the northern and eastern sides of the excavation for the proposed underground parking garage. Design of the cutoff wall should take into consideration drilling through both the bottom of the tank and the foundation walls, the perched groundwater conditions within the tank, and the potentially loose/wet materials inside the tank. The cutoff wall should be installed prior to removal of any materials inside the buried gas holder tank. Casing should be anticipated for any drilled shafts excavated inside the limits of the holder tank and in the alluvium.
- Design and installation of a dewatering system taking into account the perched groundwater conditions inside the tank and the variations in groundwater depth outside the tank.
- Demolition of the concrete walls and bottom should be performed using low vibratory techniques, such as pressure bursting or similar methods used for removal of concrete inside existing structures.

- Development and implementation of a construction monitoring program per the recommendations provided in Section 11 of our 2018 report (Ninyo & Moore, 2018).

The owner should retain a qualified and experienced engineer to design the shoring and dewatering systems. The shoring and dewatering recommendations presented in our 2018 report and this report are minimum requirements, and the shoring and dewatering designers should evaluate the adequacy of these recommendations and make the required modifications for their design.

Item 2 – Area and Volume of Gas Holder Tank

The estimated removal area for the gas holder tank is approximately 2,500 square feet, which includes a 5 feet wide area around the perimeter of the tank. The volume of material inside the holder tank is estimated to be approximately 800 cubic yards.

Item 3 – Stability of Ascending Natural Slope and Below-Grade Parking Excavation

The ascending natural slope along the western side of the property is approximately 65 feet high and steeply inclined with residential properties along the top (Figure 2). The western side of the excavation for the proposed below-grade parking area will be about 10 feet away from the property line and close to the toe of the slope. Slope stability analyses were performed using the two-dimensional stability analysis program SLOPE/W modeling the long term (with proposed below-grade parking area in place) and temporary (i.e., during removal of the buried tank foundation) conditions in order to evaluate the impact of the proposed site improvements on the westerly ascending slope. Strength parameters used in our stability analyses were based on laboratory testing performed during our 2018 geotechnical evaluation (Ninyo & Moore, 2018). The results of the slope stability analyses indicate that the westerly ascending slope will have a factor of safety of 1.5 or higher in the long run when soldier piles are incorporated into the shoring design (Figure 4). Furthermore, the westerly ascending slope will have a factor of safety of about 1.4 (Figure 5) during the temporary condition (i.e., during removal of the buried tank foundation) incorporating soldier piles into the shoring. The factors of safety presented here indicate that the stability of the subject slope under long-term and temporary conditions will be acceptable and in conformance with the standard of care currently exercised in geotechnical engineering practice.

Item 4 – Soil Profiling

Prior to conducting any onsite investigations or remediation activities, the owner will enter into a Voluntary Cleanup Agreement (VCA) with DTSC. Once the VCA is established, and based on our review of the historical environmental documentation, a supplemental soil investigation will be conducted to identify the lateral and vertical extent of residual contaminants within the gas holder tank area as well as other site areas where known contamination still exists. The results of the investigation will assist in determining the extent of remedial actions needed for onsite soils and will be used for developing the site Removal Action Work Plan (RAW). The RAW will include, but not be limited to:

- An evaluation of existing site environmental conditions.
- The appropriate site cleanup goals.
- Identification of recommended remedial alternative that are protective of human health and the environment.
- A Human Health Risk Assessment (HHRA) discussing the potential risk of site constituents of concern to human health.

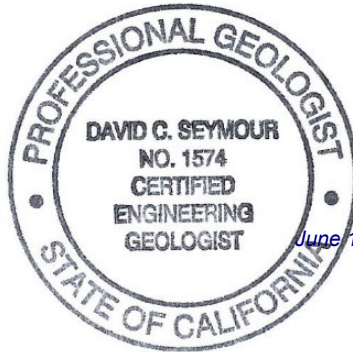
Subsequent to site remediation activities, a Remedial Action Completion Report (RACR) will be prepared to discuss construction oversight and site cleanup activities. The RACR will include a tabular representation of confirmation soil sample data, and figures with confirmation soil sample locations, along with appendices containing laboratory analytical reports.

Ninyo & Moore appreciates the opportunity to provide continued services on this project.

Sincerely,
NINYO & MOORE



David C. Seymour, PG, CEG
Principal Engineering Geologist



June 13, 2022



Soumitra Guha, PhD, PE, GE
Principal Engineer



June 13, 2022



Brandon S. Wilken, PG, QSD
Principal Geologist



June 13, 2022

DCS/SG/BSW/gvr

Attachments:

References

Figure 1 – Site Plan

Figure 2 – Cross Section A-A'

Figure 3 – Cross Section B-B'

Figure 4 – Slope Stability Results – Final Condition

Figure 5 – Slope Stability Results – Temporary Condition

REFERENCES

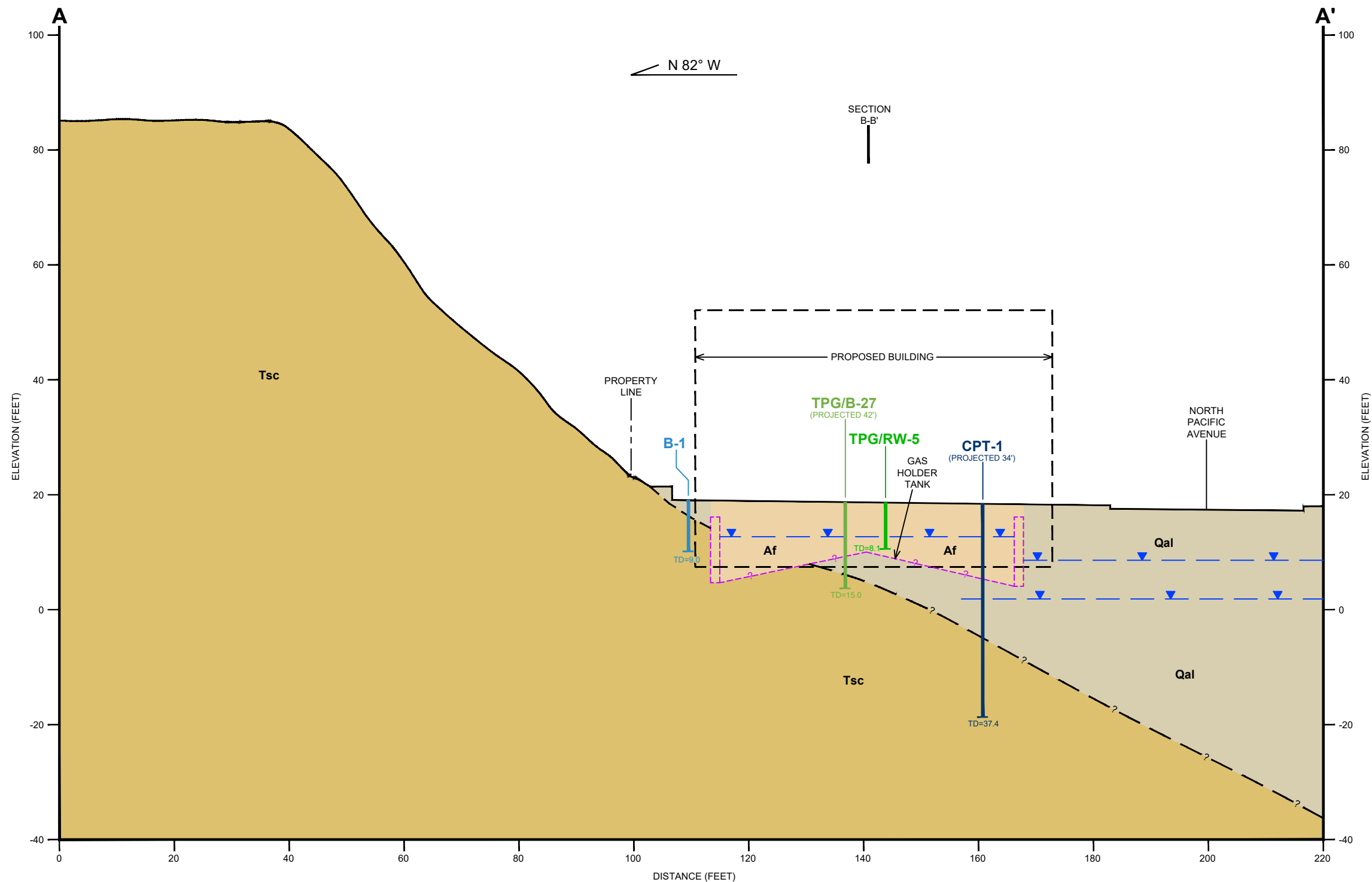
- Barg, Coffin, Lewis & Trapp, LLP, 2021, 2035 North Pacific Avenue, Office/Residential Building Project, Application No. CP19-0122, Comments on Mitigated Negative Declaration and Initial Study; Prepared on behalf of Pacific Gas and Electric Company (PG&E) and addressed to Ms. Clara Stanger, City of Santa Cruz, dated June 10.
- Ninyo & Moore, 2018, Geotechnical Evaluation, 2035 North Pacific Avenue, Santa Cruz, California, Project No. 403215001, dated May 21.
- Terra Pacific Group (TPG), 2012, April 2012 Groundwater Monitoring Report, Former Santa Cruz Manufactured Gas Plant Site, 201/211, 223, and 235 River Street, and 2027 and 2035 North Pacific Avenue, Santa Cruz, California, Project No. PGE-1030-100, prepared for Pacific Gas and Electric Company and Chevron Environmental Management Company, dated August 30.
- Terra Pacific Group (TPG), 2013, Summary of Conditions and Recommendations, Concrete Gas Holder Foundation, Former Santa Cruz Manufactured Gas Plant Site, 2035 North Pacific Avenue, Santa Cruz, California, Project No. PGE-1070-100, prepared for Pacific Gas and Electric Company and Chevron Environmental Management Company, dated March 29.
- Terra Pacific Group (TPG), 2016, Final Remedial Action Completion Report, Former Santa Cruz Manufactured Gas Plant Site, 201-217, 223, and 235 River Street, and 2027 and 2035 North Pacific Avenue, Santa Cruz, California, Project No. PGE-1070-100, prepared for Pacific Gas and Electric Company and Chevron Environmental Management Company, dated March 29.



FIGURES



FIGURE 1



LEGEND

Af	ARTIFICIAL FILL (INSIDE GAS HOLDER TANK FOUNDATION)		GROUNDWATER LEVEL	B-1	BORING (NINYO & MOORE); TD=TOTAL DEPTH IN FEET	TPG/B-27	BORING (TERRA PACIFIC GROUP); TD=TOTAL DEPTH IN FEET
Qal	ALLUVIUM HOLOCENE)		GEOLOGIC CONTACT; QUERIED WHERE UNCERTAIN	CPT-1	CONE PENETRATION TEST (NINYO & MOORE); TD=TOTAL DEPTH IN FEET	TPG/RW-5	MONITORING WELL (TERRA PACIFIC GROUP); TD=TOTAL DEPTH IN FEET
Tsc	SANTA CRUZ MUDSTONE (MIOCENE)						

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

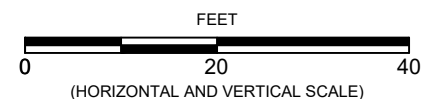
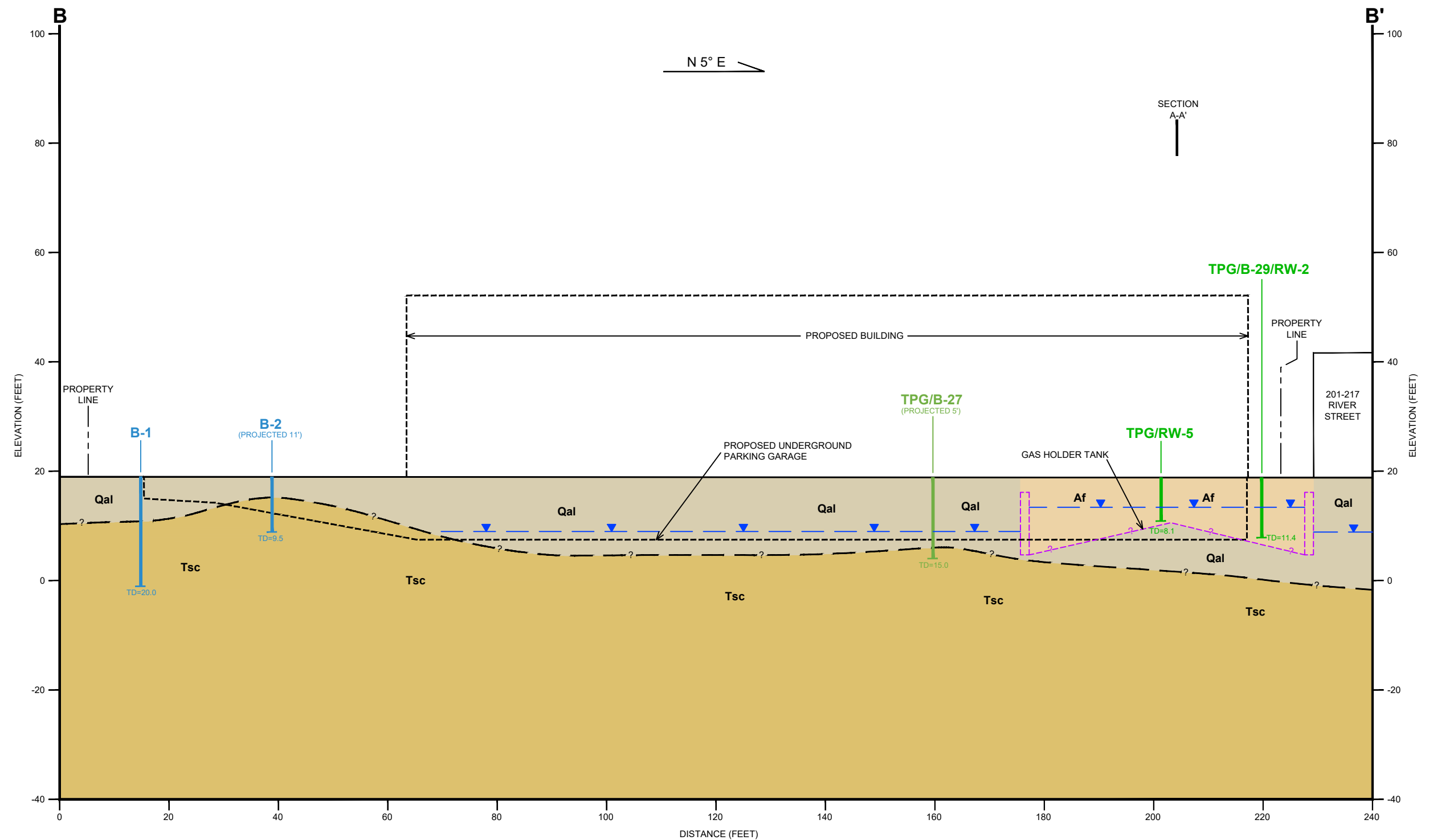
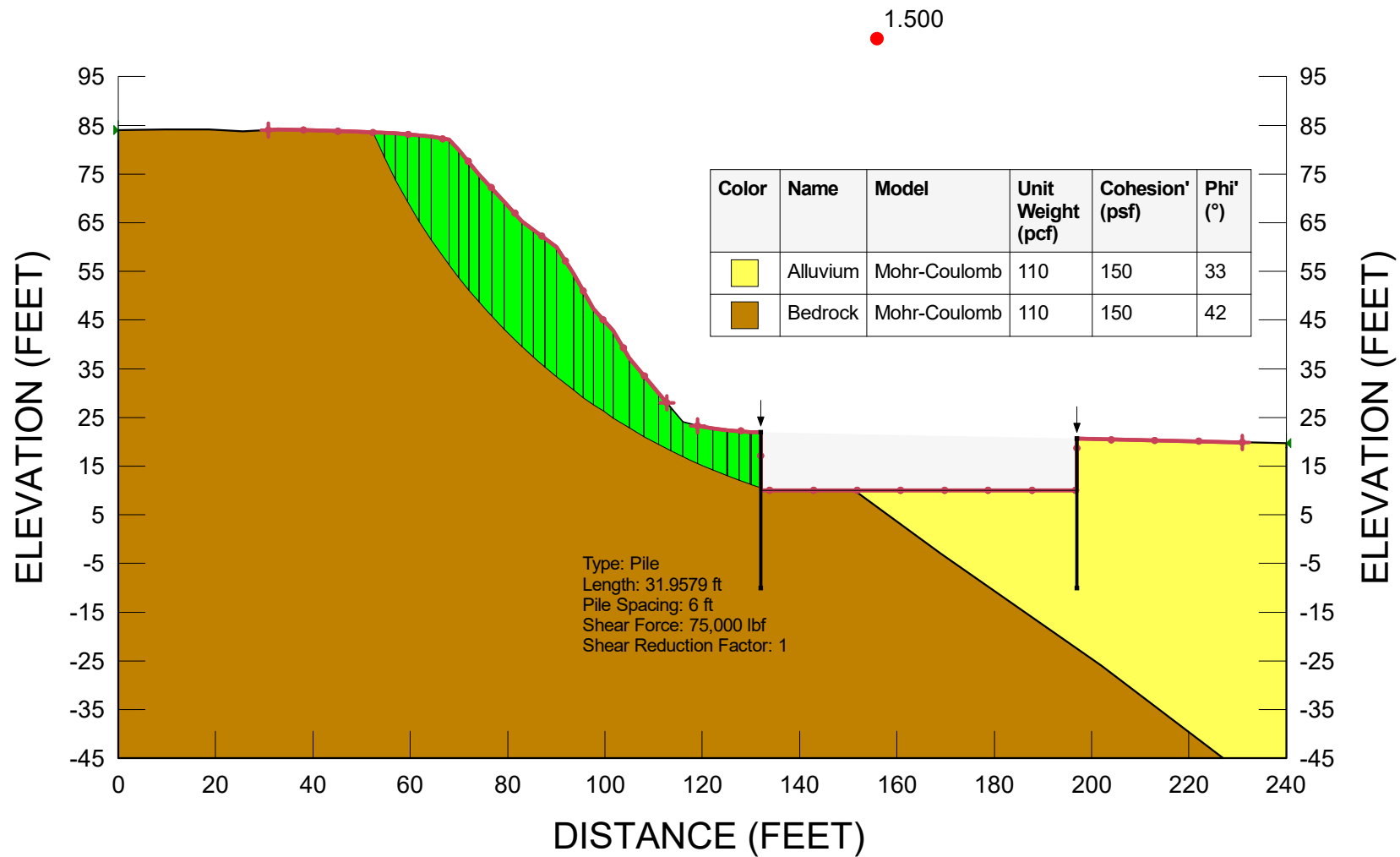


FIGURE 2

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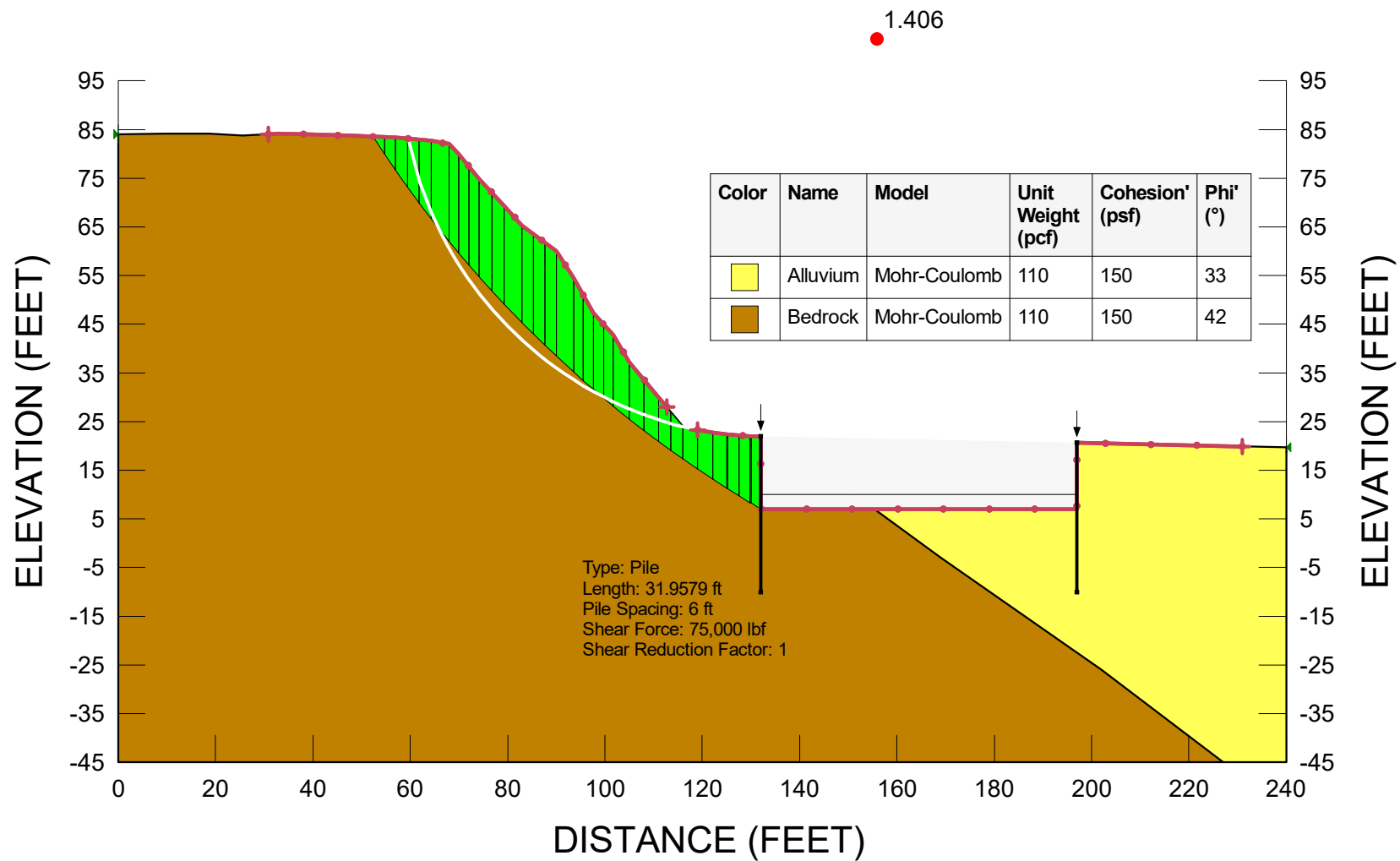


2035 N. PACIFIC AVENUE FIGURE 4 - FINAL CONDITION

SECTION A-A'

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2035 N. PACIFIC AVENUE FIGURE 5 - TEMPORARY CONDITION

SECTION A-A'

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