

May 27, 2022

The Garrett Companies
1051 Greenwood Springs Boulevard, Suite 101
Greenwood, IN 46143

Attention: Karl Stout

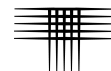
Subject: Geologic Hazard Evaluation
Citizen on Constitution
El Paso County, Colorado
CTL|T Project No. CS19460-105

This letter presents the results of our Geologic Hazard Evaluation for the proposed multi-family development to be located southwest of the intersection of Constitution Avenue and Marksheffel Road in El Paso County, Colorado (Fig. 1).

The purpose of our investigation was to evaluate potential geologic hazards that may impact development of the site. This letter contains descriptions of subsurface and groundwater conditions found in our exploratory borings and our opinion of the potential influence of the geologic conditions on planned structures and other site improvements. The report was prepared based on conditions found in our borings, results of laboratory tests, engineering analysis of field and laboratory data, and our experience. Site grading plans and updated development plans were provided to us for this evaluation. The information contained in this letter is intended to supplement the Geotechnical Investigation report for this site, CTL|T Project No. CS19460-125 dated November 16, 2021. Additional investigations will be required to develop design-level criteria for extension of Akers Drive. The scope was described in our Contract Modification dated May 19, 2022 (CTL|T Proposal No. CS-21-0114CM2).

PREVIOUS INVESTIGATIONS AND REVIEW COMMENTS

We prepared a Geotechnical Investigation for the proposed multi-family development (CTL|T Project No. CS19460-125, dated November 16, 2021). A total of twenty-eight borings were advanced at the site to depths of 20 to 30 feet. We understand a Geologic Hazards Evaluation (CTL|T Project No. CS19005-115, dated April 24, 2020) was reviewed by El Paso County and the Colorado Geological Survey (CGS) for the Citizen on Constitution project. This report was prepared for the site immediately to the west that is currently being developed as a for sale, residential duplex development by Richmond American Homes. Comments by CGS pertaining to the referenced Geotechnical Investigation and Geologic Hazards Evaluation were prepared by Mr. Jonathan R. Lovekin, P.G., Senior Engineering Geologist and submitted on May 3, 2022.



CGS Comment: “CGS recommends the geologic hazard report referenced on the Plat be expanded to include this site.”

CTL|T Response:

CTL|T agrees that a geologic hazard evaluation should be performed for the Citizen on Constitution site to meet the County’s development criteria and that evaluation is contained within this report. However, CTL|T disagrees that the CS19005-115 report which was prepared for a different type of development, on an adjacent property, for a different Client, should be “expanded” to include this site. While this report contained information about an adjacent property, the recommendations within were based on the proposed development type, and the expected final owner type, as discussed in the next comment response.

CGS Comment: “Plat Note #11 (Barron Land, 1/28/2022) references a geotechnical investigation and geologic hazard evaluation prepared by CTL Thompson Inc., dated April 24, 2020 (CTL|T Project No. CS19005-115). This referenced report does not include the ground proposed for construction of the Citizen on Constitution (SF226, located at 38.8673, -104.685) but addresses the ground adjacent and to the west. However, this previous investigation is relevant to this site as it addresses geologic hazards and constraints that should be expected at the Citizen on Constitution site.”

CTL|T Response:

CTL|T Project No. CS19005-115 was prepared for a different site with a different construction type, and recommendations from CS19005-115 are not applicable to this site. CTL|T did not offer that report for this site, nor were we aware of its reuse for this site. We do agree with CGS that CS19005-115 does offer some relevant, general information, but the report recommendations do not apply to this site or this type of construction.

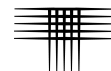
CGS Comment: CGS has indicated “The three different approaches to mitigation of the undocumented fill proposed by CTL (November 16, 2021) for this site include:

- no removal,
- utilizing a 4-foot-thick layer of new grading fill or sub-excavation backfill,
- evaluation of existing fill material during site grading with visual observations, probing, potholing, and field density tests.”

CTL|T Response:

This is a misinterpretation of the recommendations in our report. The following discussion is taken from the report (emphasis added for clarification):

“The most reliable approach to reduce risk of differential movement associated with variations of the existing fill is to remove



all existing, undocumented fill from below the proposed structures; however, this would result in substantial additional cost. We believe the existing fill **may remain below structures, provided the fill material is further evaluated by a representative of this office during site grading** and the owner accepts the risk of potential movements and associated damage. Utilizing a post-tension slab-on-grade foundation system as currently planned will significantly reduce this risk. Evaluation of existing fill material during site grading may include visual observations, probing, potholing, and field density tests. **The risk of excessive differential movement associated with undocumented fill can be reduced by constructing the buildings on at least a 4-foot-thick layer of new grading fill or sub-excavation backfill.”**

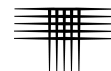
CGS states that CTL provided three different approaches to mitigation of the undocumented fill, with one approach indicating “no removal”. This is incorrect. We do not suggest any fill remain in place without evaluation. It is our opinion that decisions regarding risks and costs are commonly made by owners of commercial properties, such as this. We have offered a discussion of methods of remediation of the undocumented fill, each of which carry a cost and potential risk.

Five test pits were excavated at the site on October 25, 2021 to observe the quality of the fill for environmental reasons (CTL|T Project No. CS19460.000-205 letter dated October 28, 2021). Conditions were evaluated by both CTL|T environmental personnel and the geotechnical engineer for this project. These test pits, along with the drilling information, helped to form our opinions of appropriate recommendations concerning the fill. As these services were performed for environmental reasons, the data was not included in the Geotechnical Investigation. The total extents of fill, as well as the quality of the fill material will become more evident during grading. At that time, potholing and field density tests will be performed as needed to further evaluate the material. It was noted in our November 2021 report that relative densities observed in the fill as well as results of field penetration resistance testing are indicative that compaction effort was applied. If poorly compacted layers or otherwise unsuitable materials are identified, we will recommend removal and replacement. Furthermore, a post-tensioned slab-on-grade is designed to resist post-construction, differential movement that may be associated with ground heave or settlement, and includes a structurally integrated floor slab.

CGS Comment: *“CGS disagrees with the approach of the owner accepting this unquantified risk.”*

CTL|T Response:

This project is not a for sale product to individual owners who are unaware of geotechnical risks associated with construction. The project will include for-rent units developed by a commercial entity familiar with potential risks associated with land development and for-rent, multi-family construction. It is noted that The Garrett Companies is a nationally recognized business enterprise with experience in 17 states,



delivering over 56 Class A projects totaling over 14,000 units. We assume risk is thoroughly evaluated during their development process and risk management practices are employed during construction. As such, we believe The Garrett Companies should be involved in the decision making process regarding existing fill material and evaluate risks during their development process to make appropriate business decisions.

CGS Comment: *“In our experience, costs of structural distress from differential movement can eventually be higher than those associated with the removal and replacement of the undocumented fill. It would be prudent for the County to require settlement calculations or estimates on the potential differential settlement at this site so the owner can compare costs of removal and replacement versus long-term structural distress.”*

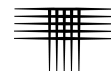
CTL|T Response:

This statement assumes that significant differential movement will occur. CTL|T does not provide recommendations that pose a high risk of damaging post-construction movement. CTL|T has identified the undocumented fill hazard as part of our investigation and includes that observation as part of this Geologic Hazard Evaluation. The Colorado Geological Survey is overstepping by commenting on engineering design considerations. The design of post-tensioned slabs-on-grade addresses potential differential movements within the recommendations. The El Paso County Engineering Criteria Manual does not include requirements for the disclosure of engineering calculations for geotechnical design. Values for heave, settlement and differential settlement are discussed in the Foundations section of our Geotechnical Investigation, based on our engineering analysis.

CGS Comment: *“It should be noted that the report of record on the plat and the geotechnical report conflict on mitigation for the undocumented fill. This can lead to confusion during construction. CGS recommends that an updated geologic hazard/geotechnical report be provided for the project that includes calculations and estimates of settlement for the different approaches for mitigating the undocumented fill. This updated report should then be referenced on the final plat.”*

CTL|T Response:

We agree. Reports not intended for the development should not be referenced. The Geologic Hazard Evaluation for this site is provided below in addition to our responses above to CGS’ geologic concerns. It is our opinion the geotechnical report and supplemental information should be referenced for geotechnical recommendations, not the survey plat, and that geotechnical recommendations should not be interpreted by the surveyor for inclusion on the plat.



GEOLOGIC HAZARD EVALUATION

SUBSURFACE CONDITIONS

Our firm investigated the subsurface conditions at the site in September 2021 by drilling twenty-eight exploratory borings. The approximate locations of the borings are shown in Fig. 1. The subsurface conditions are described in detail in our November 2021 Geotechnical Investigation report. Summary logs of our exploratory borings plotted to elevation along with the proposed finished floor elevations are provided in Appendix A. Five test pits were excavated at the site to evaluate the quality of the fill materials. Portion of the letter report discussing the materials are included in Appendix B.

GEOLOGIC HAZARDS AND ENGINEERING CONSTRAINTS

We did not identify geologic hazards that we believe preclude development of the project. Undocumented fill material and expansive soils were identified at the site and may pose a constraint to development. Regional geologic conditions that impact the site include and seismicity and radioactivity. We believe these conditions can be mitigated with engineering design and construction methods commonly employed in this area. Geologic hazards are discussed in greater detail in the sections that follow.

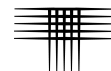
Site Geology

The surficial geology at the site was evaluated by reviewing published geologic maps. The Geologic Map of the Elsmere Quadrangle published by the Colorado Geological Survey in (Madole and Thorson, 2002) covers the project site.

The site is mapped as late Pleistocene-age eolian sand (wind-deposited sediment) consisting of very pale-brown, pale-brown, and light yellowish-brown sand with silt deposited as sand sheets, overlying the Dawson Formation. The Dawson Formation typically consists of sandstone interbedded with claystone in this area. Our subsurface investigation and observations generally confirm the mapping, although the site has been disturbed though prior use. A map of the site specific surficial geologic conditions is shown on Figure 2.

Expansive Soils and Bedrock

One of the more significant geologic hazards in Colorado is the presence of swelling clays in bedrock and surficial deposits. Moisture changes to bedrock or surficial deposits containing swelling clays can result in volumetric expansion and collapse of those units. Changes in soil moisture content can result from precipitation, irrigation, pipeline leakage, surface drainage, perched groundwater, drought, or other factors. Swelling of expansive soil and bedrock may cause excessive cracking and heaving of structures with shallow foundations, concrete slabs-on-grade, or pavements supported on these materials.



Samples were tested in the laboratory for swell/consolidation characteristics. Generally, sites are rated as low, medium, high or very high swell potential based on heave calculations utilizing swell test results. The rating of a site as low or high swell potential is not absolute. Rather, this represents a judgement. We judge this site to have a low risk of poor performance due to swelling soils. We believe expansive soils can be mitigated with engineering design and construction methods commonly employed in the area. The depth to the claystone at this site will mitigate the effects of potential heave from these materials.

Collapsible Soils

Eolian soils are occasionally susceptible to collapse. Soil collapse (or hydro-collapse) is a phenomenon where soils undergo a significant decrease in volume upon an increase in moisture content, with or without an increase in external loads. Buildings, structures, and other improvements may be subject to excessive settlement-related distress when collapsible soils are present. The results of the subsurface evaluation and laboratory testing indicate the collapse potential of the eolian deposits is low.

Undocumented Fill

Portions of the site are underlain by undocumented fill. Google Earth® aerial imagery doesn't depict possible earthwork. Historic aerial imagery obtained for the Phase I Environmental Assessment shows a historic drainage on the western site of the site was pipped in about 2013 and surficial disturbance of the site between 1953 and 1993. The approximate extents of undocumented fill are shown on Figure 2. Undocumented fill should be further evaluated or mitigated at the time of site grading as recommended in our November 2021 report.

Shallow Bedrock

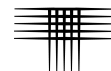
Based on our investigation shallow bedrock is not a concern at the site. Claystone bedrock was encountered in six of our borings; however, the claystone was below depths of 18 feet. Based on our understanding of the proposed development, excavations are not expected to extend into the bedrock.

Shallow Groundwater

Groundwater was measured in six of our borings at depths between 16 and 26 feet below the existing ground surface, which is not expected to create a hazard for the proposed construction.

Debris Flow and Debris Fans

The geologic mapping does not indicate the presence of debris flows, or debris fans on this property, and the surrounding topography and infrastructure make debris flows unlikely.



Rockfall

The project is not located within areas mapped as rockfall susceptible, as mapped in the Colorado Geological Survey Open-File Report 06-3 (2006) by Jonathan L. White and T.C. Wait, and does not appear susceptible, per our observations.

Subsidence and Abandoned Mining Activity

The site is not included in the “Colorado Springs Subsidence Investigation” completed by Dames & Moore of the State of Colorado, Division of Mine Reclamation, dated April 1985. We understand the investigation reported areas that have been or could potentially be affected by mine subsidence activity. The subject site was not located within the investigated area. We observed no evidence of subsurface mining at the site. Based upon the results of the State’s investigation, the project site is not underlain by underground mine workings.

Flooding

Information presented on “Flood Insurance Rate Map” (FIRM), Map Number 08041C0752G, with an effective date of December 7, 2018, indicates the project site is in Zone X, an area of minimal flood hazard. The project Civil Engineer should address localized flood potential.

Faults

The geologic mapping does not indicate the presence of faulting on the project site. The nearest potentially active fault is the Rampart Range fault approximately 10 miles west of the site.

Steeply Dipping Bedrock

We reviewed mapping of “Areas Susceptible to Differential Heave in Expansive, Steeply Dipping Bedrock, City of Colorado Springs, Colorado” (1999) by John W. Himmelreich, Jr., and David C. Noe published by the Colorado Geologic Survey. The site is well outside of areas mapped as having steeply dipping bedrock.

Elevated Radioactivity and Radon

We believe no unusual hazard exists from naturally occurring sources of radioactivity on the site. However, the materials found in this area are often associated with the production of radon gas and concentrations in excess of those currently accepted by the EPA can occur. Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after a structure is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, we recommend structures be tested after they are enclosed. Commonly utilized mitigation techniques may minimize risk.



LIMITATIONS

This report has been prepared for the exclusive use of The Garrett Companies for the purpose of providing a Geologic Hazard Evaluation for the proposed project. The information and conclusions presented herein are based on consideration of many factors including, but not limited to, the type of structures proposed, the geologic setting, and the subsurface conditions encountered. The conclusions contained in the report are not valid for use by others. If the proposed project is not constructed within about three years, we should be contacted to determine if we should update this report.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report, please call.

Sincerely,

CTL | THOMPSON, INC

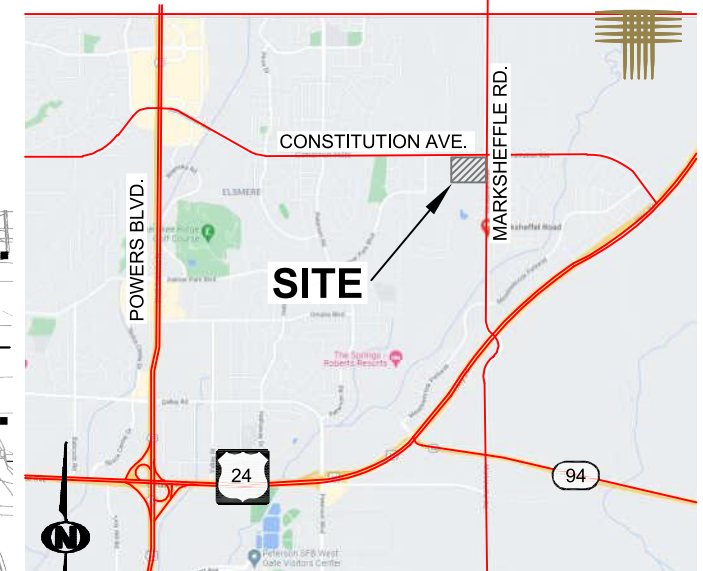
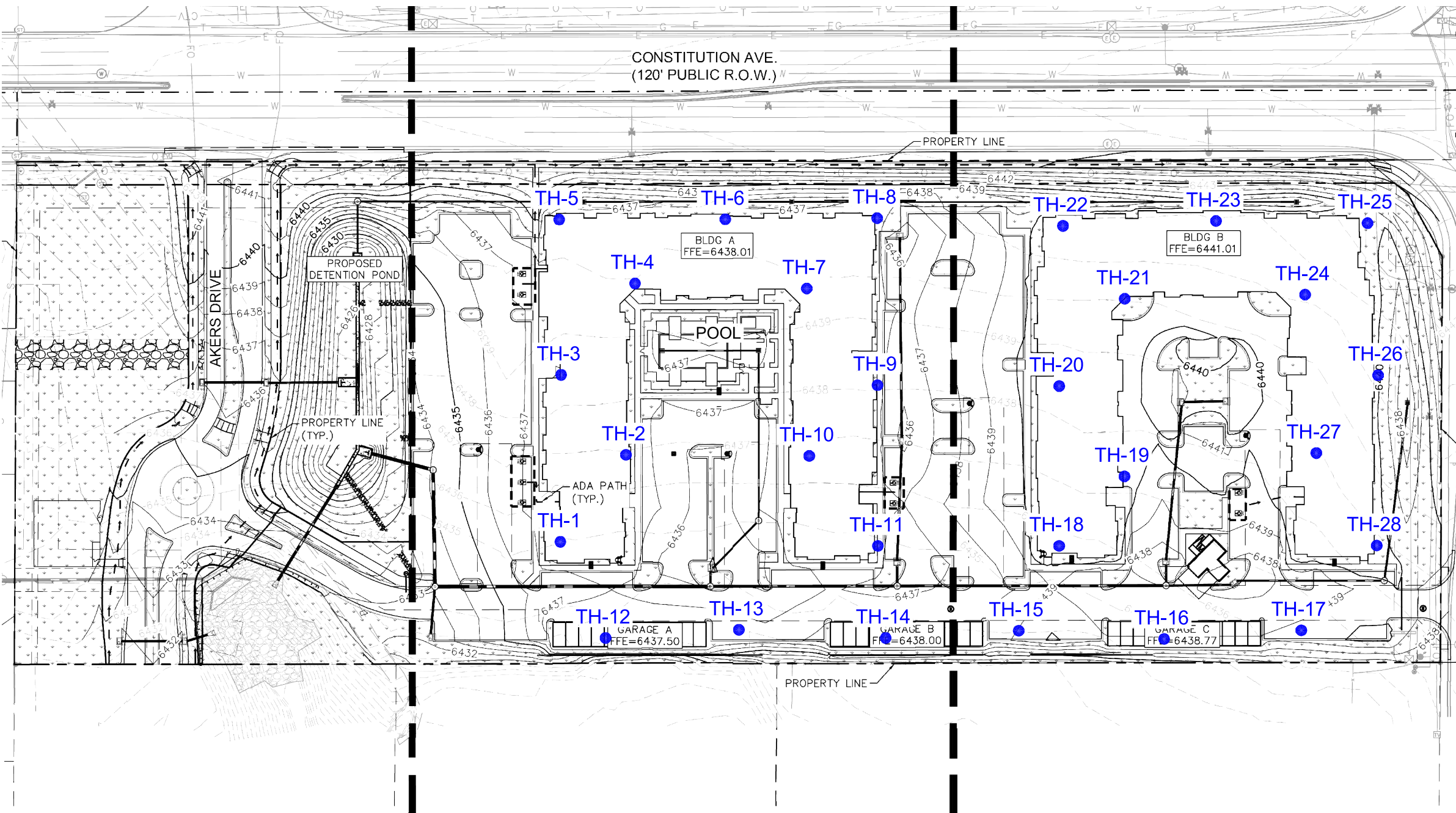
Gwendolyn E. Eberhart, P.E.
Project Manager

Reviewed by:

Timothy A. Mitchell, P.E.
Division Manager

GE:JMJ:TAM:cw

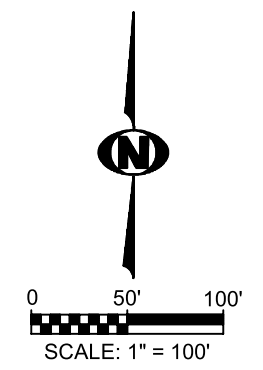
Via Email: AWhite@TheGarrettCo.com; Karl@TheGarrettCo.com



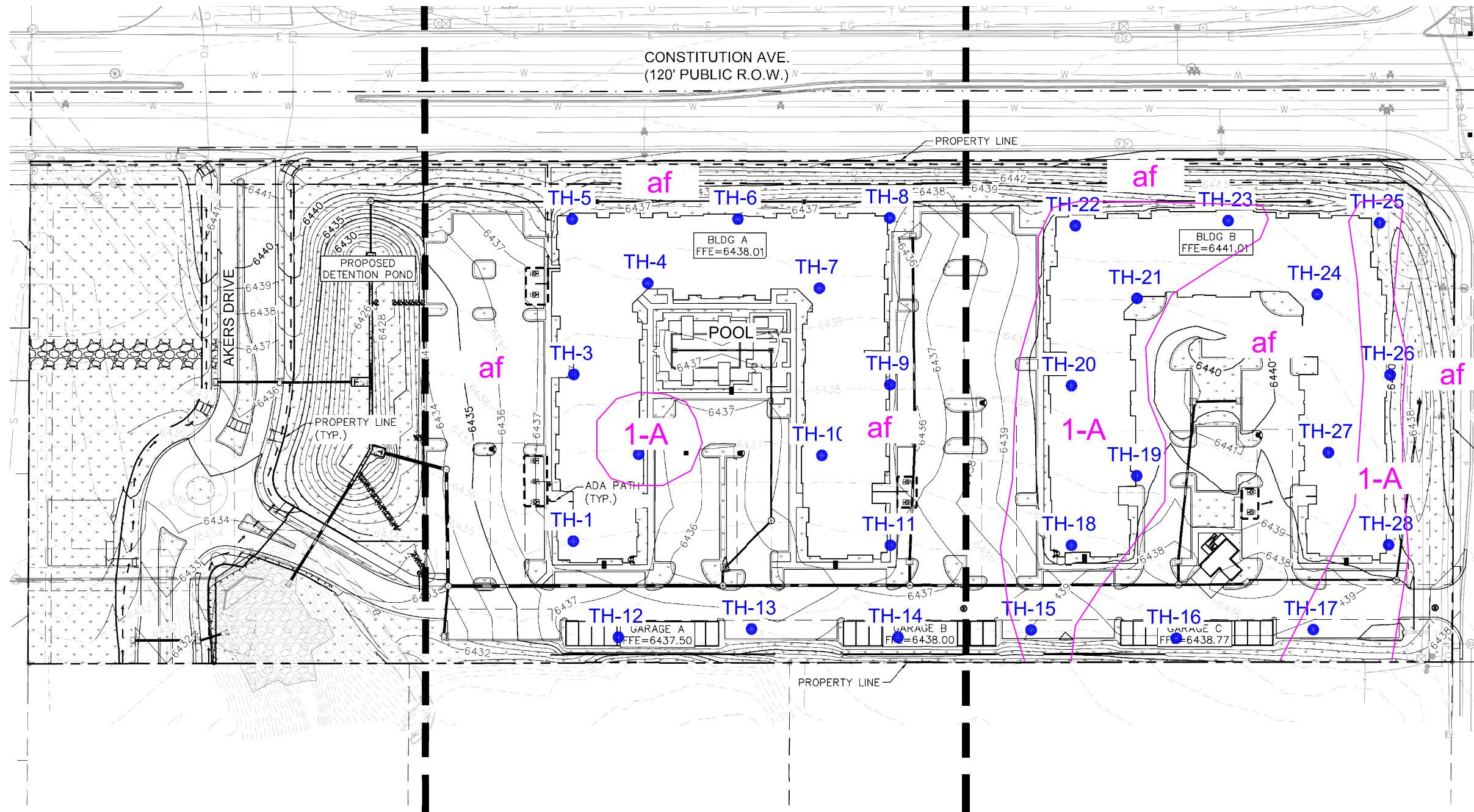
VICINITY MAP
(NOT TO SCALE)

LEGEND:
 TH-1 ● APPROXIMATE LOCATION OF EXPLORATORY BORING.

NOTE:
 BASE DRAWING WAS PREPARED BY KIMLEY-HORN
 (PROJECT NO. 096481004, DATED APRIL 18, 2022).

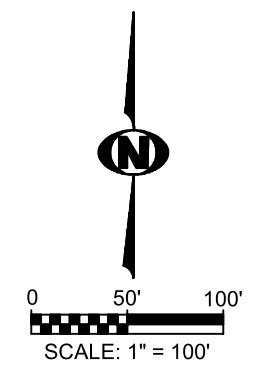


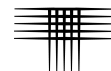
**Location of
Exploratory
Borings**



- LEGEND:**
- TH-1 APPROXIMATE LOCATION OF EXPLORATORY BORING.
 - ~ APPROXIMATE BOUNDARY BETWEEN GEOLOGIC CONTACTS
 - 1-A STABLE ALLUVIUM AND COLLUVIUM ON FLAT TO GENTLE SLOPES (0-5%)
 - af ARTIFICIAL FILL

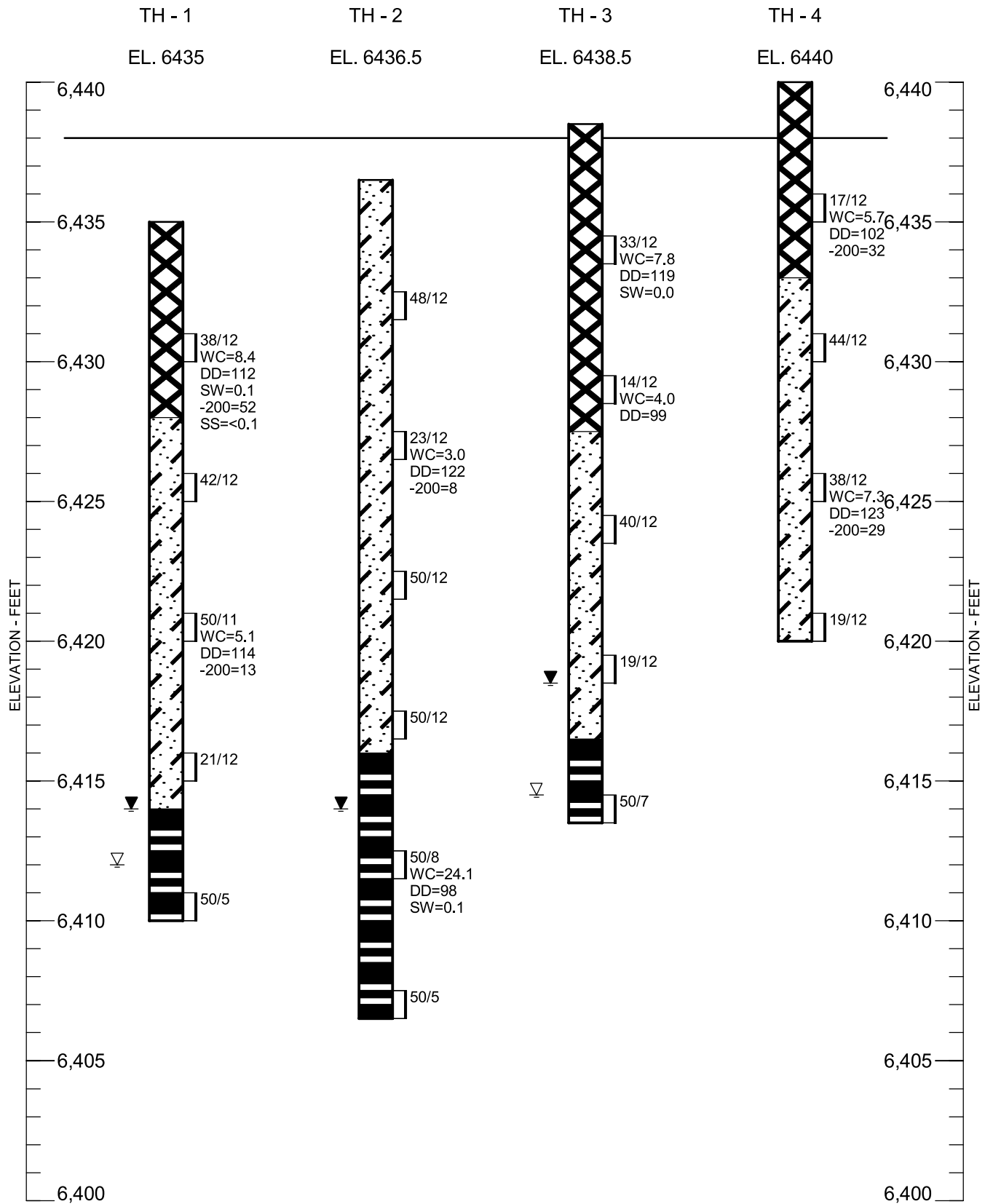
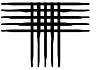
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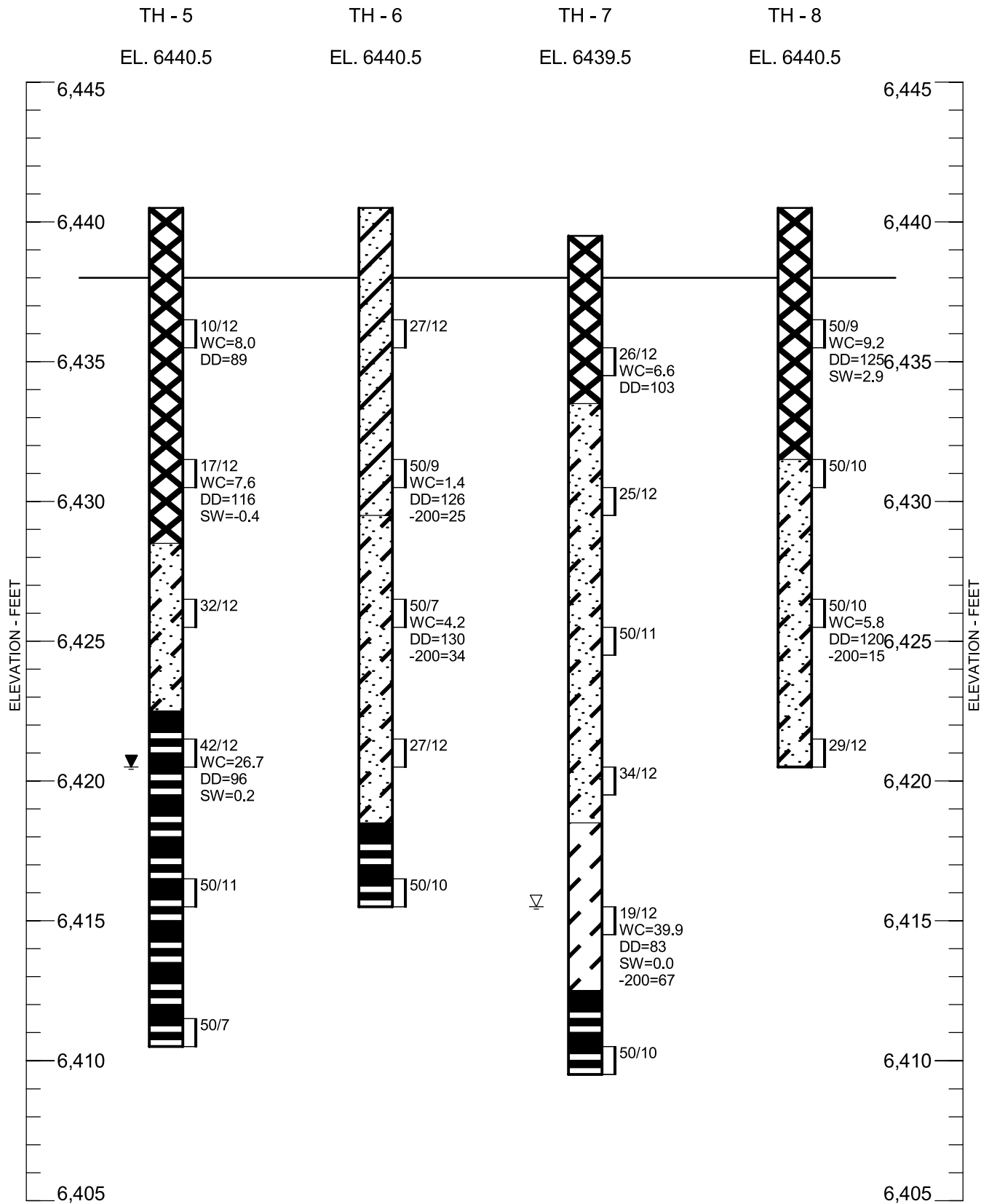
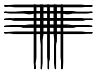


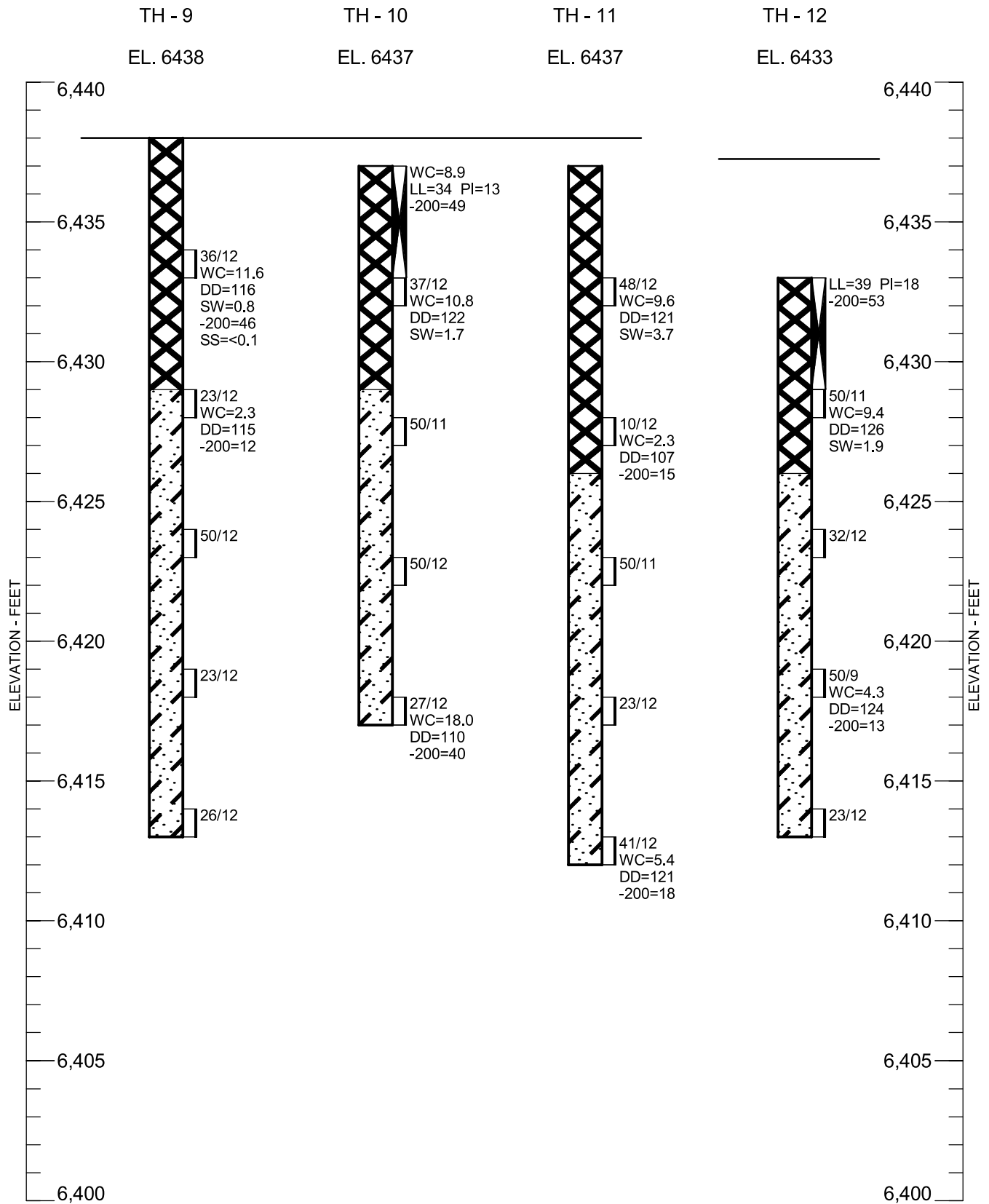
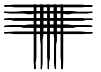


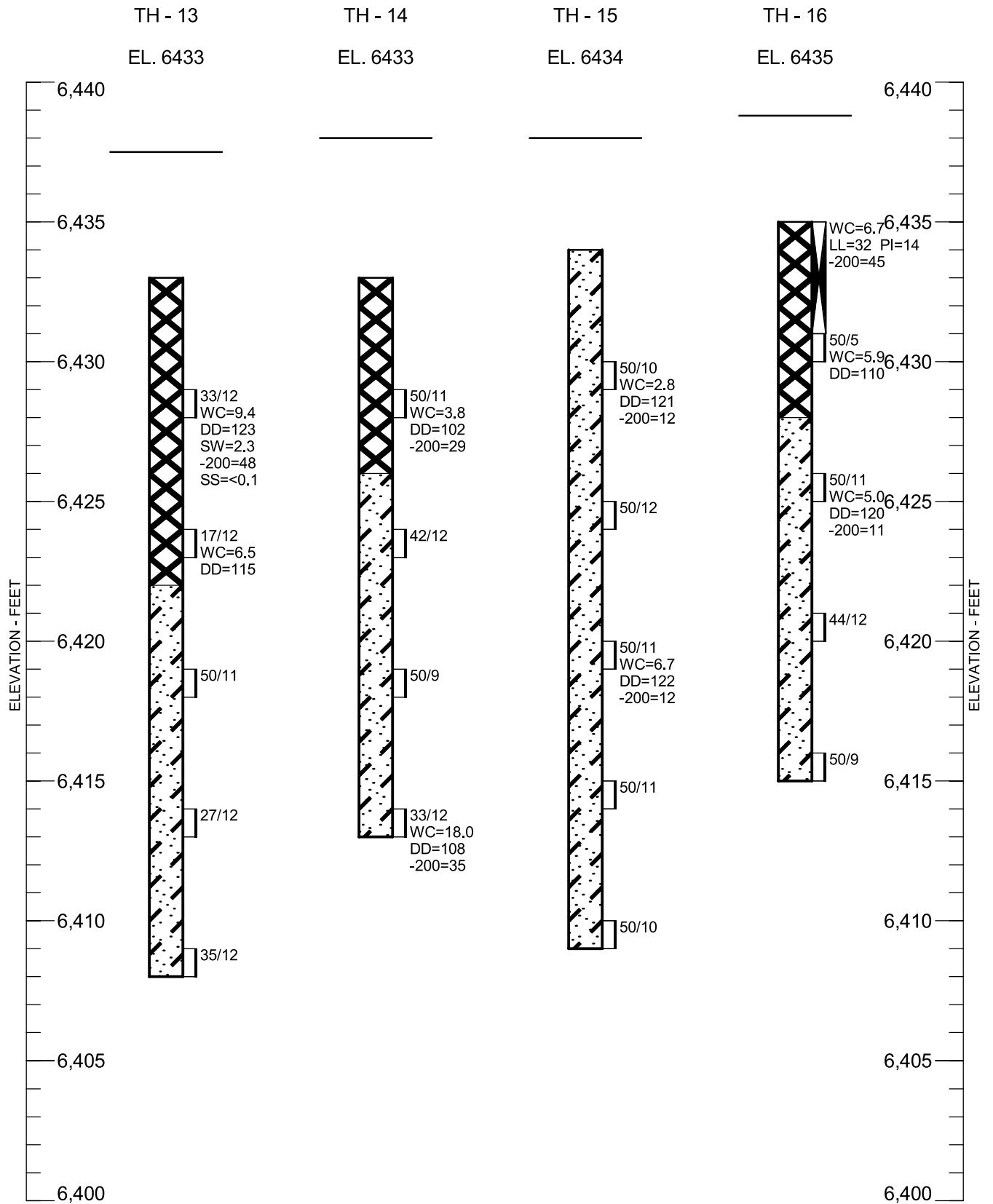
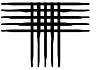
APPENDIX A

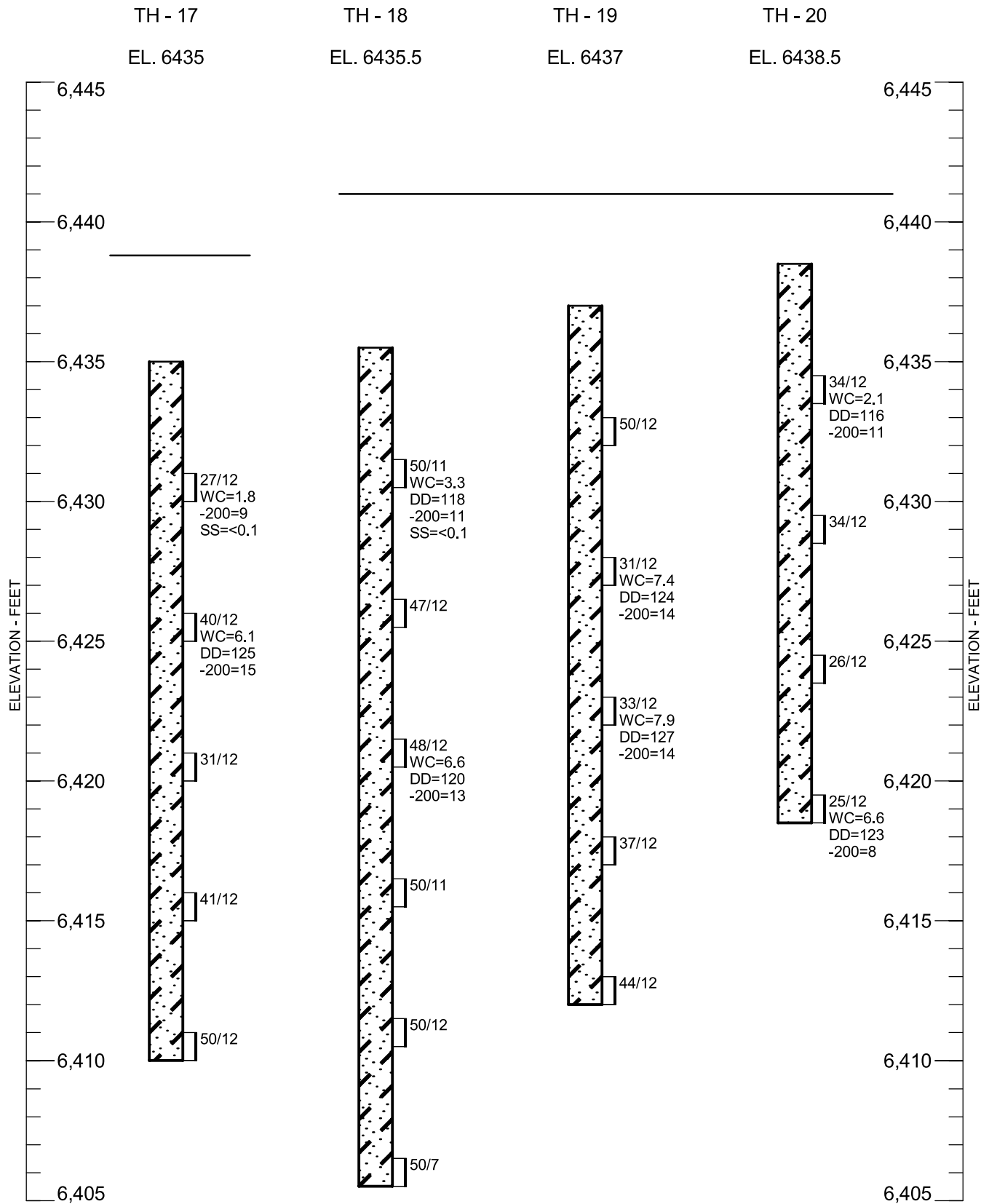
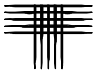
SUMMARY LOGS OF EXPLORATORY BORINGS CS19460-125

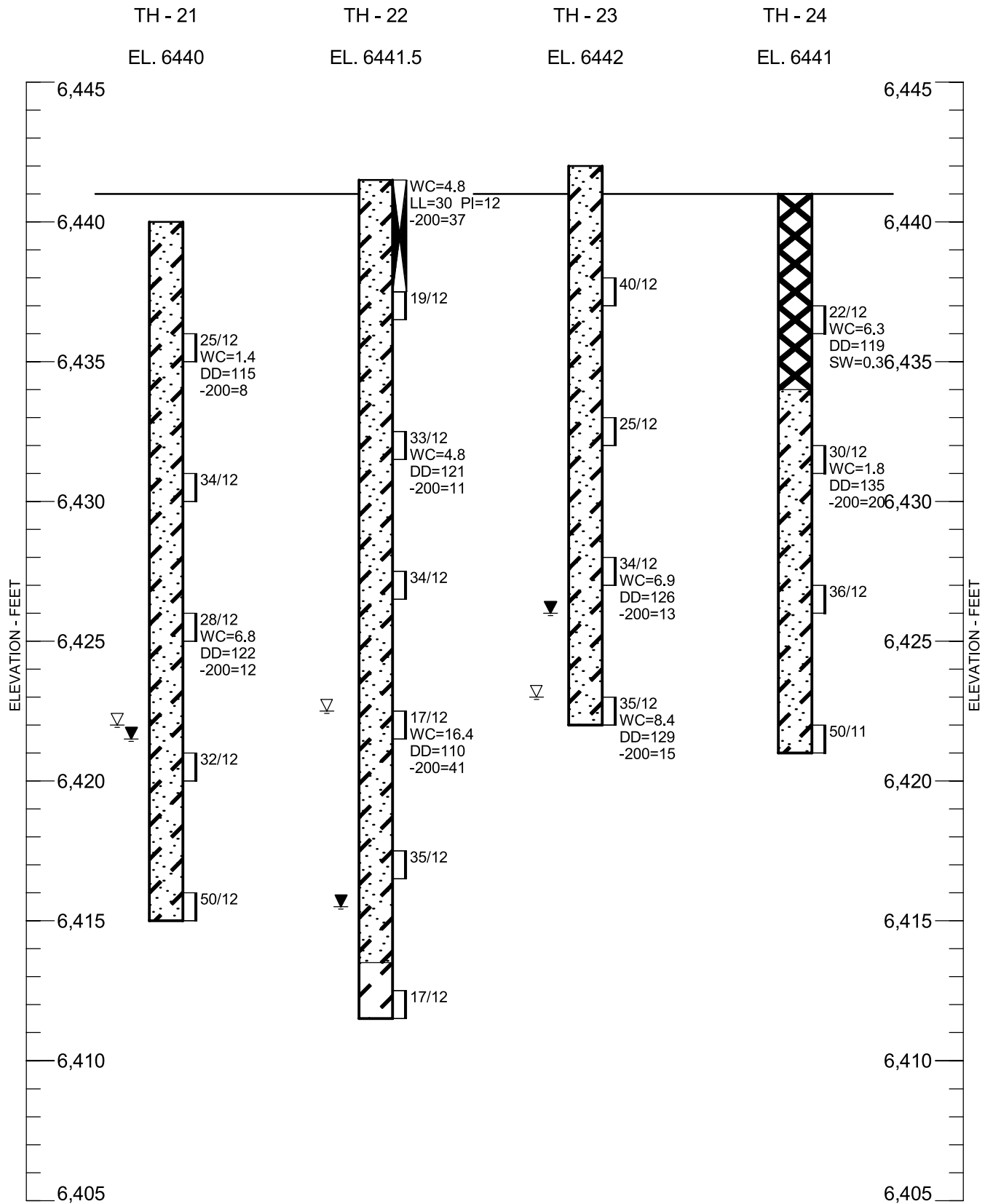
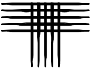


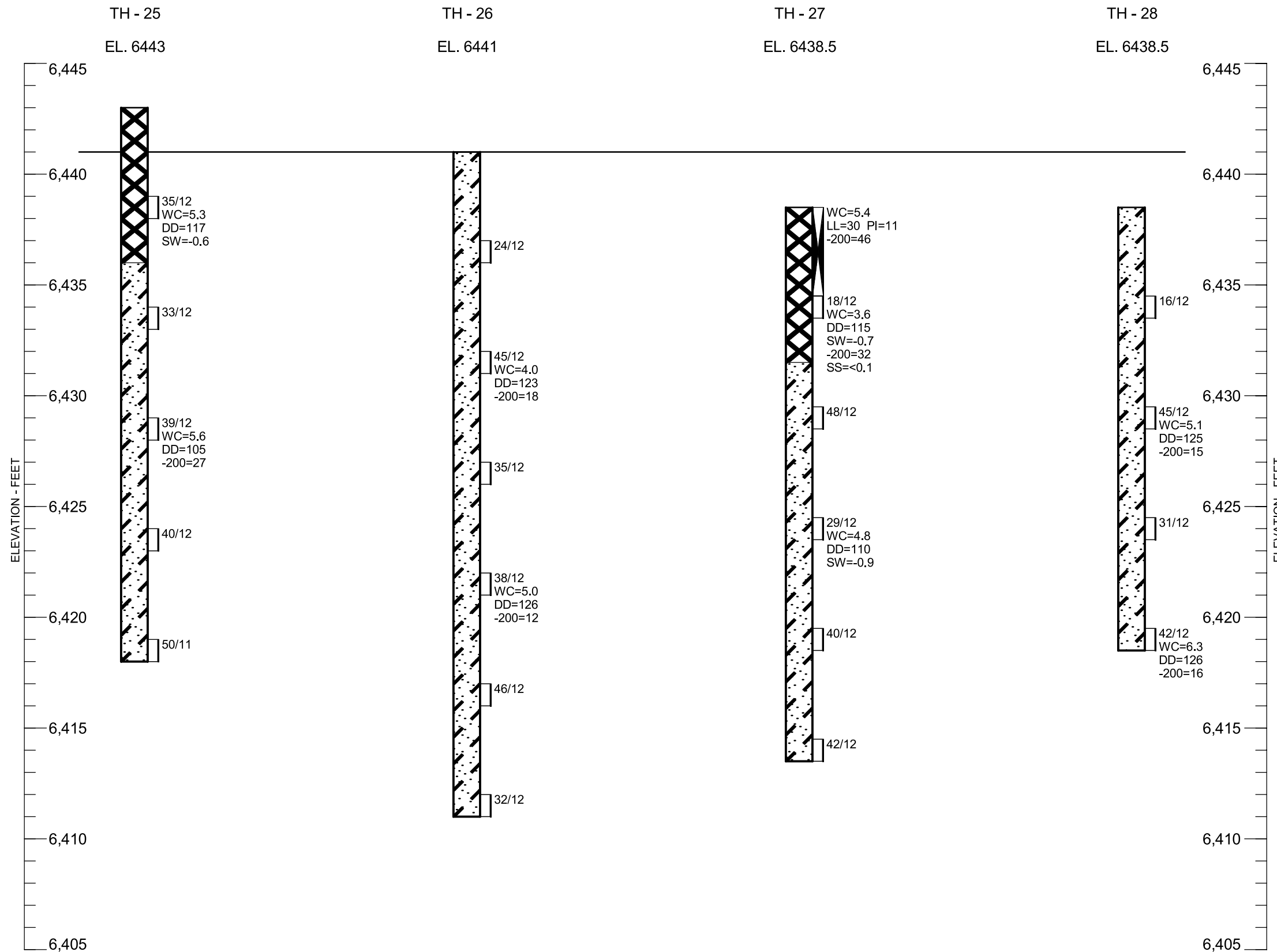










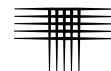


LEGEND:

- FILL, CLAY, SANDY TO VERY SANDY WITH LENSES OF CLAYEY TO VERY CLAYEY SAND, MEDIUM DENSE TO VERY DENSE, DRY TO SLIGHTLY MOIST, DARK BROWN.
- SAND, SILTY, MEDIUM DENSE TO DENSE, DRY, LIGHT BROWN (SM).
- SANDY, SLIGHTLY CLAYEY TO VERY CLAYEY, MEDIUM DENSE TO VERY DENSE, DRY TO WET, LIGHT BROWN TO BROWN (SC, SP-SC, SW-SC).
- CLAY, VERY SANDY, VERY STIFF, WET, GRAY TO BROWN (CL).
- CLAYSTONE, SANDY, HARD TO VERY HARD, SLIGHTLY MOIST TO MOIST, GRAY TO BROWN.
- DRIVE SAMPLE. THE SYMBOL 38/12 INDICATES 38 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- INDICATES BULK SAMPLE OBTAINED FROM AUGER CUTTINGS.
- GROUNDWATER LEVEL MEASURED AT TIME OF DRILLING.
- GROUNDWATER LEVEL MEASURED AFTER DRILLING.
- FINISH FLOOR ELEVATION.

NOTES:

1. THE BORINGS WERE DRILLED SEPTEMBER 27, AND 28, 2021 USING A 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A CME-45, TRUCK-MOUNTED DRILL RIG.
2. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS, AND CONCLUSIONS AS CONTAINED IN THIS REPORT.
4. WC - INDICATES MOISTURE CONTENT. (%)
DD - INDICATES DRY DENSITY. (PCF)
SW - INDICATES SWELL WHEN WETTED UNDER APPROXIMATE OVERBURDEN PRESSURE. (%)
LL - INDICATES LIQUID LIMIT.
(NV : NO VALUE)
PI - INDICATES PLASTICITY INDEX.
(NP : NON-PLASTIC)
-200 - INDICATES PASSING NO. 200 SIEVE. (%)
SS - INDICATES WATER-SOLUBLE SULFATE CONTENT. (%)
5. ELEVATIONS ARE BASED ON OVERALL GRADING PLAN PREPARED BY KIMLEY HORN, DATED APRIL 18, 2022.



APPENDIX B

**A Portion of
CTL|T Project No. CS19460.000-205 letter report,
dated October 28, 2021**



Field Investigation – Test Pits

CTL visited the site on October 25, 2021 and observed the excavation of 5 test pits. The test pits were excavated with a mini-excavator. The excavator and operator were provided by T-Bone Construction. The test pits were advanced to an approximate depth of eight feet within the approximate area of former debris piles. Table I below presents a general summary of the test pits, including the materials encountered. The approximate locations of the test pits are presented on Figure 2. Photographs of the test pits are presented in Attachment A.

Table I
Summary of Exploratory Test Pits

Test Pit ID #	Approximate Dimensions (LxWxD) (ft)	Summary of Field Observations
TP-1	6x3x8	Fill, clay, sandy to very sandy with lenses of clayey to very clayey sand over sandy, slightly clayey to very clayey
TP-2	6x3x8	Fill, clay, sandy to very sandy with lenses of clayey to very clayey sand
TP-3	6x3x8	Fill, clay, sandy to very sandy with lenses of clayey to very clayey sand
TP-4	6x3x8	Fill, clay, sandy to very sandy with lenses of clayey to very clayey sand
TP-5	6x3x8	Fill, clay, sandy to very sandy with lenses of clayey to very clayey sand

Results and Discussion – Solid Waste Materials

During the excavation of the test pits, we did not observe suspect solid waste materials; therefore, no samples were collected for laboratory analysis.

Conclusions and Recommendations

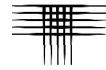
Based on the results of the limited evaluation at the Site, the following can be concluded:

- Suspect solid waste materials were not observed in the test pits.
- We do not believe that further investigation is warranted at this time. If potentially solid waste materials are encountered during the development of the Site, we should be contacted for further guidance.
- A very limited amount of debris was encountered in Test Pit 3.



ATTACHMENT A

PHOTOGRAPHS



1. Test Pit 1



2. Material from Test Pit 1



3. Overall view of excavation for Test Pit 1



4. Test Pit 2



5. Material from Test Pit 2



6. Test Pit 3



7. Material from Test Pit 3



8. Test Pit 4



9. Material from Test Pit 4



10. Test Pit 5



11. Material from Test Pit 5