GEOTECHNICAL INVESTIGATION
FLYWHEEL OFFICE DEVELOPMENT
SOUTHEAST OF EMBRAER HEIGHTS AND CRESTERRA PARKWAY
COLORADO SPRINGS, COLORADO

Prepared For:

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Project No. CS19327-125

November 10, 2020

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SCOPE

This report presents the results of our Geotechnical Investigation for the proposed Flywheel Commercial Office Building to be constructed southeast of the intersection of Embraer Heights and Cresterra Parkway in Colorado Springs, Colorado. The purpose of our investigation was to evaluate subsurface conditions at the site in order to develop geotechnical design and construction criteria for the proposed office building. This report summarizes the results of our field and laboratory investigations, and presents our design and construction recommendations for foundations, floor systems, and pavement section alternatives, as well as surface and subsurface drainage precautions. We believe the investigation was completed in accordance with our proposal (CTL|T Proposal No. CS-20-0144) dated September 23, 2020. Evaluation of the property for the possible presence of potentially hazardous materials (environmental site assessment) was not included in the scope of this investigation.

The report was prepared based on conditions encountered in our exploratory borings, results of laboratory tests, engineering analyses, and our experience. The design criteria presented in the report were based on our understanding of the planned construction. If changes occur, we should review the revised plans to determine their effect on our recommendations. The following section summarizes the report. More detailed descriptions of subsurface conditions, as well as our design and construction recommendations, are presented in the report.

SUMMARY OF CONCLUSIONS

1. The natural, near-surface soils encountered in our exploratory borings drilled within the proposed building footprint generally consisted of slightly silty to silty sand to the maximum depths explored of 30 feet. We encountered about 6 feet of fill at the ground surface in one of the five boring locations.

2. Groundwater was not encountered in the borings during the drilling operations. The borings were again found to be dry when checked one day following the completion of our drilling. A more detailed discussion of groundwater is presented in the report.

3. We believe the proposed building can be constructed with a spread footing foundation constructed on the existing natural soils or densely compacted fill.

4. We judge the risk of poor slab-on-grade floor performance to be low where they are supported by the granular natural soils or densely compacted granular fill. Floor slab preparation details are presented in the report.

5. We believe the proposed parking areas can be paved with 3 inches of asphalt concrete over 6 inches of aggregate base course. For entrances and main drive lanes, the asphalt thickness should be increased to 4-inches. Alternative pavement sections are included in the report.

6. Overall surface drainage should provide for the rapid removal of runoff away from the proposed building and off pavement areas.

SITE CONDITIONS

The project site is situated on a vacant parcel of land located at the Peak Innovation Park located southeast of the intersection of Embraer Heights and Cresterra Parkway, in eastern Colorado Springs, Colorado. The general vicinity of the property is presented in Fig. 1. The ground surface over most of the site is comparatively flat. The northern and western 100 to 200 feet of the site slope gently downward toward the adjacent streets. Vegetation consist of weeds, and native grasses. The general vicinity surrounding the property is currently undeveloped and vacant. Embraer Heights is located adjacent to the north, and Crestarra Parkway is located adjacent to the west of the site.

PROPOSED CONSTRUCTION

Preliminary development plans available at the time of our investigation indicate the proposed office building will consist of 50,000 square feet. The structure is planned as a single-story building with exterior construction consisting of site cast, tilt-up concrete panels. We understand slab-on-grade floors are planned throughout the building with no below grade areas. Based on the proposed use, we anticipate some racking and forklift traffic within the building. A loading dock may be included in the construction. Parking lots and drive lanes are planned around the perimeter of the building. We expect minimal cuts and fills at the site to establish a building pad elevation.

INVESTIGATION

Subsurface conditions at the site were investigated by drilling five exploratory borings within the proposed building footprint and three shallow exploratory borings (5 feet) within proposed parking and drive lane areas. The borings were drilled at the approximate locations shown on Fig. 1. The borings were drilled using a 4-inch diameter, continuous-flight auger and a truck-mounted drill rig.

Samples of the soils were obtained using a 2.5-inch diameter (O.D.) modified California barrel sampler driven by blows from a 140-pound hammer falling 30 inches. Representatives of CTL|Thompson, Inc. were present during drilling to observe drilling operations, log the subsurface conditions encountered in the borings, and obtain samples.

Samples were returned to our laboratory where they were visually classified by the geotechnical engineer for this project, and laboratory tests assigned. Laboratory tests performed included dry density, moisture content, sieve analysis, Atterberg limits, and water-soluble sulfate content. Summary logs of the conditions found in the exploratory borings, including results of field penetration resistance tests and a portion of the laboratory data, are presented on Fig. 1. Laboratory testing is presented on Figs. 3 through 5 and summarized in Table 1.

SUBSURFACE CONDITIONS

The near-surface soils encountered in our exploratory borings drilled within the proposed building footprint generally consisted of silty sand fill and natural, slightly silty to silty sand to the maximum depths explored. Groundwater was not encountered at the time of drilling. When water level measurements were conducted one day following the completion of the drilling, the borings were again found to be dry. The pertinent engineering characteristics of the soils encountered are discussed in the following paragraphs.

Fill

We encountered up to 6 feet of fill in one boring (TH-3) located in the southwest corner of the proposed building footprint. The fill materials classified as silty sand and were dense based on field penetration resistance testing suggesting they were likely placed under controlled conditions. The fill was likely placed during previous rough grading of the site. Records of the fill placement were not available to us for review at the time of this investigation.

A sample of the fill tested contained 24 percent of silt and clay-sized particles (passing the No. 200 sieve). Test results and our experience indicate the sand fill materials are typically non-expansive or exhibit low swell potential when wetted.

Natural Sand

Natural granular materials were encountered at the ground surface or overlain by fill materials and extended to the maximum depths explored of up to 30 feet. The granular materials were medium dense based on field penetration resistance testing and consisted of slightly silty to silty sand. Samples tested in our laboratory contained 9 to 37 percent silt and clay-sized particles (passing the No. 200 sieve). Based on experience, we anticipate the granular materials are non-expansive or exhibit slight expansion when wetted under estimated overburden pressures.

Groundwater

At the time of drilling, groundwater was not encountered in the borings drilled to depths of up to 30 feet. When checked one day following the completion of the drilling operations, the borings were again found to be dry. Our holes were drilled at the end of the summer season and beginning of the fall season when groundwater levels tend to be at or near their seasonal lows. We expect levels may rise during the summer months in response to precipitation and irrigation.

Seismicity

The soil is not expected to respond unusually to seismic activity. Based on the 2015 International Building Code (IBC), we judge the site classifies as Site Class D (stiff soil profile).

SITE DEVELOPMENT

No grading plans were available at the time of our investigation. Based on the existing topography, the site appears to have been rough graded and we expect new cuts and fills on the order of 5 feet or less will be necessary to establish a building pad elevation and achieve desired grades across most of the site. Documentation was not available regarding the existing fill materials encountered at the site; therefore, we must consider them to be of suspect quality and recommend it be reconstructed within the structure footprint. The following sections discuss site development in more detail.

Excavation

We believe the soils can be excavated with conventional, heavy-duty excavation equipment. Based on our investigation and Occupational Safety and Health Administration (OSHA) standards, we believe the on-site surficial soils classify as Type C materials. OSHA requires Type C materials be braced or laid back to a maximum slope inclination of 1.5:1 (horizontal to vertical) for dry conditions. If groundwater conditions change and becomes more shallow, the granular materials may “flow” into the excavation. Excavation slopes specified by OSHA are dependent upon the types of soil and groundwater conditions encountered. The contractor’s “competent person” should identify the soils encountered in the excavations and refer to OSHA standards to determine appropriate slopes.

Sub-Excavation

We encountered up to 6 feet of suspect quality fill materials in one boring (TH-3) located in the southwest portion of the proposed building footprint. The fill materials should not be relied upon to support new construction without documentation of its placement. We recommend the fill material be excavated to a depth that exposes the natural, underlying granular soils and be re-placed as moisture conditioned and densely placed sub-excavation backfill. Excavation of the fill should extend at least 5 feet laterally beyond the exterior sides of the proposed foundations.

Fill Placement

The soils found at this site are suitable to re-use as fill material provided vegetation, topsoil, debris and other deleterious materials are substantially removed. If imported fill is necessary, it should ideally consist of granular material with 100 percent passing the 2-inch sieve and containing less than 30 percent passing the No. 200 sieve. The import soil should exhibit low plasticity with a Liquid Limit less than 30 and a Plasticity Index less than 10. A sample of the import material should be submitted to our office for testing before transporting to the site.

Before fill placement, vegetation, topsoil, asphalt, and other deleterious material should be removed. Areas to receive fill should be deeply scarified, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of maximum modified Proctor dry density (ASTM D1557), for on-site granular soils.

The properties of the fill will affect the performance of foundations and slabs-on-grade. Granular fill placed below-footings and slabs should be moisture conditioned to within 2 percent of optimum moisture content and compacted in thin lifts to at least 95 percent of maximum modified Proctor dry density (ASTM D 1557).

We recommend utility trench backfill be moisture conditioned and compacted as stated above. The placement and compaction of backfill should be observed and tested by a representative of our firm during construction.

FOUNDATIONS

We anticipate a finished floor elevation will be established near or within about 5 feet of existing grades. We believe the proposed building can be constructed with a spread footing foundation supported by the natural granular soils or non-expansive, dense granular fill. No documentation of the existing fill materials was available to us for our review, therefore, fill materials within the building footprint should be removed and replaced under controlled conditions as described in the SITE DEVELOPMENT section of this report. Design criteria for spread footings is discussed in the following section.

Spread Footings

The following sections present our design and construction recommendations for the spread footing foundation system. We can provide criteria for alternative systems, if desired.

1. Spread footings should be constructed on the existing granular materials or new, densely compacted granular fill. Fill materials should be moisture conditioned and compacted as described in the Fill Placement

section of this report. Soils loosened during excavation, pockets of loose material, or areas containing undocumented fills should be removed and densely replaced as previously discussed prior to placing concrete.

2. Spread footings should be designed for a maximum allowable soil pressure of 3,000 psf.

3. We recommend footings beneath continuous foundation walls be at least 16 inches wide. Footings beneath isolated column pads should be at least 24 inches square. Larger footing sizes will likely be required to accommodate the anticipated foundation loads.

4. We recommend designs consider total settlement of 1-inch and differential settlement of 1/2-inch.

5. Continuous foundation walls should be reinforced, top and bottom, to span local anomalies in the subsoils. We recommend the reinforcement required to simply span an unsupported distance of at least 8 feet.

6. Exterior footings must be protected from frost action with a soil cover of at least 30 inches; typical for this area.

7. A representative of our firm should observe the completed foundation excavations to confirm the exposed conditions are similar to those encountered in our exploratory borings. The placement and compaction of below-footing fill should be observed and tested by a representative of our firm during construction.

BELOW-GRADE CONSTRUCTION

We are not aware of any proposed habitable, below-grade construction. If plans should change to include below-grade construction, we should be contacted to provide recommendations for foundation wall lateral earth pressures and subsurface drains.

FLOOR SYSTEMS AND SLABS-ON-GRADE

We anticipate a slab-on-grade floor is preferred within the proposed building. We believe a low risk of poor slab performance will exist for a floor slab underlain by non-expansive granular materials. Expansive materials and undocumented fills encountered in foundation excavations should be removed and replaced as discussed under the SITE DEVELOPMENT section of this report. The slab-on-grade subgrade in lightly loaded areas (50 psf or less) should be scarified to a depth of 8 inches, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of maximum modified Proctor maximum dry density (ASTM D 1557).

We understand some portions of the slab-on-grade floors located in the building may be designed for pressures greater than 50 psf. Some areas may experience loading influenced by racking and forklift traffic. We recommend the subgrade below the heavily loaded areas consist of at least 2 feet of dense granular fill. The fill should consist of the on-site granular soils, moisture conditioned to within 2 percent of optimum, and compacted to at least 95 percent of maximum modified Proctor dry density. Slabs-on-grade supported by this dense fill material can be designed considering a modulus of subgrade reaction of 250 pci.

Shallow building foundations will likely settle relative to lightly loaded slab-on-grade floors. We estimate this relative movement between footing foundations and floor slabs could be on the order of 1 inch. The settlement can cause cosmetic cracking of drywall. We recommend the slab-on-grade floors be separated from exterior walls and interior bearing members with joints that allow for free vertical movement of the slab. Slip-joints in slab-bearing partitions should allow for at least 1-1/2 inches of free vertical movement. If the “float” is provided at the tops of partitions, the connection between interior, slab-supported partitions and exterior, foundation-supported walls should be detailed to allow differential movement. These architectural connections are critical to help reduce cosmetic damage when foundations and floor slabs move relative to each other. We have seen instances where these architectural connections were not designed and constructed properly and resulted in moderate cosmetic damage, even though the movement experienced was well within the anticipated range. The architect should pay special attention to these issues and detail the connections accordingly.

The 2015 International Building Code (IBC) requires a vapor retarder be placed between base course or the subgrade soils and the concrete slab-on-grade floor, unless the designer of the floor (structural engineer) waives this requirement. The merits of installing a vapor retarder below the floor slab depend on the sensitivity of floor coverings and building use to moisture. A properly installed vapor retarder (10 mil minimum) is more beneficial below concrete slab-on-grade floors where floor coverings, painted floor surfaces or products stored on the floor will be sensitive to moisture. The vapor retarder is most effective when concrete is placed directly on top of it, rather than placing a sand or gravel leveling course between the vapor retarder and the floor slab. The placement of concrete on the vapor retarder may increase the risk of shrinkage cracking and curling. Use of concrete with reduced shrinkage characteristics including minimized water content, maximized coarse aggregate content, and reasonably low slump will reduce the risk of shrinkage cracking and curling. Considerations and recommendations for the installation of vapor retarders below concrete slabs are outlined in Section 3.2.3 of the 2006 report of the American Concrete Institute (ACI) Committee 302, "Guide for Concrete Floor and Slab Construction (ACI 302.R-96)".

All parties must realize that even small movements of the floor slab (less than 1-inch) can damage comparatively brittle floor treatments such as ceramic or stone tile that might be used in restrooms, or impact movement sensitive medical equipment. If some movement of the slab is not acceptable, a structurally supported floor with an air space between the floor and the subgrade soils is recommended. The air space required by building codes depends on the materials used to construct the floor. The structural floor is supported by the foundation system. There are design and construction issues associated with structural floors, such as ventilation and increased lateral loads that must be considered.

PAVEMENTS

Our exploratory borings and understanding of the proposed construction suggest the subgrade soils within the planned access driveways and parking lots surrounding the proposed building will consist predominantly of silty sand. Samples of the subgrade materials obtained from the site were combined and subjected to laboratory testing. The samples contained 25 percent silt and clay sized particles and exhibited a Liquid Limit of 20 and a Plasticity Index of 4. Subgrade soil samples tested in our laboratory classify as A-2-4 according to the American Association of State Highway Transportation Officials (AASHTO) system. The silty sand subgrade materials generally exhibit comparatively excellent to good pavement support characteristics. Based on our laboratory testing of A-2-4 soils, a Hveem stabilometer ("R") value of 50 was assigned to the subgrade materials for design purposes.

We anticipate the access driveways may be subjected to occasional heavy vehicle loads such as trash and delivery trucks. We considered a daily traffic number (DTN) of 2 for the auto parking areas and 10 for the access driveways which correspond to 18-kip equivalent, single-axle loads (ESAL) of 14,600 and 73,000, respectively, for a 20-year pavement design life. We recommend the parking stalls be paved with 5 inches of asphalt concrete <u>or</u> 3 inches of asphalt concrete over 6 inches of aggregate base course. The access driveways and other portions of the proposed paved areas subjected to occasional truck traffic should be paved with 6 inches of asphalt concrete <u>or</u> 4 inches of asphalt underlain by 6 inches of aggregate base course. Alternately, a plain portland cement pavement section consisting of 8 inches of concrete over a prepared subgrade may be used for concrete access roads and loading docks anticipated to experience truck traffic.

We recommend a concrete pad be provided at the trash dumpster site and any service areas. The pad should be at least 8 inches thick and long enough to support the entire length of the trash truck and dumpster or delivery service vehicle.

Joints between concrete and asphalt pavements should be sealed with a flexible compound.

Our design considers pavement construction will be completed in accordance with the City of Colorado Springs “Standard Specifications” and the Pikes Peak Region Asphalt Paving Specifications. Our calculations are based on regionally accepted structural coefficients of locally available materials. The specifications contain requirements for the pavement materials (asphalt, base course, and concrete) as well as the construction practices used (compaction, materials sampling, and proof-rolling). Of particular importance are those recommendations directed toward subgrade and base course compaction and proof-rolling. During proof-rolling, particular attention should be directed toward the areas of confined backfill compaction. Areas that pump excessively should be stabilized prior to pavement construction. A representative of our office should be present at the site during placement of fill and construction of pavements to perform density testing.

CONCRETE

Concrete in contact with soils can be subject to sulfate attack. We measured water-soluble sulfate concentrations in one sample from this site. Based on laboratory testing and our experience, concentrations were measured at less than 0.1 percent, typical of the materials encountered at the site. Sulfate concentrations less than 0.1 percent indicate Class 0 exposure to sulfate attack for concrete in contact with the subsoils, according to ACI 201.2R-01 as published in the 2008 *ACI Manual of Concrete Practice*. For this level of sulfate concentration, the American Concrete Institute (ACI) indicates Type I cement can be used for concrete in contact with the subsoils. In our experience, superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious material ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete subjected to freeze-thaw cycles should be air entrained.

SURFACE DRAINAGE

Performance of foundations, concrete flatwork, pavements, and other surface improvements is influenced by the moisture conditions existing within the foundation or subgrade soils. Overall surface drainage should be designed, constructed, and maintained to provide rapid removal of surface water runoff away from the building and off of pavements and flatwork. We recommend a minimum slope of 5 percent in unpaved areas and 2 percent in paved areas to direct flow away from the building.

Roof drain outlets should discharge beyond backfill zones or into appropriate storm sewers. Landscaped areas should be adequately sloped to direct flow away from the building. Use of area drains can assist draining areas that cannot be provided with adequate slope, to help collect snowmelt runoff.

Backfill around foundation walls should be moistened and compacted as outlined in the report. We recommend the following precautions be observed during construction and maintained at all times after construction is completed.

1. Wetting or drying of the open foundation excavation should be avoided.
2. Positive drainage should be provided away from the building. We recommend a minimum slope of at least 10 percent in the first 5 to 10 feet away from the foundations in landscaped areas. Paved surfaces should be sloped to drain away from the building. A minimum slope of 2 percent is suggested. More slope is desirable.
3. Backfill around foundations should be moistened and compacted according to criteria presented in <u>Fill Placement</u>.
4. Landscaping should be carefully designed to minimize irrigation. Plants placed close to foundation walls should be limited to those with low moisture requirements. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will

increase likelihood of slab and foundation movements and associated damage.

5. Impervious plastic membranes should not be used to cover the ground surface immediately surrounding the new construction. These membranes tend to trap moisture and prevent normal evaporation from occurring. Geotextile fabrics can be used to control weed growth and at the same time allow for evaporation.

6. Roof drains should be directed away from the building. Downspout extensions and splash blocks should be provided at all discharge points. Roof drains should not be directed below slab-on-grade floors. Where this is unavoidable, drain pipes should be thoroughly pressure tested for leaks. Any leaks should be repaired before placing slabs or backfill.

CONSTRUCTION OBSERVATIONS

We recommend that CTL|Thompson, Inc. provide construction observation services to allow us the opportunity to confirm soil conditions are consistent with those found during this investigation. If others perform these observations, they must accept responsibility to judge whether the recommendations in this report remain appropriate.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the structure will perform satisfactorily. It is critical that all recommendations in this report are followed during construction. The owner must assume responsibility for maintaining the structure and use appropriate practices regarding drainage.

LIMITATIONS

This report has been prepared for the exclusive use of Colarelli Construction for the purpose of providing geotechnical design and construction criteria for the 50,000 square foot Flywheel Commercial Building. The information, conclusions, and recommendations presented herein are based upon consideration of many factors including, but not limited to, the type of structure proposed, the geologic setting, and the subsurface conditions encountered. The conclusions and recommendations contained in the report are not valid for use by others. Standards of practice continuously evolve in the area of geotechnical engineering. The recommendations provided are appropriate for about three years. If the project is not constructed within about three years, we should be contacted to determine if we should update this report.

Our borings locations were chosen by the client, and we believe the borings were reasonably spaced to obtain a reasonably accurate picture of foundation conditions below the proposed building area. The data are representative of conditions encountered only at the exact boring locations. Variations in the subsurface conditions not indicated by our borings are possible. Representatives of our firm should periodically visit the site to during construction to perform observation and testing services.

We believe this investigation was conducted in a manner consistent 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 or in the analysis of the influence of the subsoil conditions on design of the building, please call.

CTL | THOMPSON, INC.

Patrick Foley, EIT
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Reviewed by:

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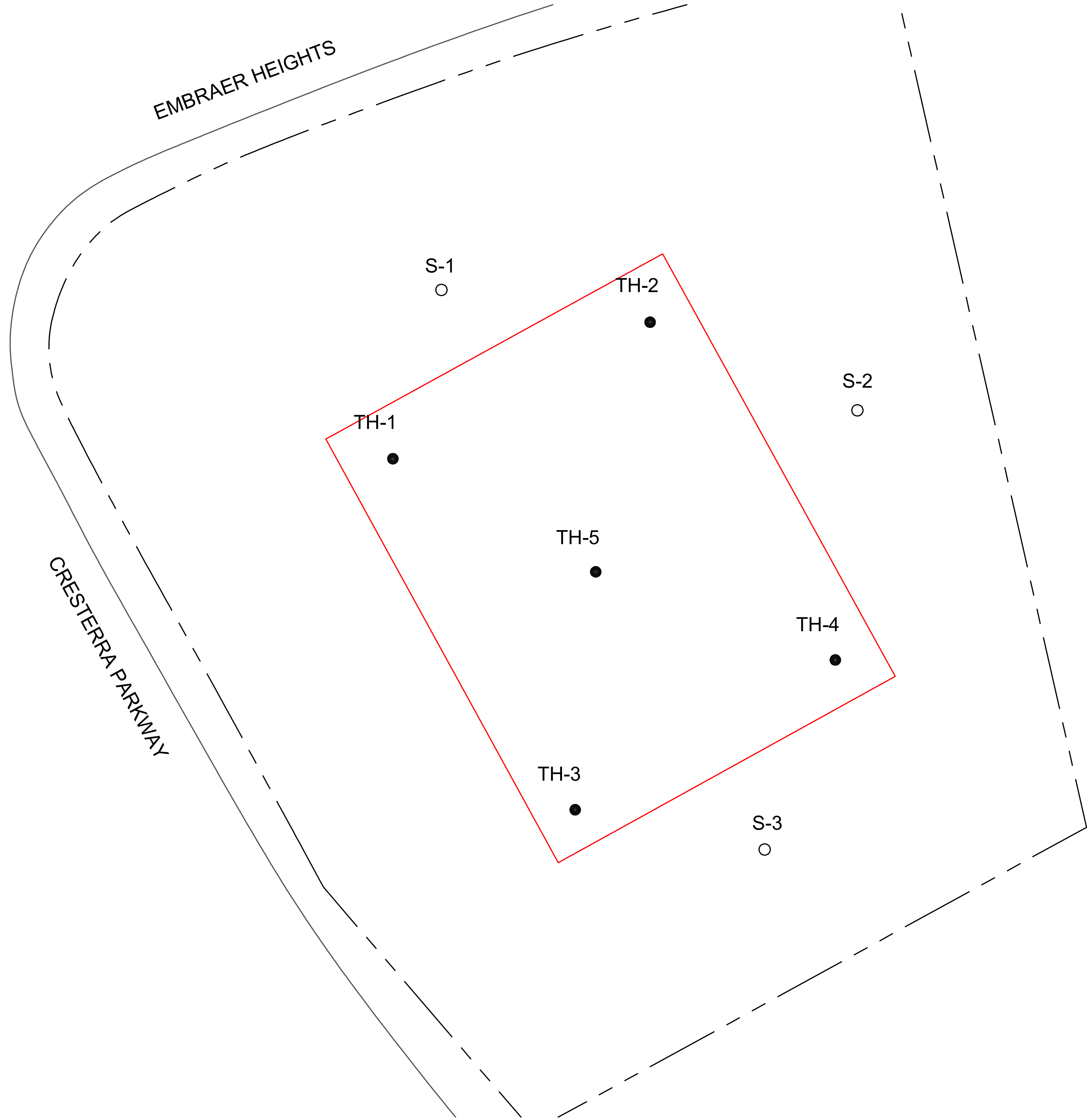
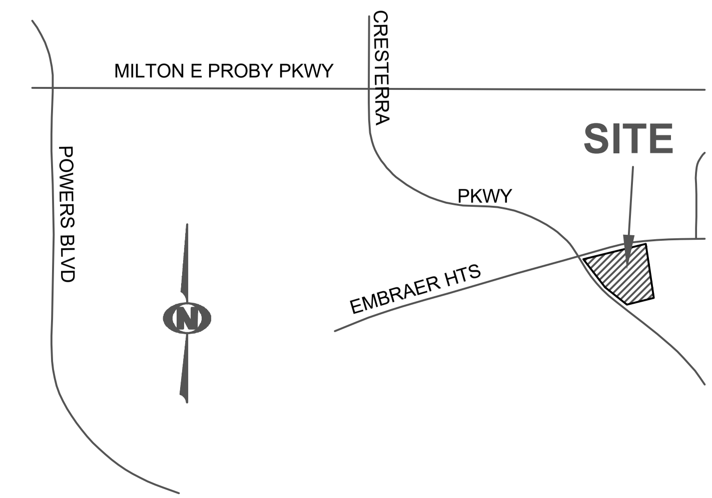


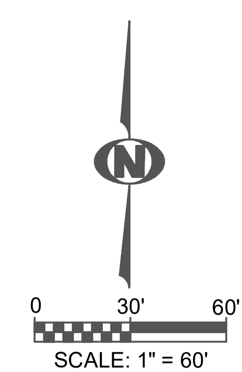


VICINITY MAP

(NOT TO SCALE)

LEGEND:

TH-1 ●	APPROXIMATE LOCATION OF EXPLORATORY BORING.
S-1 ○	APPROXIMATE LOCATION OF SUBGRADE SAMPLE.
— - —	PROJECT BOUNDARY
—— (red)	LOCATION OF PROPOSED BUILDING FOOTPRINT.

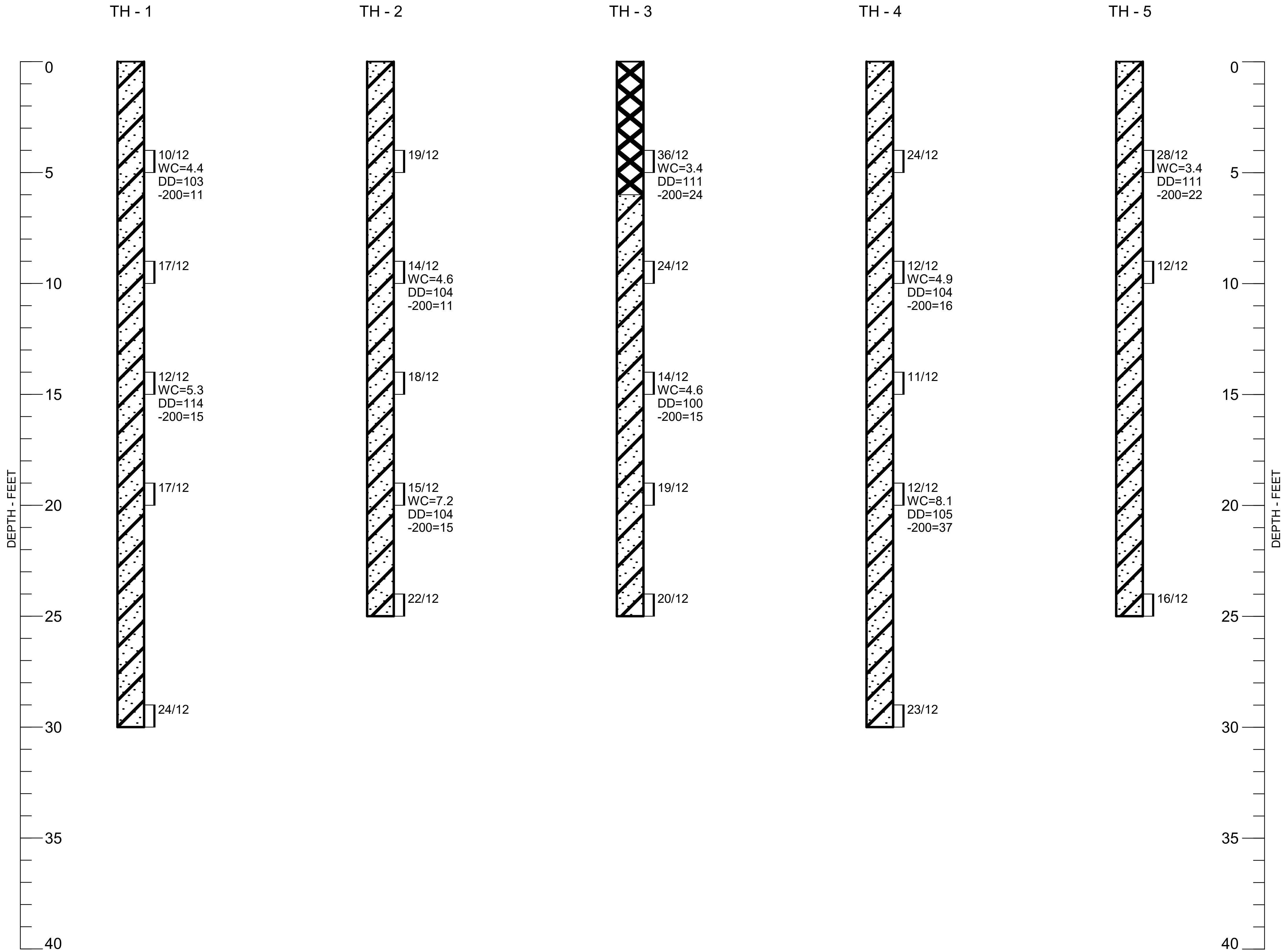


NOTE:
BASE DRAWING WAS PROVIDED BY COLARELLI CONSTRUCTION DRAWING BY INTERGROUP ARCHITECTS (DATED AUGUST 12, 2020).

Location of Exploratory Borings

FIG. 1

COLARELLI CONSTRUCTION
FLYWHEEL COMMERCIAL DEVELOPMENT - ONE
CTL|T PROJECT NO. CS19327.000-125



LEGEND:

FILL, SAND, SILTY, DENSE, MOIST, BROWN.

SAND, SLIGHTLY SILTY TO VERY SILTY, MEDIUM DENSE, SLIGHTLY MOIST TO MOIST, LIGHT BROWN TO BROWN (SW-SM, SM).

DRIVE SAMPLE. THE SYMBOL 10/12 INDICATES 10 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.

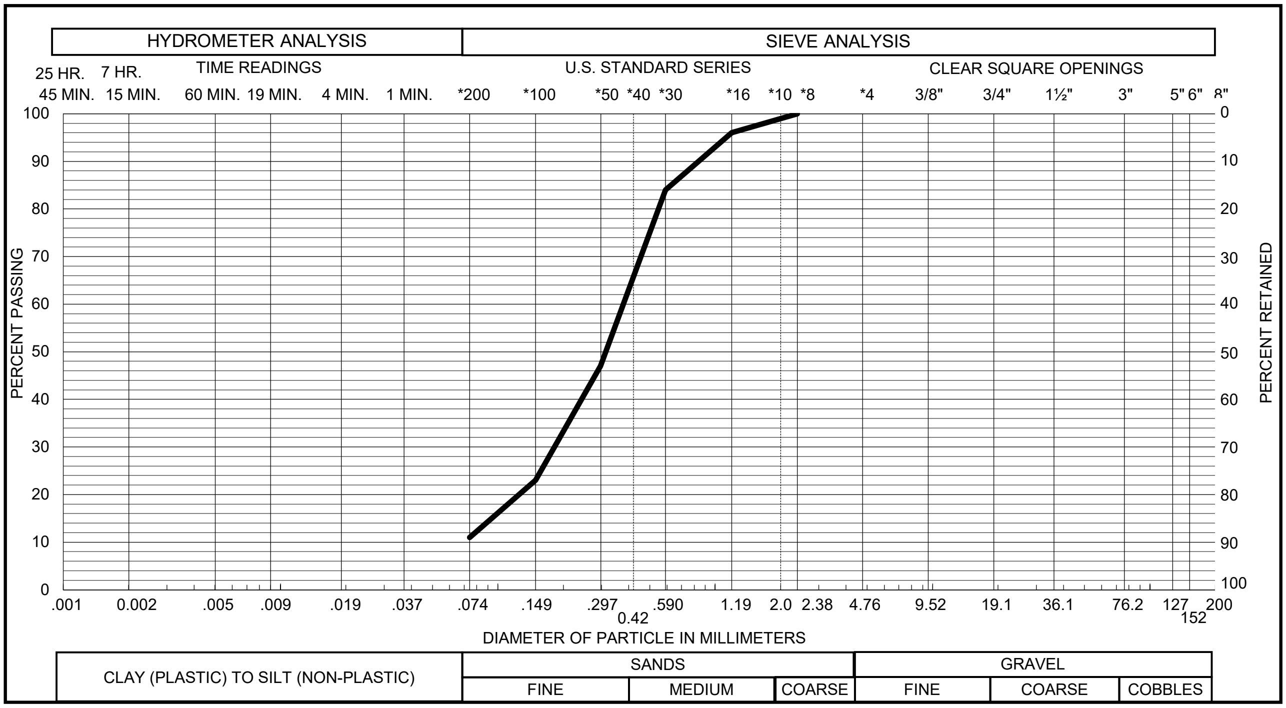
NOTES:

1. THE BORINGS WERE DRILLED OCTOBER 9, 2020 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.
3. GROUNDWATER WAS NOT ENCOUNTERED IN THE EXPLORATORY BORINGS DURING THIS INVESTIGATION.
4. WC - INDICATES MOISTURE CONTENT. (%)
   DD - INDICATES DRY DENSITY. (PCF)
   -200 - INDICATES PASSING NO. 200 SIEVE. (%)

COLARELLI CONSTRUCTION
FLYWHEEL COMMERCIAL DEVELOPMENT - ONE
CTL|T PROJECT NO. CS19327-125

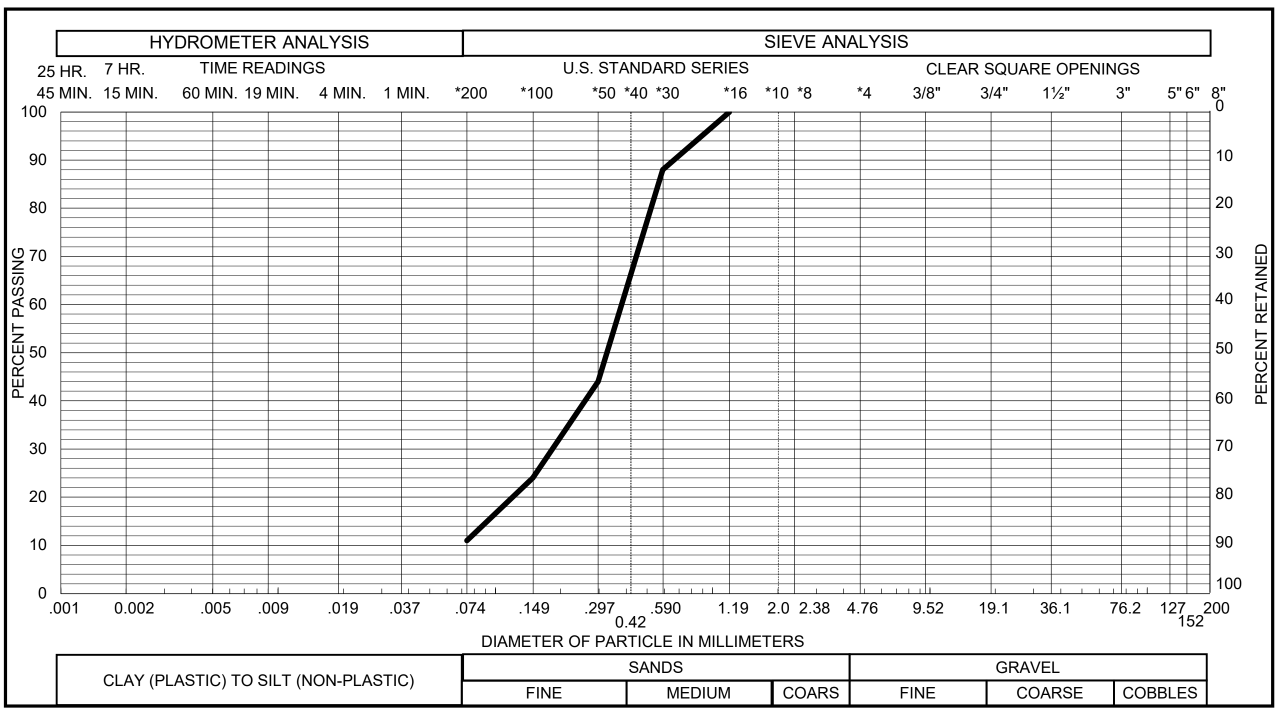
Summary Logs of Exploratory Borings

FIG. 2



Sample of SAND, SLIGHTLY SILTY (SW-SM)
From TH - 1 AT 4 FEET

GRAVEL 0 % SAND 89 %
SILT & CLAY 11 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of SAND, SLIGHTLY SILTY (SW-SM)
From TH - 2 AT 9 FEET

GRAVEL 0 % SAND 89 %
SILT & CLAY 11 % LIQUID LIMIT %
PLASTICITY INDEX %

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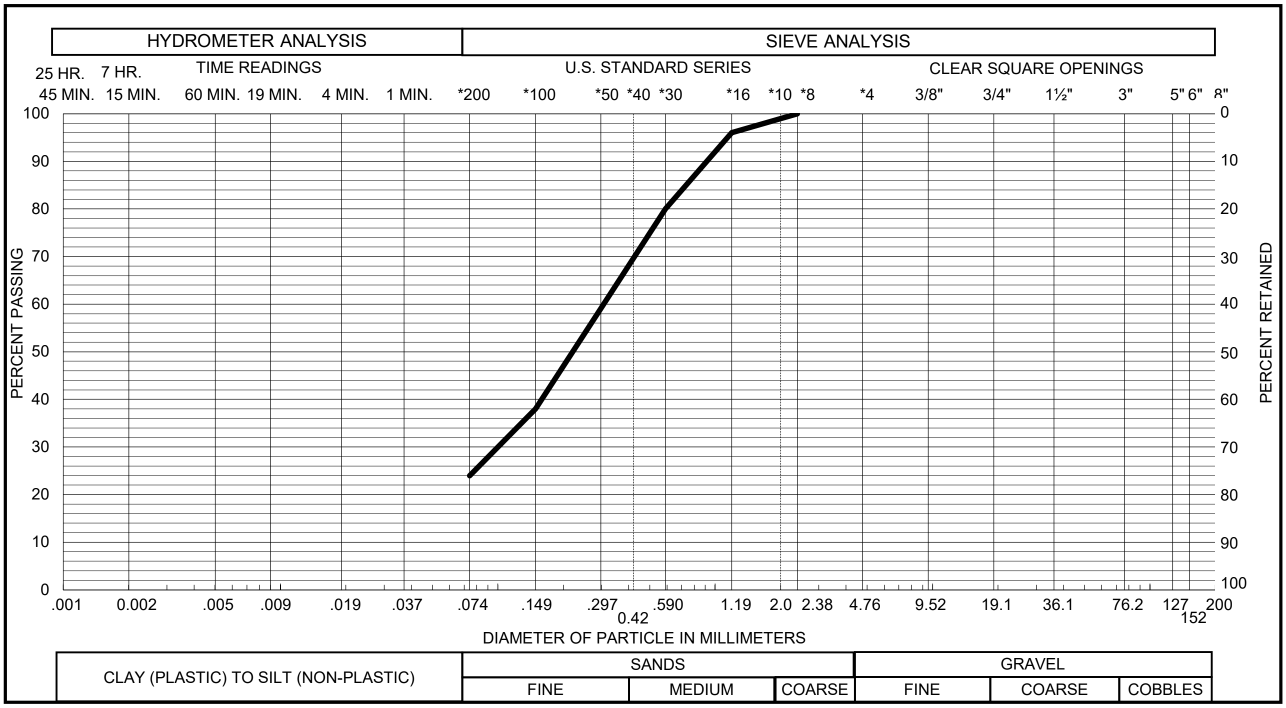
FLYWHEEL COMMERCIAL DEVELOPMENT - ONE
CTL|T PROJECT NO. CS19327-125

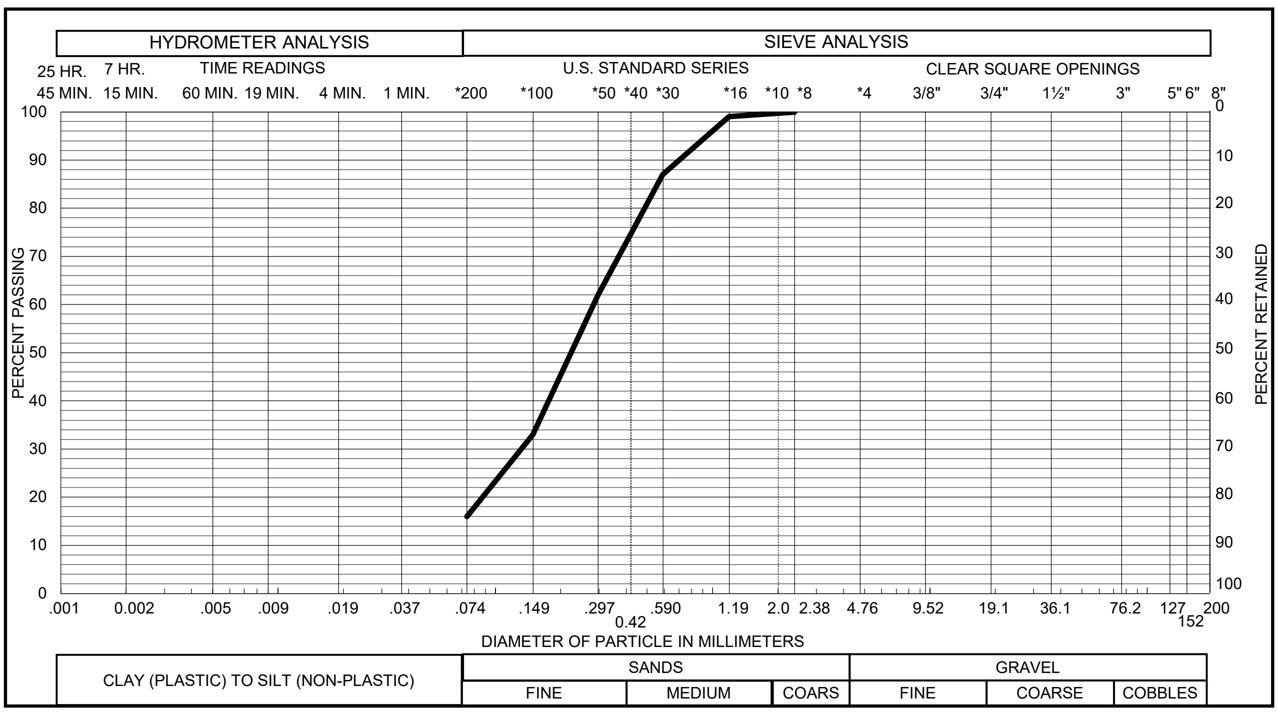
Gradation Test Results

FIG. 3



Sample of FILL, SAND, SILTY
From TH - 3 AT 4 FEET

GRAVEL 0 % SAND 76 %
SILT & CLAY 24 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of SAND, SILTY (SM)
From TH - 4 AT 9 FEET

GRAVEL 0 % SAND 84 %
SILT & CLAY 16 % LIQUID LIMIT %
PLASTICITY INDEX %

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FLYWHEEL COMMERCIAL DEVELOPMENT - ONE
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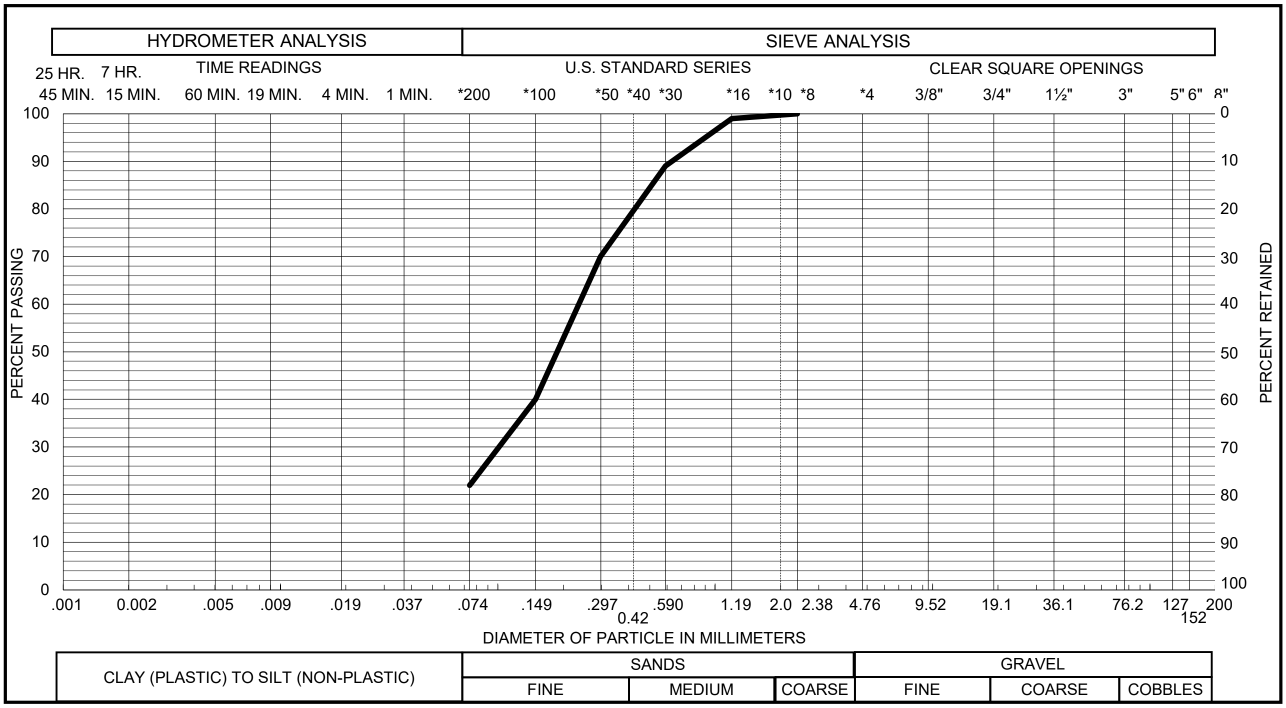
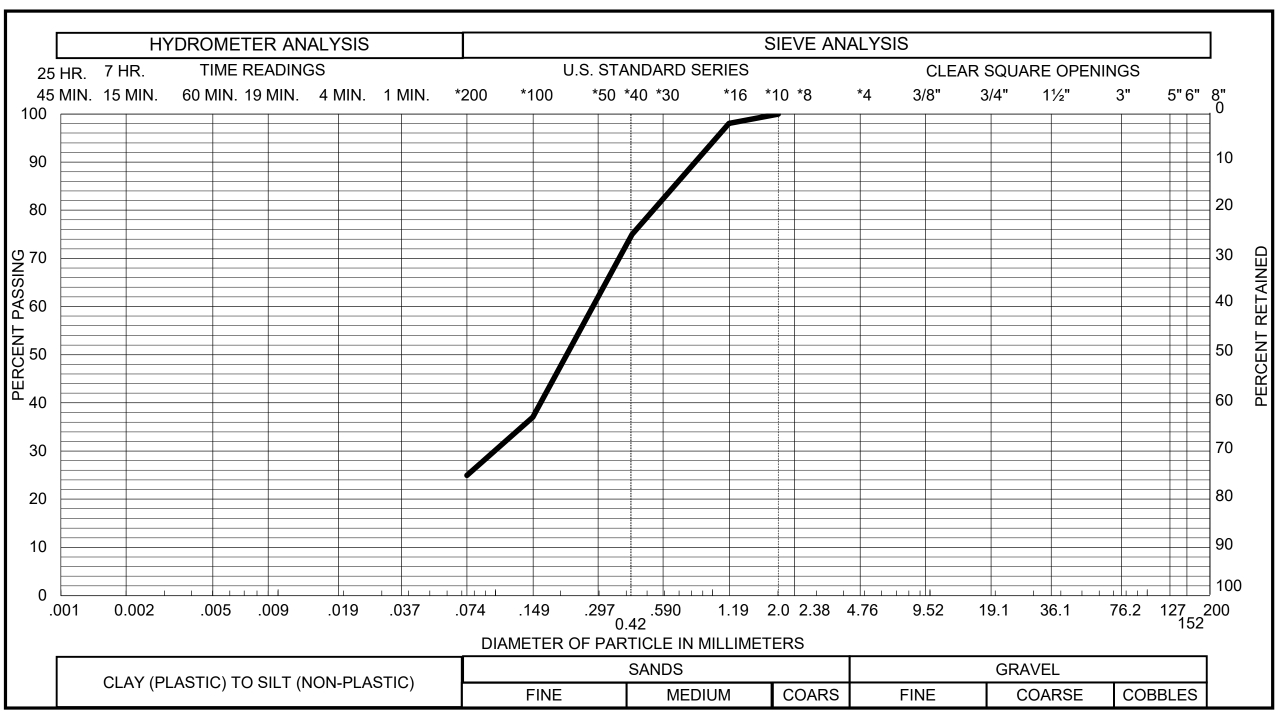
Gradation Test Results

FIG. 4



Sample of	SAND, SILTY (SM)	GRAVEL	0 %	SAND	78 %
From	TH - 5 AT 4 FEET	SILT & CLAY	22 %	LIQUID LIMIT	%
		PLASTICITY INDEX	%		



Sample of	SAND, SILTY (SM)	GRAVEL	0 %	SAND	75 %
From	COMBO - 1 AT 0-4 FEET	SILT & CLAY	25 %	LIQUID LIMIT	20 %
		PLASTICITY INDEX	4 %		

COLARELLI CONSTRUCTION
FLYWHEEL COMMERCIAL DEVELOPMENT - ONE
CTL|T PROJECT NO. CS19327-125

Gradation Test Results

FIG. 5

TABLE I

SUMMARY OF LABORATORY TESTING
CTL|T PROJECT NO. CS19327.000-125

BORING	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTICITY INDEX (%)	SWELL TEST RESULTS* SWELL (%)	SWELL TEST RESULTS* SWELL PRESSURE (PSF)	PASSING NO. 200 SIEVE (%)	WATER SOLUBLE SULFATES (%)	DESCRIPTION
TH-1	4	4.4	103					11		SAND, SLIGHTLY SILTY (SW-SM)
TH-1	14	5.3	114					15		SAND, SILTY (SM)
TH-2	9	4.6	104					11		SAND, SLIGHTLY SILTY (SW-SM)
TH-2	19	7.2	104					15		SAND, SILTY (SM)
TH-3	4	3.4	111					24		FILL, SAND, SILTY
TH-3	14	4.6	100					15		SAND, SILTY (SM)
TH-4	9	4.9	103					16		SAND, SILTY (SM)
TH-4	19	8.1	105					37		SAND, VERY SILTY (SM)
TH-5	4	3.4	111					22		SAND, SILTY (SM)
TH-5	14	3.9	106					9		SAND, SILTY (SM)
COMBO 1	0-4	2.9		20	4			25	<0.1	SAND, SILTY (SM)

* SWELL MEASURED WITH 1000 PSF APPLIED PRESSURE, OR ESTIMATED IN-SITU OVERBURDEN PRESSURE.
NEGATIVE VALUE INDICATES COMPRESSION.