jeff- the development will require foundation drains to be connected to underdrains so we need that design in the GEC also- this is in Upper Back Sq so the undedrain has to recharge the groundwater it cant be taken downstream

GEOLOGIC HAZARD EVALUATION AND PRELIMINARY GEOTECHNICAL INVESTIGATION GRANDVIEW RESERVE, FILING 1 EASTONVILLE ROAD AND U.S. HIGHWAY 24 FALCON, COLORADO

See comments within report, the ECM requires geologic hazards and geotechnical reports addressing site constraints and mitigation for projects involving construction of public improvements. The DCM Volume 1 addresses the need for geotechnical analyses for embankment structures and DCM Volume 2 addresses geotechnical construction requirements for water quality best management practices (BMPs). Applicants are also required to comply with the State Engineer's requirements regarding embankments and dams utilized for storage of water.

Planning defers to engineering to determine if they are satisfied with the ECM and DCM report requirements; please note Utiltiy installation is requested with this application

Prepared For:

D.R. HORTON
9555 S. Kingston Court
Englewood, Colorado

Division of Water Resources
Department of Natural Resources
www.water.state.co.us P 303.866.3581

NON-JURISDICTIONAL WATER IMPOUNDMENT STRUCTURE[1]
This notice is required per Section 37-87-125, C.R.S. (1998) and must be submitted to the Division Engineer's Office a minimum of 45 days prior to construction.

OWNER INFORMATION

Name: Paul Howard Telephone/E-Mail: (719) 499-8416 / paulinfinity1@msn.com

Address: 1271 Kelly Johnson Boulevard, Suite 100 (Street / P.O. Box/ Rural Route) Colorado Springs (City) CO (State) 80920 (Zip Code)

Responsible Person: Paul Howard Telephone/E-Mail: (719) 499-8416 / paulinfinity1@msn.com

Address: 1271 Kelly Johnson Boulevard, Suite 100 (Street / P.O. Box/ Rural Route) Colorado Springs (City) CO (State) 80920 (Zip Code)

Contractor: HR Green - Phil Stuepfert Telephone/E-Mail: (720) 602-4941 / pstuepfert@hrgreen.com

STRUCTURE INFORMATION

Name of Dam: Pond A Water Division: _____ Water District: _____

Location: *(Provide Section, Township, Range, **and** GPS Point taken at crest of dam above streamline/outlet)*

- Section: 21, Township: 12 South, Range: 64 West, 6th P.M.

- Northing 4315351.537 meters, Easting 537956.397 meters (*Datum should be UTM, NAD 83)*

TABLE OF CONTENTS

SCOPE

This report presents the results of our Geologic Hazards Evaluation and Preliminary Geotechnical Investigation for Filing 1 of the proposed Grandview Reserve development. The proposed development is located east of Eastonville Road, west of U.S. Highway 24, and north of Stapleton Road in Falcon, Colorado (Fig. 1). We understand you are assessing the land for the construction of single-family residences. The purpose of our investigation was to evaluate the property for the occurrence of geologic hazards and their potential effect on the proposed development and to evaluate subsurface conditions to assist in planning of residential construction. The report includes descriptions of the subsurface conditions encountered in our exploratory borings, and discussions of construction as influenced by geotechnical considerations. The scope was described in our Contract Modification (CS-20-0171) dated November 19, 2021. Evaluation of the property for the presence of potentially hazardous materials (Environmental Site Assessment) was not included in our scope.

This report is based on our understanding of the planned construction, subsurface conditions disclosed by exploratory borings, results of field and laboratory tests, engineering analysis, and our experience. It contains descriptions of the soil and bedrock conditions and groundwater levels found in our exploratory borings, and preliminary design and construction criteria for foundations, floor systems, and surface and subsurface drainage. The discussions of foundation and floor systems are intended for planning purposes only. Additional site-specific investigations will be necessary as development plans progress to design structures, pavements, and other site improvements. A brief summary of our conclusions and recommendations follows, with more detailed discussion in the report.

SUMMARY OF CONCLUSIONS

1. We did not identify geotechnical or geologic constraints at this site that we believe precludes construction of single-family residences. The primary geotechnical concerns are the sporadic lenses of expansive claystone bedrock and locally shallow groundwater. We believe these

concerns can be mitigated with proper planning, engineering, design, and construction.

2. Strata encountered in our exploratory borings consisted of 0.5 to 16 feet of natural silty to clayey sand underlain by sandstone and claystone bedrock to the maximum depths explored of 20 to 30 feet. Testing and our experience indicates the near-surface soils are generally non-expansive. The underlying bedrock is predominantly non-expansive to low swelling sandstone. Claystone layers are intermittently present within the bedrock and exhibit variable swell potential.

3. Groundwater was encountered in eleven of our borings during drilling at depths between 7 and 19.5 feet. Groundwater was measured several days after drilling in each of the thirteen borings at depths ranging from 4.5 to 16.5 feet below the existing ground surface. Groundwater elevations can be altered by development and will vary with seasonal precipitation and landscaping irrigation.

4. The presence of expansive soils and bedrock on the site constitutes a geologic hazard. There is risk that these materials may heave and damage slabs-on-grade and foundations. We believe the risk of damage can be mitigated through typical engineering practices employed in the region. Slabs-on-grade and in some instances, foundations, may be damaged. Where claystone is encountered within excavations, subexcavation may be appropriate.

5. We believe spread footings designed and constructed to apply a minimum deadload will be appropriate if underlain by natural sand, sandstone bedrock, or new, moisture conditioned and densely compacted fill.

6. Control of surface drainage will be critical to the performance of foundations and slabs-on-grade. Overall surface drainage should be designed to provide rapid removal of surface runoff away from the proposed residences. Conservative irrigation practices should be followed to avoid excessive wetting.

SITE CONDITIONS

Filing 1 of the proposed Grandview Reserve development consists of approximately 190 acres of undeveloped land located east of Eastonville Road, west of U.S. Highway 24, and north of Stapleton Road in the unincorporated community of Falcon, Colorado. The site location and approximate extents as well as a preliminary development plan are shown in Fig. 1. At the time of our investigation, the ground

surface was largely undisturbed with the exception of some unimproved dirt roads and a gas line easement that extends through the southern portion of the property in a general southwest to northeast direction. Additionally, a small dam is present in the southern portion of the site. A few natural drainages cross the property in a general northwest to southeast direction. The drainages typically only flow in response to recent precipitation. Site topography is gently rolling with a gentle descent to the southeast. Moderate slopes are present along drainages. Historically the land has been used for agriculture and grazing. Vegetation consists of prairie grasses and weeds.

PROPOSED DEVELOPMENT

The proposed Grandview Reserve development will primarily include residential development varying from low to high density, as well as a community park, church, and school. An extension of Rex Road is planned to extend to the east at the northern end of Filing 1. The Rex Road extension will continue southeast through future filings and intersect with U.S. Highway 24. A network of additional collector and residential streets will provide access to the various residential neighborhoods. Existing drainages are expected to remain or be rerouted.

PREVIOUS INVESTIGATIONS

In January 2019, Entech Engineering, Inc. performed a Preliminary Soil, Geology, Geologic Hazard, and Wastewater Study for the Grand Reserve site (Entech Job No. 181951). Entech advanced ten borings at the site in late November 2018. We were provided with a copy of the Entech report for review and utilized the subsurface information to supplement the information obtained during our investigations.

In December 2020, CTL|Thompson, Inc. performed a Preliminary Geotechnical Investigation for a larger 768 acre site that included the subject site. A total of 12 very widely spaced exploratory borings were advanced at the site. Borings TH-1, TH-4, TH-7, and TH-10 were drilled within the 190 acre portion of the Grandview

Reserve development that is the subject of this report. We utilized the information obtained from the borings to supplement this study.

INVESTIGATION

Subsurface conditions at the site were investigated by our firm by drilling a total of thirteen widely spaced exploratory borings. Four exploratory borings (TH-1, TH-4, TH-7, and TH-10) were drilled during a previous study completed in December 2020, and an additional 9 exploratory borings (TH-101 through TH-109) were recently advanced within the subject 190 acre site, to depths between 20 and 30 feet. The boring locations were established by the client's surveyor. The approximate locations of the borings are shown in Fig. 1. Our representative observed the drilling operations, logged the subsurface conditions found in the borings, and obtained samples for laboratory testing. Graphical logs of the borings, including the results of field penetration resistance tests, and some laboratory test data are presented in Appendix A. Soil samples obtained during drilling were visually classified and laboratory testing was assigned to representative samples. Swell-consolidation and gradation test results are presented in Appendix B. Laboratory test data are summarized in Table B-1.

SUBSURFACE CONDITIONS

Strata encountered in our exploratory borings generally consisted of natural slightly silty to silty and clayey to very clayey sand underlain by sandstone and claystone bedrock to the maximum depths explored of 20 to 30 feet. Some of the pertinent engineering characteristics of the soil and bedrock are described in the following paragraphs.

Natural Soils

Natural soils were encountered at the surface in each of our borings and extended to depths varying from 0.5 to 16 feet. The natural soils consisted of predominantly slightly silty to silty and clayey to very clayey sand. A layer of sandy clay was

encountered between 12 and 16 feet in boring TH-104. The sand was loose to dense based on field penetration resistance testing and our observations during drilling. Eight samples of the sand tested in our laboratory contained 9 to 48 percent silt and clay-sized particles (passing the No. 200 sieve). The silty sand is judged to be non-expansive. The clayey sand is non-expansive to low swelling. A sample of the sandy clay exhibited 0.7 percent swell when wetted under estimated overburden pressures.

Bedrock

Bedrock was encountered in each of the borings underlying the natural soils, at depths of between 0.5 and 16 feet below the ground surface. The predominate sandstone bedrock contained sporadic layers of sandy to very sandy claystone. The bedrock was hard to very hard. Five samples of the sandstone contained 21 to 31 percent silt and clay-sized particles. The sandstone is judged to be non-expansive to low swelling.

Sandy to very sandy claystone bedrock was encountered in five of our borings at varying depths. Two samples of the claystone tested in our laboratory contained 54 and 68 percent silt and clay-sized particles and exhibited measured swells between 0.8 and 2.2 percent when wetted under estimated overburden pressure.

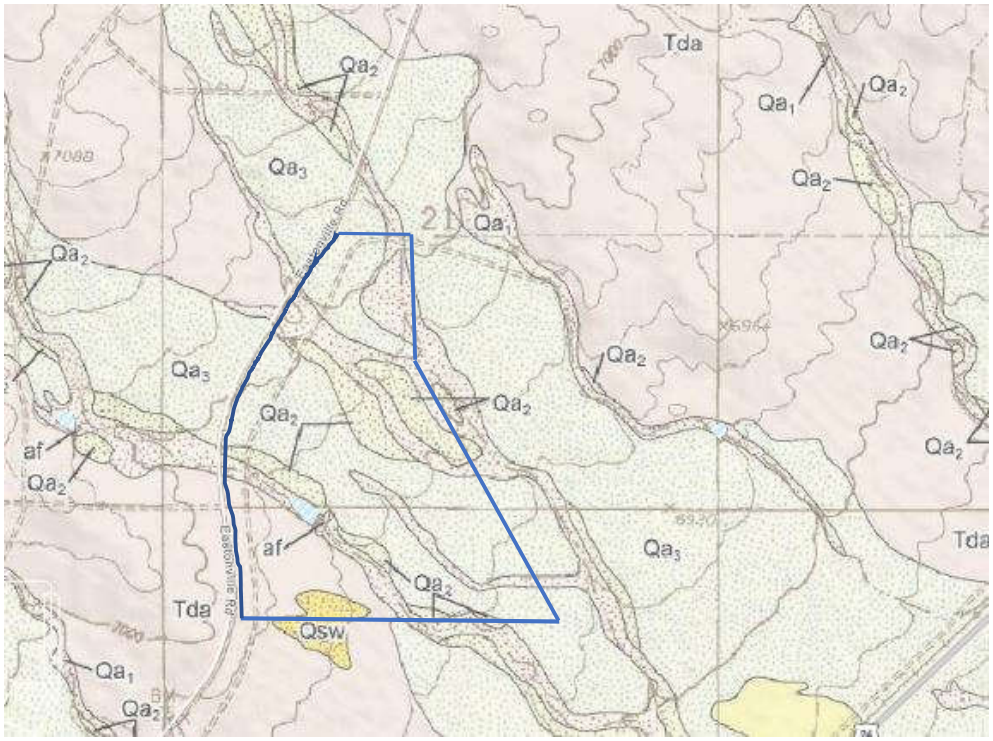
Groundwater

Groundwater was encountered in eleven of our borings during drilling at depths between 7 and 19.5 feet. Groundwater was measured several days after drilling in each of the thirteen borings at depths ranging from 4.5 to 16.5 feet below the existing ground surface. Groundwater may develop and fluctuate seasonally and rise in response to development, precipitation, and landscape irrigation.

SITE GEOLOGY

The surficial geology at the site was evaluated by reviewing published geologic maps and our own site reconnaissance. The site lies within the area of the Falcon Quadrangle Geologic map published by the Colorado Geological Survey.

The predominant geologic unit at the site Quaternary-age Alluvium (Qa_1, Qa_2, and Qa_3). The alluvium consists of poorly to well sorted, poorly to moderately consolidated, silt, sand, gravel, and minor clay along active stream channels and terraces. Artificial fill (af) is mapped at the location of a small earthen dam. A portion of the southwestern corner of the site is mapped as Dawson Formation bedrock (Tda). The Dawson Formation consists of white to tan, thick to massive, cross-bedded arkoses, pebbly arkoses, and arkosic pebble conglomerates. The Dawson Formation in the site area is predominantly sandstone with sparse interbeds of thin-bedded gray claystone and sandy claystone. The bedrock underlies the surficial alluvium throughout the site. Conditions at the site were found to be similar to the mapped conditions.



Excerpt from Falcon Quadrangle Geologic Map, El Paso County, Colorado, 2012.

GEOLOGIC HAZARDS

Geologic hazards we identified at the site include expansive soils, hard bedrock, and shallow groundwater. No geologic hazards were noted that we believe preclude the proposed development. We believe potential hazards can be mitigated with proper engineering, design, and construction practices, as discussed in this report. Figure 2 shows our interpretation of the engineering geology modified from the system used by Charles Robinson & Associates (1977).

Shallow Groundwater

Groundwater was encountered in eleven of our borings during drilling at depths between 7 and 19.5 feet. Groundwater was measured several days after drilling in each of the thirteen borings at depths ranging from 4.5 to 16.5 feet below the existing ground surface. Our borings were drilled in late fall when natural groundwater elevations are receding from their seasonal highs. It should be expected that site development including overlot grading and utility installation will alter groundwater levels. The depth to groundwater is indicated on Fig. 2.

The presence of shallow groundwater can impact basement level construction. Current groundwater depths indicate proximity of groundwater to basement level foundation systems may be a concern, particularly near drainages. This condition can be mitigated through use of foundation drains, active underdrains (if allowed and installed by the developer), or cut-off drains. The depth to groundwater will also be impacted by proposed grading and depth of foundations. This condition should be further evaluated at the time of lot-specific Soils and Foundation Investigations.

Hard Bedrock

The sandstone and claystone of the Dawson Formation are hard to very hard and present at shallow depths within the site. The hard to very hard bedrock will be difficult to excavation and will require heavy duty excavation equipment. Deep excavations into bedrock will require rock teeth and rock buckets.

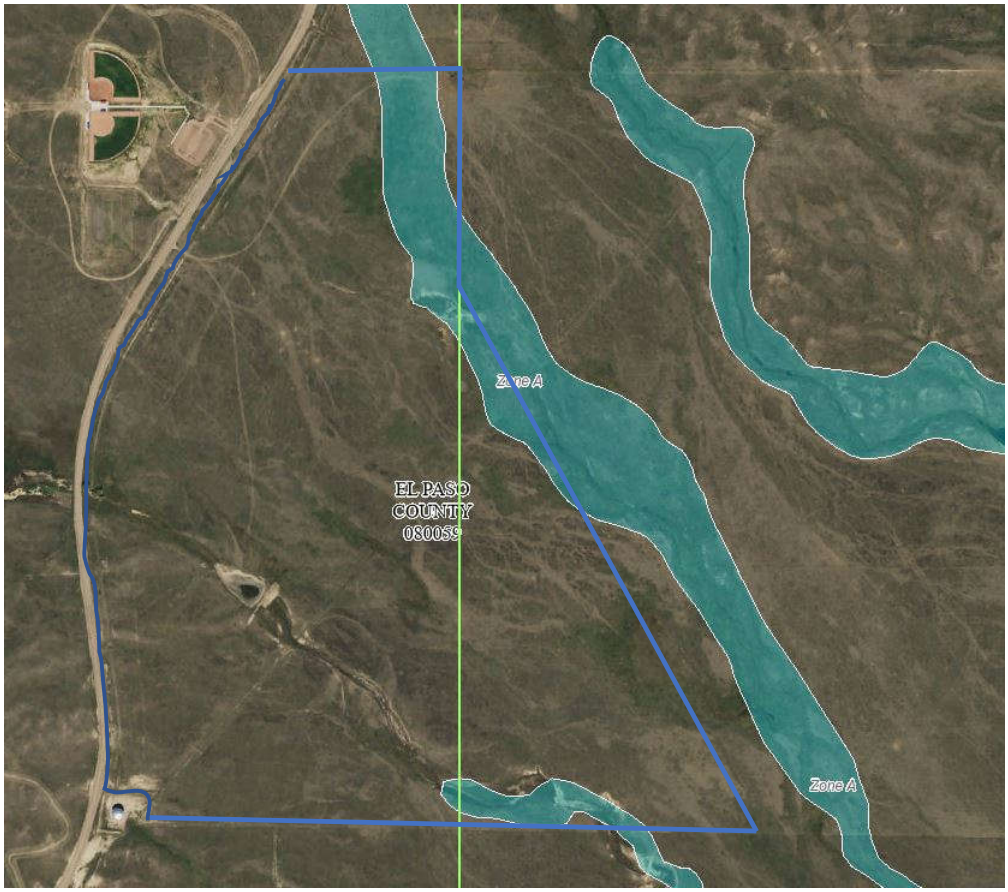
Expansive Soils and Bedrock

Colorado is a challenging location to practice geotechnical engineering. The climate is relatively dry and the near-surface soils are typically dry and comparatively stiff. These soils and related sedimentary bedrock formations react to changes in moisture conditions. Some of the soils swell as they increase in moisture and are referred to as expansive soils. Other soils can compress significantly upon wetting and/or additional loading (from foundations or site grading fill) and are identified as compressible or collapsible soils. Much of the land available for development east of the Front Range is underlain by expansive clay or claystone bedrock near the surface. The soils that exhibit compressible behavior are more likely west of the Continental Divide; however, both types of soils occur throughout the state.

Covering the ground with structures, streets, driveways, patios, etc., coupled with lawn irrigation and changing drainage patterns, leads to an increase in subsurface moisture conditions. As a result, some soil movement due to heave or settlement is inevitable. Expansive bedrock is present at this site, which constitutes a geologic hazard. There is risk that foundations and slab-on-grade floors will experience heave or settlement and damage. It is critical that precautions are taken to increase the chances that the foundations and slabs-on-grade will perform satisfactorily. Engineered planning, design and construction of grading, pavements, foundations, slabs-on-grade, and drainage can mitigate, but not eliminate, the effects of expansive and compressible soils. Sub-excavation is a ground improvement method that can be used to reduce the impacts of swelling soils.

Flooding

The majority of the site lies within Zone D (undetermined flood hazard) as shown on FIRM Community Map Numbers 08041C0552G and 08041C0556G, revised December 7, 2018. Zone D indicates floods are possible, but not likely. Some portions of the site within drainage areas lie within Zone A as shown below.



Excerpt from FEMA National Flood Hazard Layer Viewer

Based on the topography at the site the potential for a flood to impact the majority of the site area is low. During peak precipitation events, some accumulation of surface sheet flow in drainages is expected with possible inundation within the Zone A areas. Development will increase the relative area of impervious surfaces, which can lead to drainage problems and erosion if surface water flow is not adequately

designed. Surface drainage design and evaluation of flood potential should be performed by a civil engineer as part of the project design.

Seismicity

This area, like most of Colorado, is subject to a low degree of seismic risk. The soil and bedrock units are not expected to respond unusually to seismic activity. According to the 2015 International Residential Code and based upon the results of our investigation, we judge the site classifies as Seismic Site Class C.

Erosion

The site is susceptible to the effects of wind and water erosion. Water flowing across the site in an uncontrolled manner will likely result in considerable erosion, particularly where the water flow is concentrated. The surficial sandy soils are relatively stable and resistant to wind erosion where vegetation is established. Disturbance of the vegetative cover and long-term exposure of these deposits to the erosive power of wind and water increases the potential for erosion. Maintaining vegetative cover and utilizing surface drainage collection and distribution systems will reduce the potential for erosion from wind and water.

Radon/Radioactivity

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. The EPA provides guidance on construction radon resistant structures.

Recoverable Minerals

The project site is included in the Aggregate Resources of Colorado mapping from the Colorado Geological Survey. The mapping does not indicate any commercial sand or gravel pits near the project site. We observed no evidence of surface or subsurface mining at the site.

ESTIMATED POTENTIAL HEAVE

Based on the subsurface profiles, swell-consolidation test results and our experience, we calculated potential heave at the existing ground surface for each test hole. The analysis involves dividing the soil profile into layers and modeling the heave of each layer from representative swell tests. We estimate potential ground heave will generally be less than 0.5-inch with one test hole calculated at up to about 1-inch. A depth of wetting of 24 feet below existing grades was considered for the analysis. This depth of wetting is typically used for irrigated residential sites. Variations from our estimates should be anticipated. It is not certain whether the estimated heave will occur.

The heave estimates are summarized in the table below. We judge there is a relatively low risk of problems due to expansive soils and bedrock for much of the site; however, it should be understood that our borings were very widely spaced. As such, significant areas of moderately expansive claystone may be present.

ESTIMATED POTENTIAL GROUND HEAVE BASED ON
24 FEET DEPTH OF WETTING

BORING	ESTIMATED POTENTIAL GROUND HEAVE (INCHES)
TH-1	<0.5
TH-4	<0.5
TH-7	<0.5
TH-10	<0.5
TH-101	<0.5
TH-102	<0.5
TH-103	<0.5
TH-104	<0.5
TH-105	<0.5
TH-106	<0.5
TH-107	0.9
TH-108	<0.5
TH-109	<0.5

Sub-Excavation

Our investigation indicates soils and bedrock with nil to moderate expansion potential are present locally at shallow depths likely to influence the performance of shallow foundations and slabs-on-grade. We estimated total potential ground heave could be up to about 0.9 inches. Our experience suggests performance of structures constructed on claystone bedrock materials can be erratic. Where present near foundation levels, sub-excavation of up to 4 feet in thickness may be appropriate. Localized areas of deeper sub-excavation may be necessary. This condition is not expected to be widespread, and the need for sub-excavation and appropriate methods should be evaluated at the time of the lot specific soils and foundation investigation.

BUILDING CONSTRUCTION CONSIDERATIONS

Foundations

Our investigation indicates predominantly granular soils and sandstone bedrock will be present at foundation elevations. Expansive claystone is present locally at varying depths. If claystone is encountered at foundation depths, sub-excavation

will likely be appropriate to reduce the risk of poor performance. Typically, sub-excavation depths in this formation are in the range of 4 to 8 feet in thickness where these lenses are present. We expect spread footing foundations designed to apply minimum deadload will likely be appropriate for the lots. We estimate maximum allowable pressures of about 3,000 psf will be appropriate for the lots included in this investigation. Detailed soils and foundation investigations should be performed to determine the appropriate foundation types and to provide design criteria on a lot-specific basis.

Floor Construction

We expect slab-on-grade basement floors and garage floors will be appropriate for the site. The site will likely have a low to moderate risk (where shallow claystone is encountered) of poor slab-on-grade performance, although sub-excavation may be required where claystone lenses are identified near floor elevations. Structural floors should be used in non-basement, finished living areas. A structural floor is supported by the foundation system. Design and construction issues associated with structural floors include ventilation and lateral loads. Where structurally supported floors are installed in basements or over a crawlspace, the required air space depends on the materials used to construct the floor and the potential expansion of the underlying soils. The risk of poor performance of floor slabs, driveways, sidewalks, and other surface flatwork may increase where expansive soils are present, unless sub-excavation is performed.

Subsurface Drainage

Surface water can penetrate relatively permeable loose backfill soils located adjacent to residences and collect at the bottom of relatively impermeable foundation excavations, causing wet or moist conditions after construction. Foundation walls and grade beams should be designed to resist lateral earth pressures. Foundation drains should be constructed around the lowest excavation levels of basement and/or crawlspace areas. Where locally high groundwater is present, below slab drainage layers may be appropriate. These drains could be connected to an

underdrain system (if present) to provide a gravity outlet. Sump pits should be provided so pumps can be installed as a backup if underdrains do not perform as intended.

Surface Drainage

The performance of foundations, floors, and other improvements is affected by moisture changes within the soil. This is largely influenced by surface drainage. When developing an overall drainage scheme, consideration should be given by the developer to drainage around each residence. The ground surface around the residences should be sloped to provide positive drainage away from the foundations. We recommend a slope of at least 10 percent for the first 10 feet surrounding each building, where practical. If the distance between buildings is less than 20 feet, the slope in this area should be 10 percent to the swale between houses. Variation from these criteria is acceptable in some areas. For example, for lots graded to direct drainage from the rear yard to the front, it is difficult to achieve the recommended slope at the high point behind the house. We believe it is acceptable to use a slope of about 6 inches in the first 10 feet (5 percent) at this location. A 5 percent slope can also be used adjacent to residences without basements. Roof downspouts and other water collection systems should discharge beyond the limits of backfill around structures.

Concrete

Concrete in contact with soil can be subject to sulfate attack. We measured the water-soluble sulfate concentration in two samples from this site at less than 0.1 percent. For this level of sulfate concentration, ACI 332-08 *Code Requirements for Residential Concrete* indicates there are no special requirements for sulfate resistance.

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 materials 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 exposed to freeze/thaw conditions should be air entrained. We recommend foundation walls and grade beams surrounding living areas that are in contact with the subsoils be damp-proofed.

RECOMMENDED FUTURE INVESTIGATIONS

We recommend the following investigations and services:

1. Design-level Soils and Foundation Investigations for each individual lot;
2. Pavement Subgrade Investigations; and
3. Foundation installation observations.

CONSTRUCTION OBSERVATIONS

This report has been prepared for the exclusive use of D.R. Horton and your team to provide geotechnical design and construction criteria for development. The information, conclusions, and recommendations presented herein are based upon consideration of many factors including, but not limited to, the type of structures proposed, the geologic setting, and the subsurface conditions encountered.

We recommend that CTL | Thompson, Inc. provide construction observation services to allow us the opportunity to verify whether 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 structures will perform satisfactorily. It is critical that all recommendations in this report are followed during construction.

LIMITATIONS

Our borings were very widely spaced to provide a general picture of subsurface conditions for due diligence and preliminary planning of residential construction. Variations from our borings should be anticipated. We believe this investigation was conducted in a manner consistent with that level of care and skill ordinarily 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 analysis of the influence of subsurface conditions on the project, please call.

CTL | THOMPSON, INC.

COLORADO LICENSED JEFFREY MARK JONES 47539 1/6/22 PROFESSIONAL ENGINEER

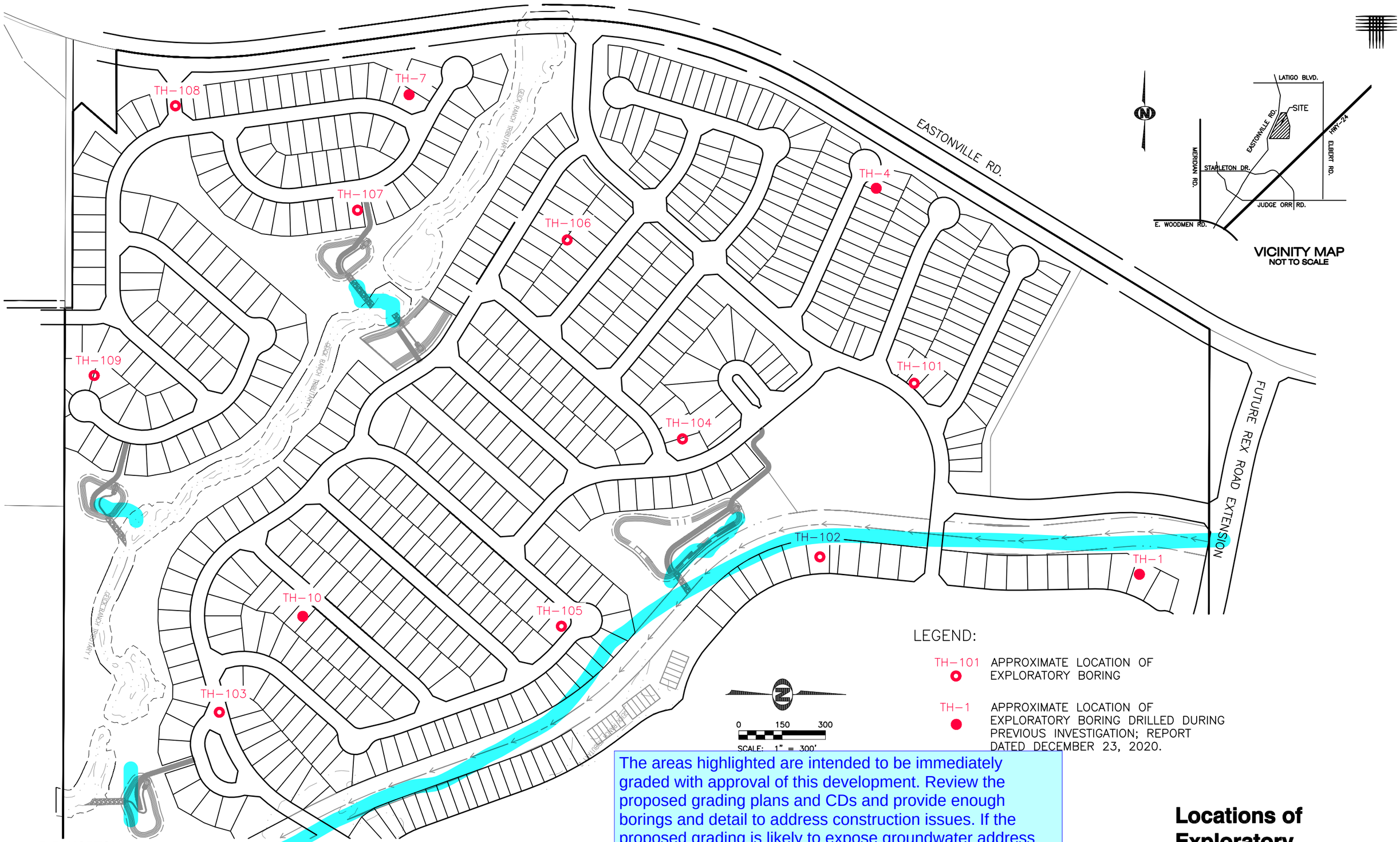
Jeffrey M. Jones, P.E.
Associate Engineer

Reviewed by

Timothy A. Mitchell, P.E.
Principal Engineer

JMJ:TAM:cw
(2 copies sent)

Via e-mail: rhillen@drhorton.com; mwbird@drhorton.com



VICINITY MAP
NOT TO SCALE

LEGEND:

TH–101 APPROXIMATE LOCATION OF EXPLORATORY BORING

TH–1 APPROXIMATE LOCATION OF EXPLORATORY BORING DRILLED DURING PREVIOUS INVESTIGATION; REPORT DATED DECEMBER 23, 2020.

The areas highlighted are intended to be immediately graded with approval of this development. Review the proposed grading plans and CDs and provide enough borings and detail to address construction issues. If the proposed grading is likely to expose groundwater address mitigation measures.

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T Project No. CS19345-115-R2

Locations of Exploratory Borings

Fig. 1

LEGEND:

TH–101 APPROXIMATE LOCATION OF EXPLORATORY BORING

TH–1 APPROXIMATE LOCATION OF EXPLORATORY BORING DRILLED DURING PREVIOUS INVESTIGATION; REPORT DATED DECEMBER 23, 2020.

1-A STABLE ALLUVIUM, COLLUVIUM, AND BEDROCK ON FLAT TO GENTLE SLOPES (0–12%). EMPHASIS ON SURFACE AND SUBSURFACE DRAINAGE.

7-A PHYSIOGRAPHIC FLOODPLAIN WHERE EROSION AND DEPOSITION PRESENTLY OCCUR AND IS GENERALLY SUBJECT TO RECURRENT FLOODING. INCLUDES 100–YEAR FLOODPLAIN ALONG MAJOR STREAMS WHERE FLOODPLAIN STUDIES HAVE BEEN CONDUCTED. EMPHASIS ON FREQUENCY OF SURFACE WATER FLOW, DEPTH AND CONTROL.

(4) DEPTH TO GROUNDWATER (FEET)

EASTONVILLE RD.

FUTURE REX ROAD EXTENSION

DUCK POND TRIBUTARY

TH–108 (16.5)
TH–7 (9)
TH–107 (9)
TH–106 (6.5)
TH–4 (15)
TH–109 (12.5)
TH–101 (4.5)
TH–104 (15)
TH–102 (7.5)
TH–1 (9.5)
TH–10 (7)
TH–105 (4.5)
TH–103 (16.5)

1-A
7-A

Please identify the lots impacted by the groundwater levels that may preclude basements. Groundwater 4feet below the surface may preclude basements on specific lots in addition to the under drains required throughout development. These lots shall be identified in the standard geo note to be on the face of the prel plan. Does the bedrock (hard-veryhard preclude basements? If so what mitigation, what lots? Is the entire development subject to heave or just some lots? Please clarify graphicly and via Geo note on prelim plan

these lots can not be platted until LOMR is complete;

2

0 150 300

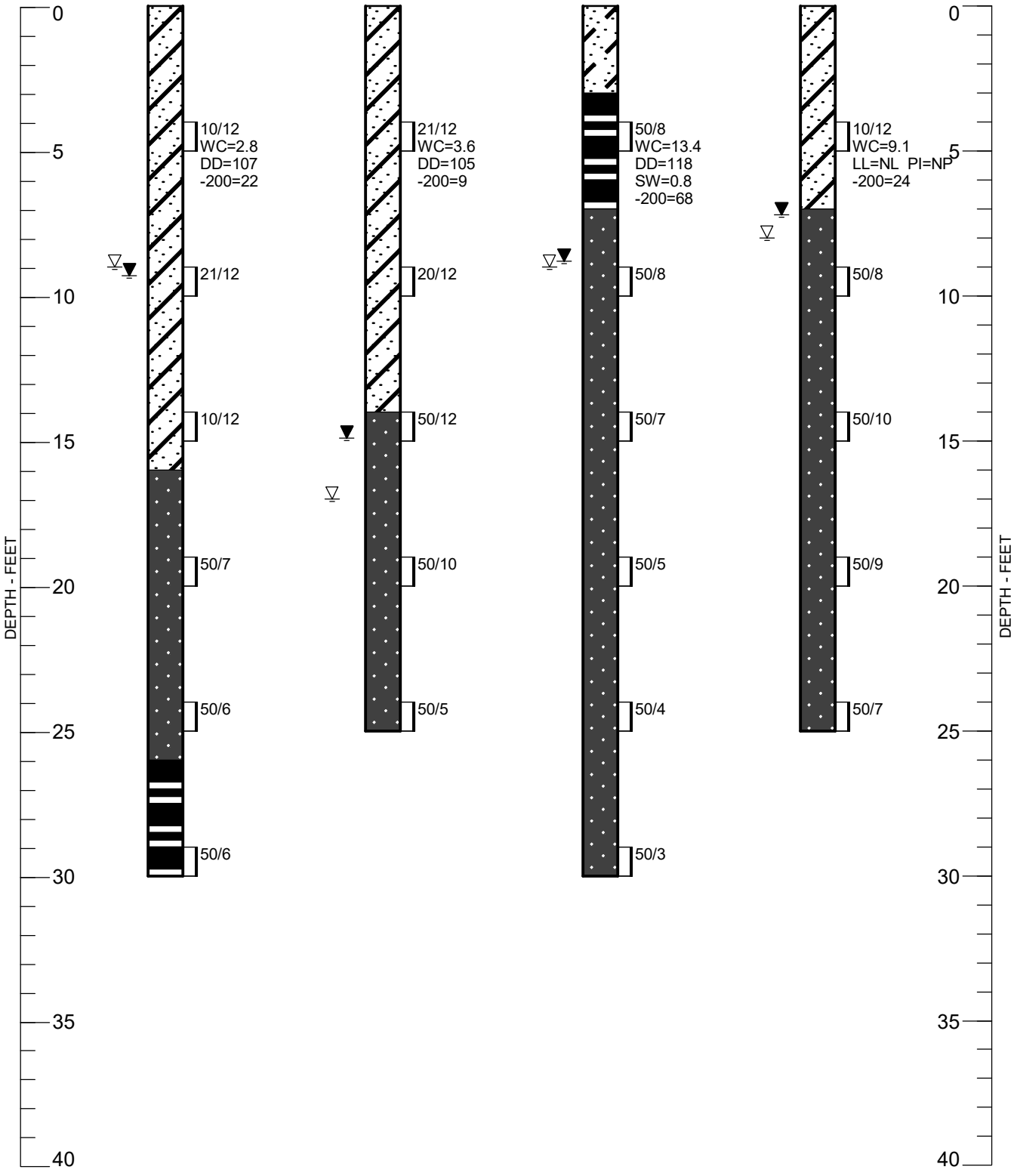
SCALE: 1" = 300'

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T Project No. CS19345-115-R2

Engineering Geologic Conditions Fig. 2

APPENDIX A

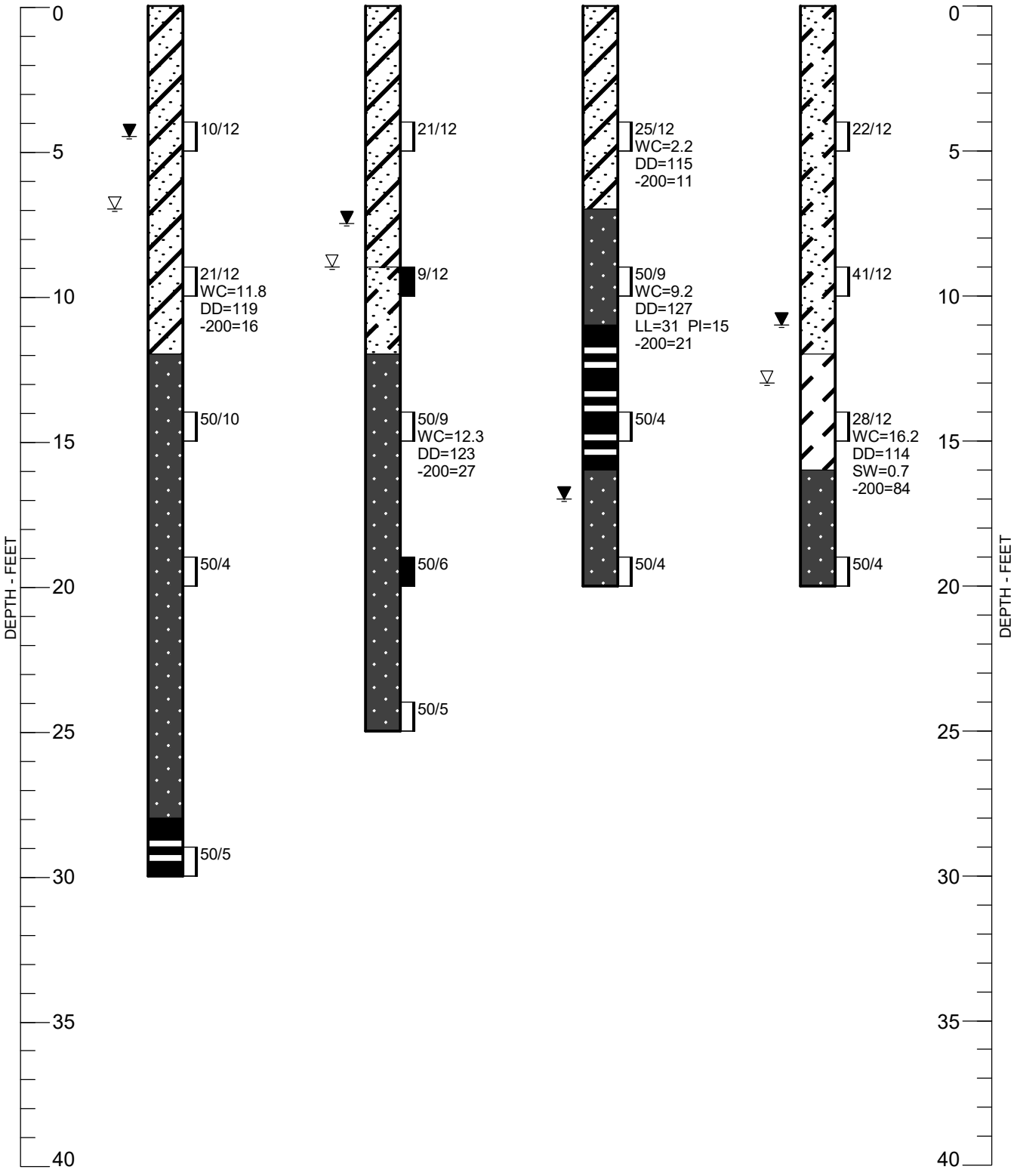
SUMMARY LOGS OF EXPLORATORY BORINGS



D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

Summary Logs of Exploratory Borings

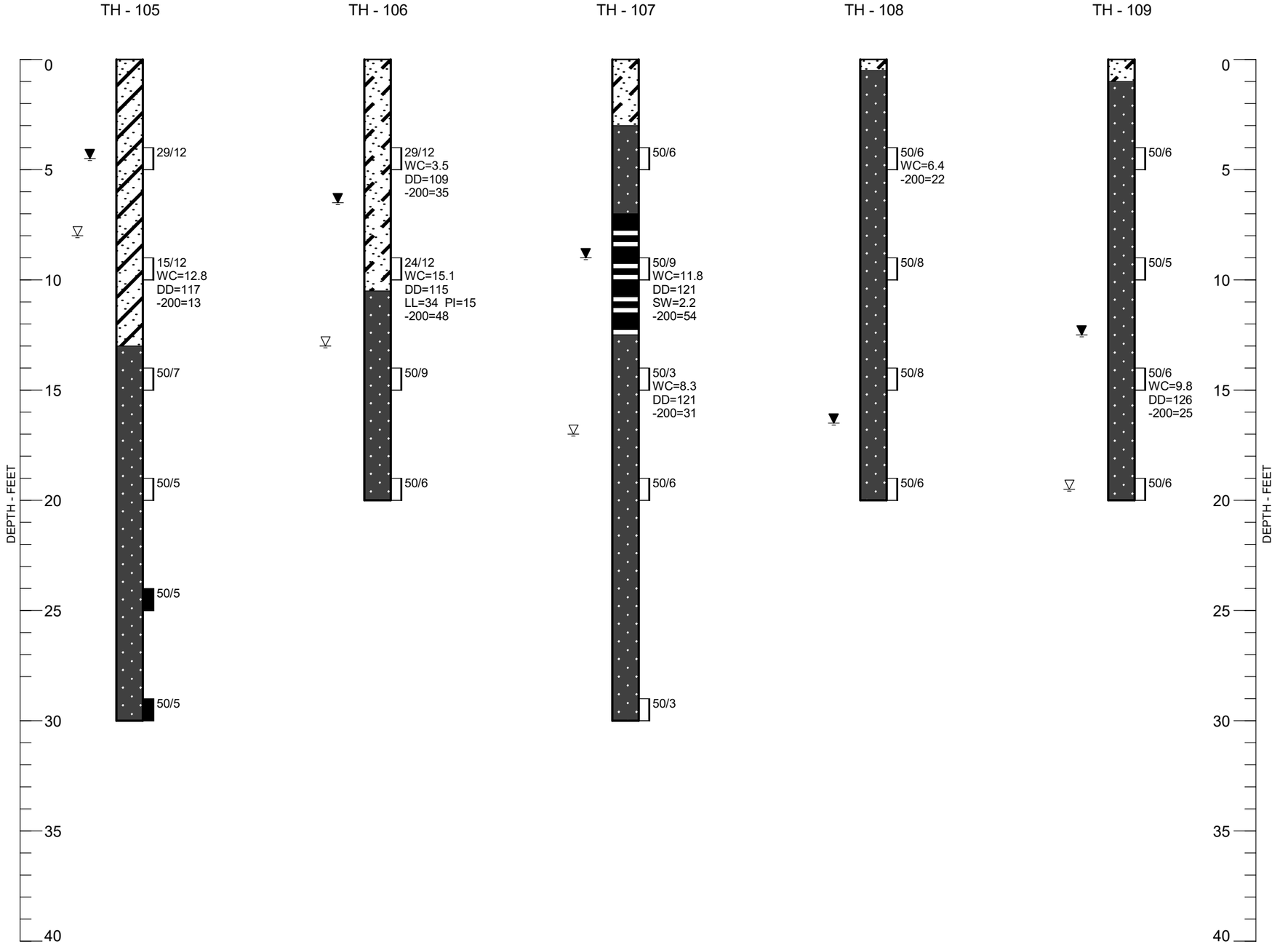
FIG. A-1



D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

Summary Logs of Exploratory Borings

FIG. A-2



LEGEND:

- CLAY, VERY SANDY, VERY STIFF, SLIGHTLY MOIST, GRAYISH-BROWN (CL).
- SAND, CLAYEY TO VERY CLAYEY, LOOSE TO DENSE, SLIGHTLY MOIST TO WET, LIGHT BROWN, OLIVE (SC).
- SAND, SLIGHTLY SILTY TO SILTY, MEDIUM DENSE TO DENSE, SLIGHTLY MOIST TO WET, LIGHT BROWN (SM, SP-SM).
- BEDROCK, CLAYSTONE, SANDY TO VERY SANDY, HARD TO VERY HARD, SLIGHTLY MOIST, GRAYISH-BROWN, GRAY.
- BEDROCK, SANDSTONE, SILTY TO CLAYEY, HARD TO VERY HARD, MOIST TO VERY MOIST, LIGHT BROWN, GRAY, RUST.
- 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.
- DRIVE SAMPLE. THE SYMBOL 10/12 INDICATES 10 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.0-INCH O.D. SAMPLER 12 INCHES.
- GROUNDWATER LEVEL MEASURED AT TIME OF DRILLING.
- GROUNDWATER LEVEL MEASURED AFTER DRILLING.

NOTES:

1. BORINGS TH-1, TH-4, TH-7, AND TH-10 WERE DRILLED DECEMBER 1 AND 2, 2020; BORINGS TH-101 THROUGH TH-109 WERE DRILLED NOVEMBER 29 AND DECEMBER 13, 2021 USING A 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A CME-45 OR DIEDRICH D90, TRUCK-MOUNTED DRILL RIG.
2. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS, AND CONCLUSIONS AS CONTAINED IN THIS REPORT.
3. 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. (%)

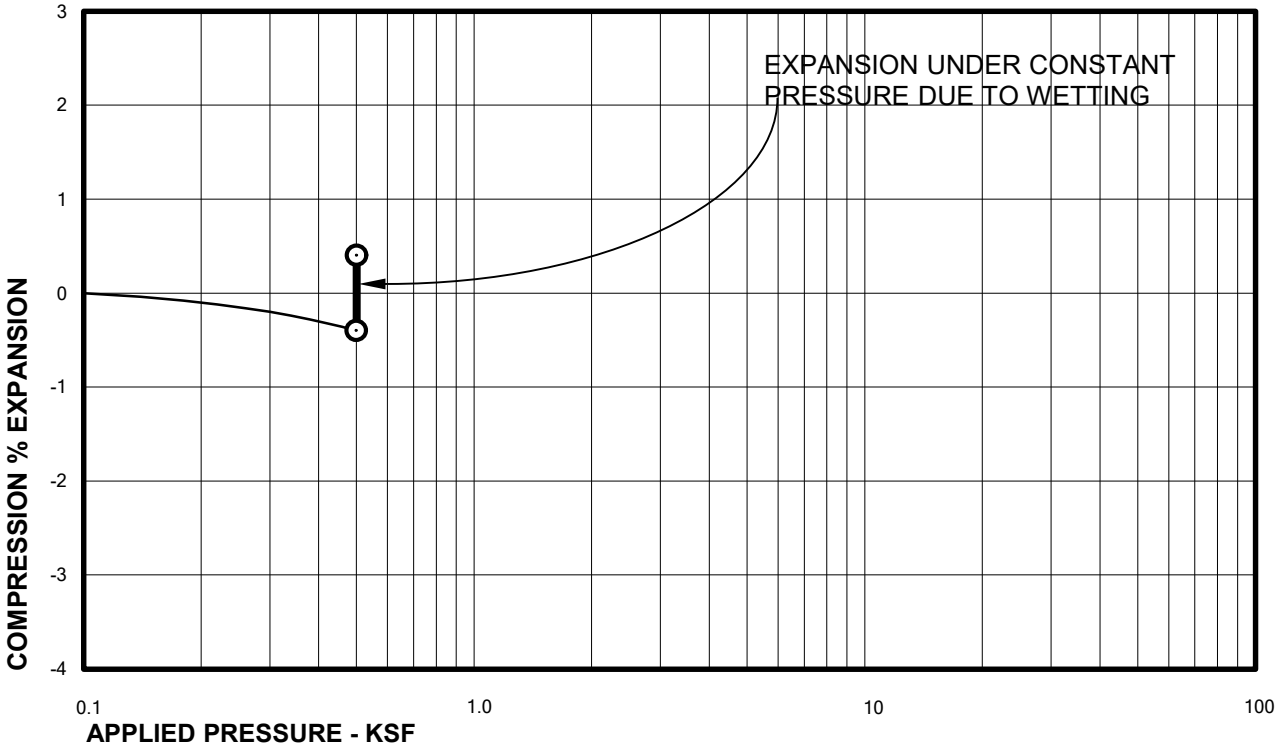
D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

Summary Logs of Exploratory Borings

FIG. A-3

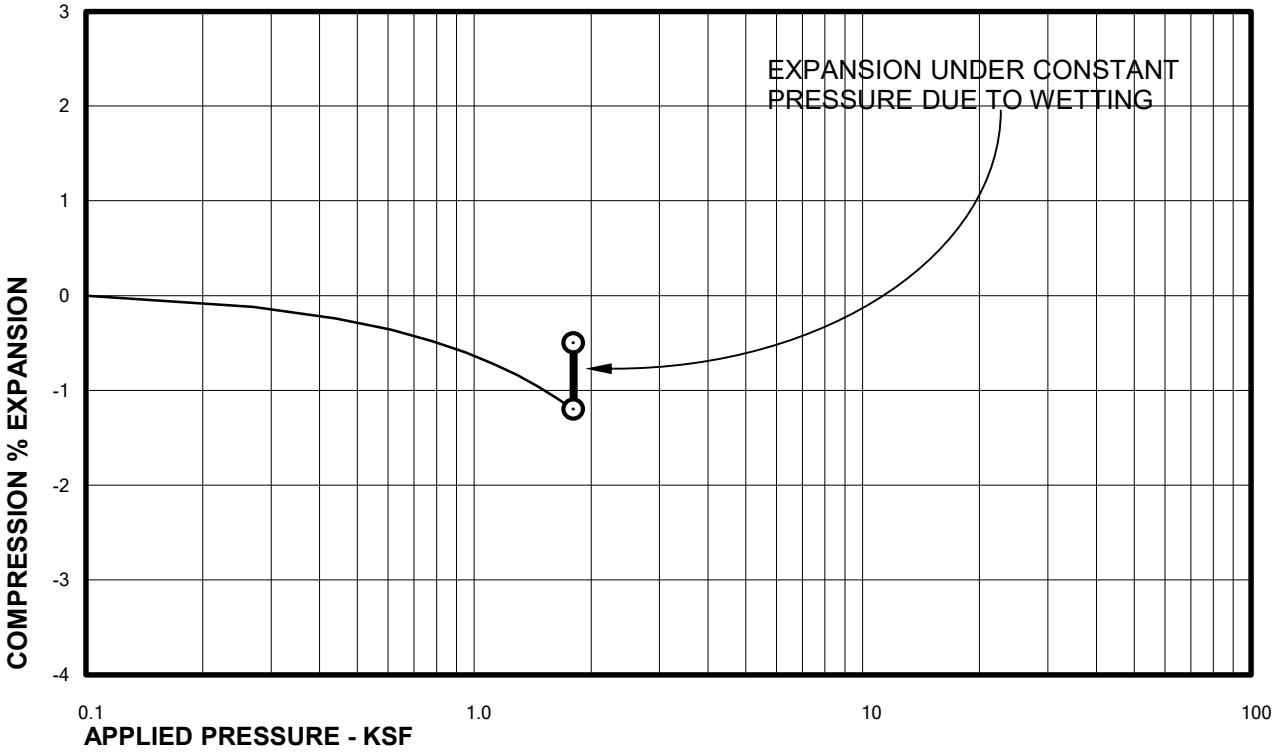
APPENDIX B

LABORATORY TEST RESULTS
TABLE B-I – SUMMARY OF LABORATORY TEST RESULTS



Sample of CLAYSTONE, SANDY
From TH-7 AT 4 FEET

DRY UNIT WEIGHT= 118 PCF
MOISTURE CONTENT= 13.4 %



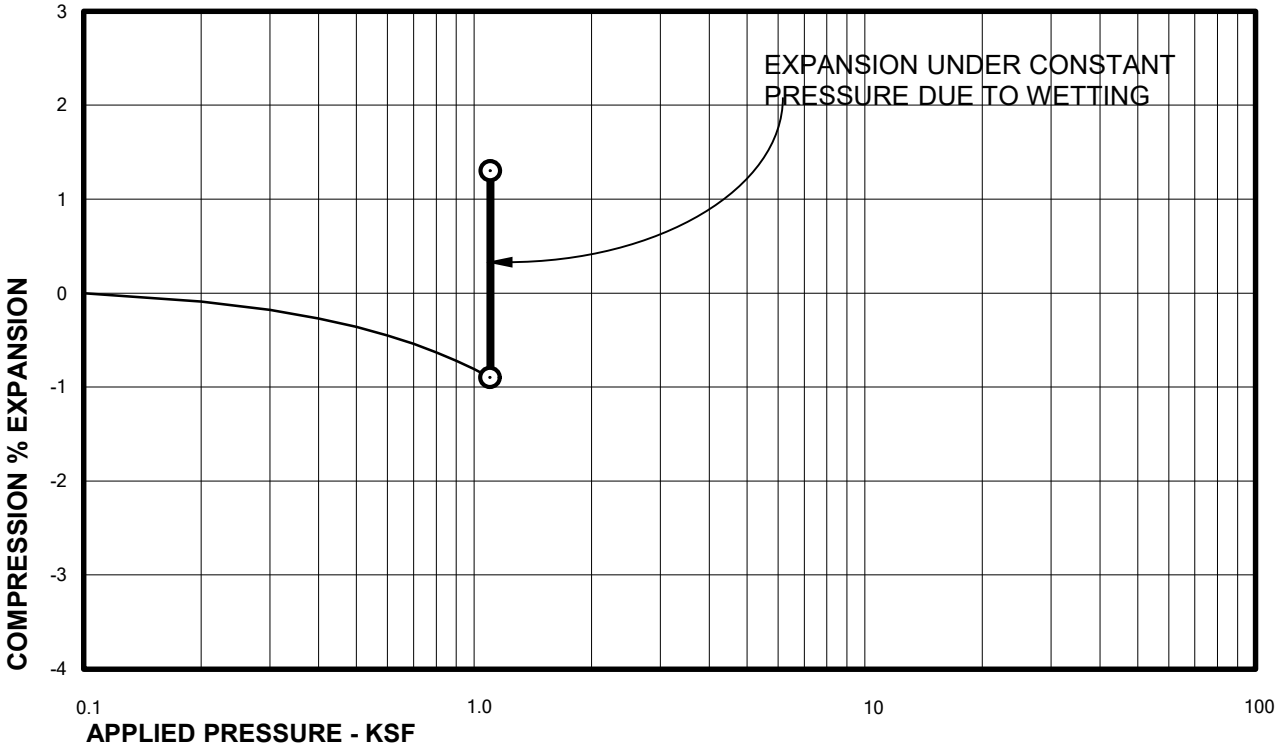
Sample of CLAY, SANDY (CL)
From TH-104 AT 14 FEET

DRY UNIT WEIGHT= 114 PCF
MOISTURE CONTENT= 16.2 %

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

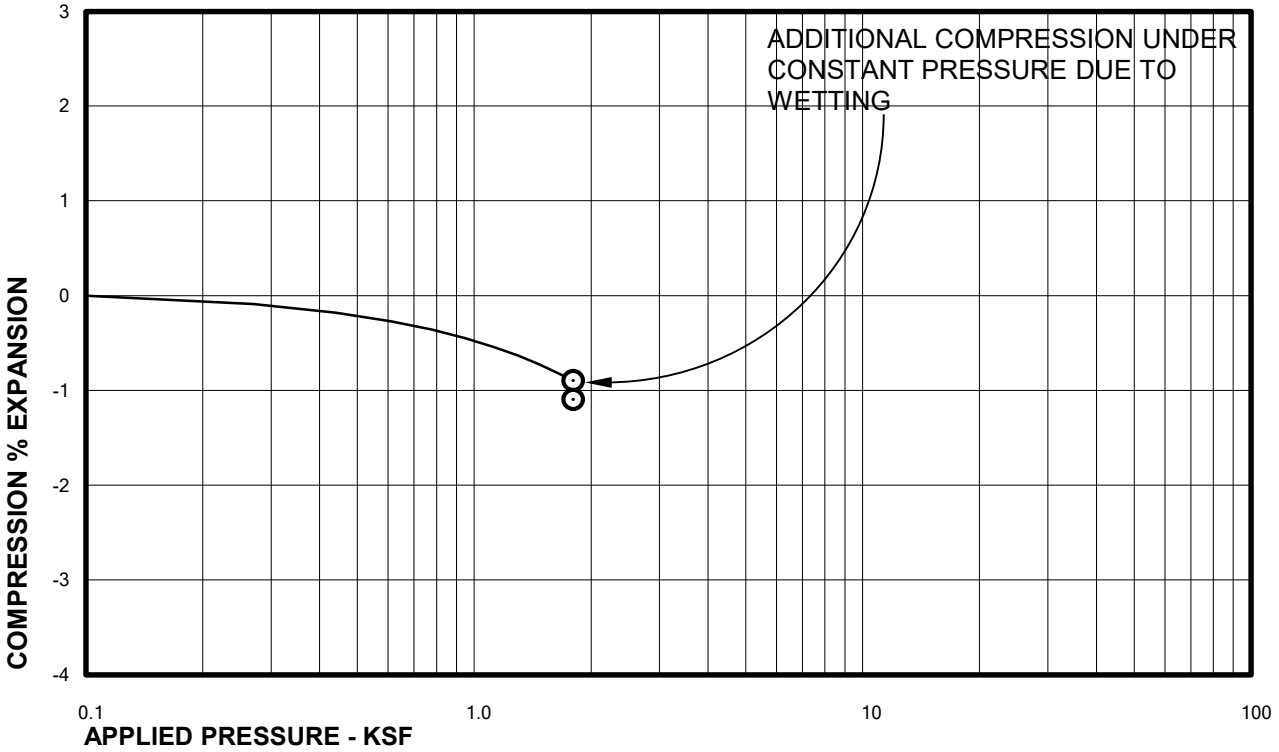
Swell Consolidation Test Results

FIG. B-1



Sample of CLAYSTONE, VERY SANDY
From TH-107 AT 9 FEET

DRY UNIT WEIGHT= 121 PCF
MOISTURE CONTENT= 11.8 %



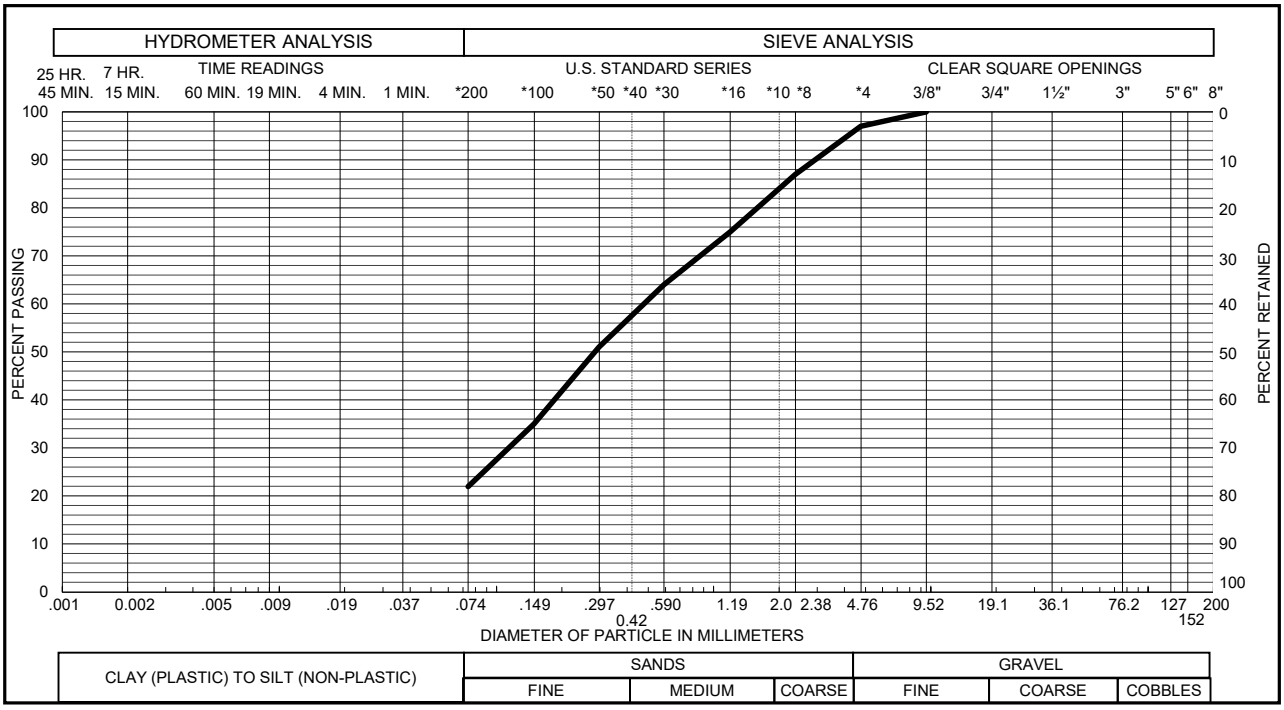
Sample of SANDSTONE, CLAYEY
From TH-107 AT 14 FEET

DRY UNIT WEIGHT= 121 PCF
MOISTURE CONTENT= 8.3 %

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

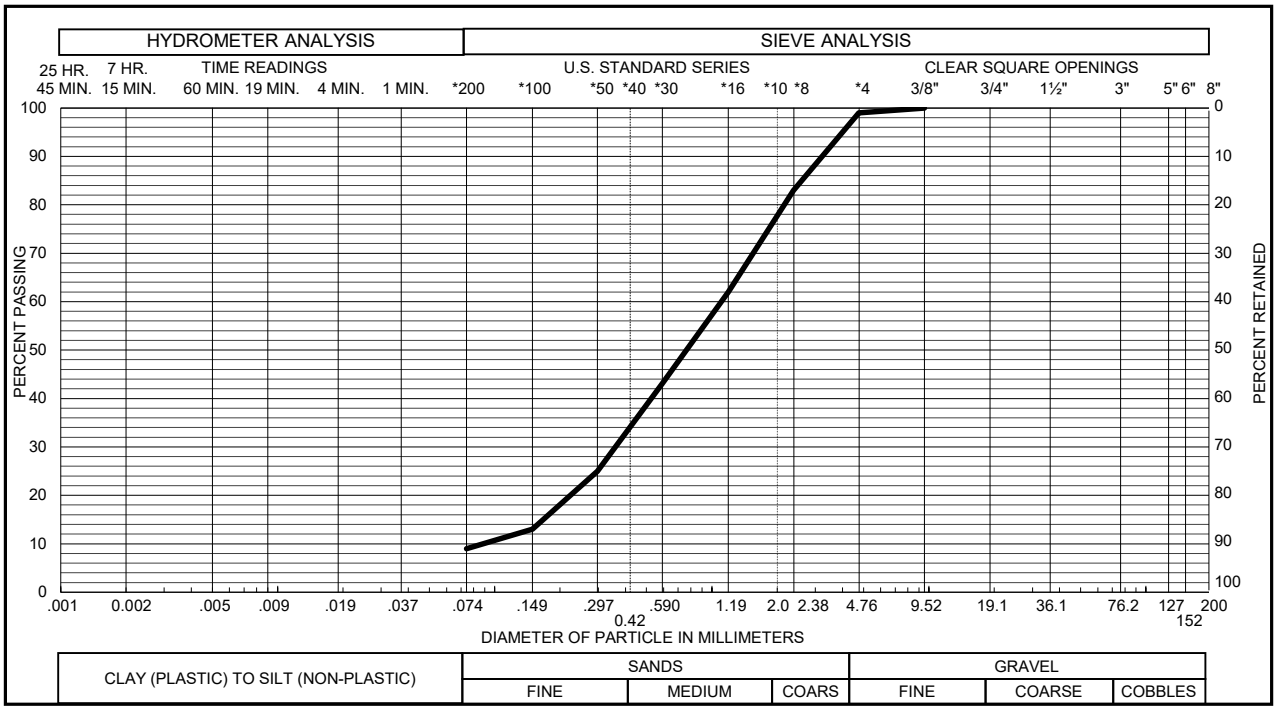
Swell Consolidation Test Results

FIG. B-2



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

GRAVEL 3 % SAND 75 %
SILT & CLAY 22 % LIQUID LIMIT
PLASTICITY INDEX



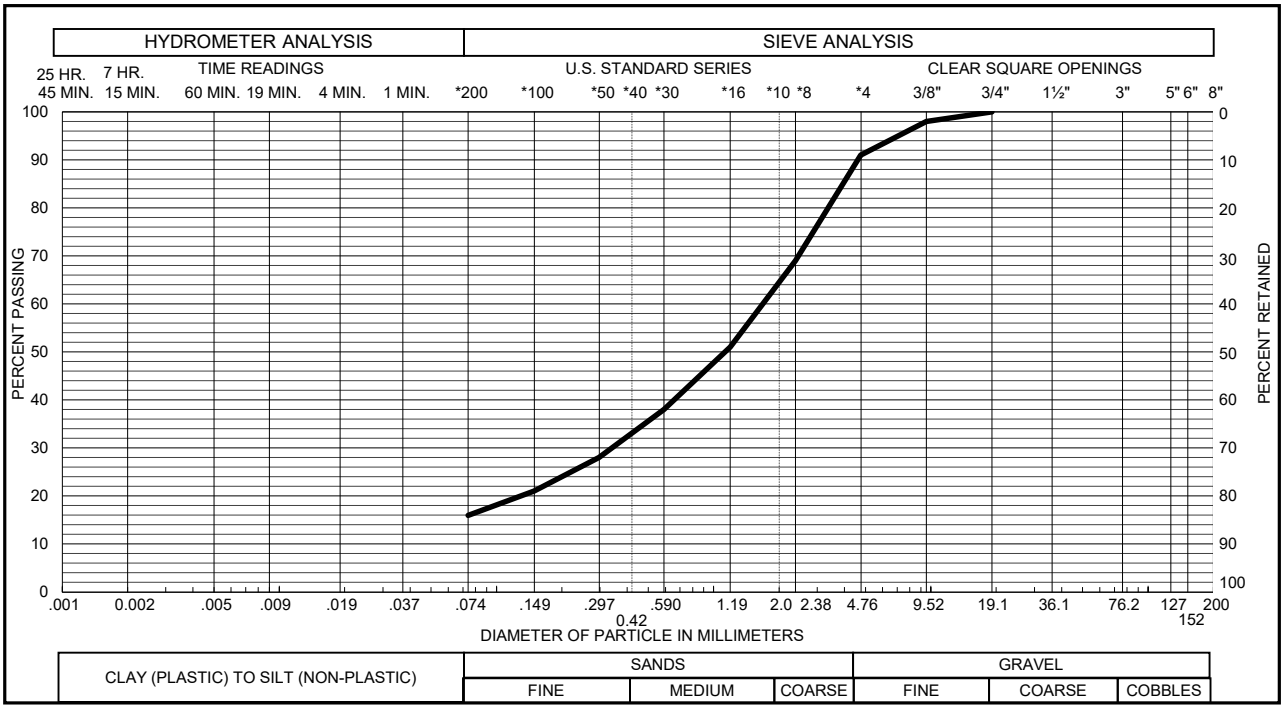
Sample of SAND, SLIGHTLY SILTY (SP-SM)
From TH - 4 AT 4 FEET

GRAVEL 1 % SAND 90 %
SILT & CLAY 9 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

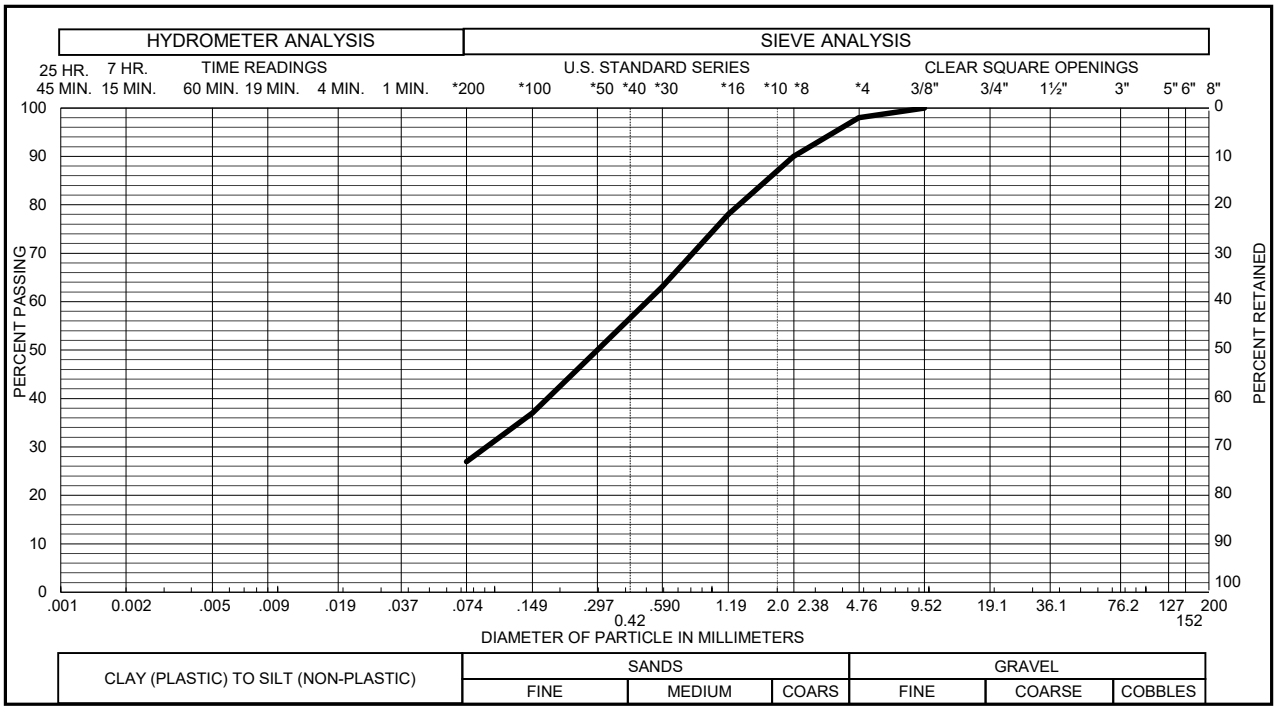
FIG. B-3

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2



Sample of SAND, SILTY (SM)
From TH - 101 AT 9 FEET

GRAVEL 9 % SAND 75 %
SILT & CLAY 16 % LIQUID LIMIT
PLASTICITY INDEX



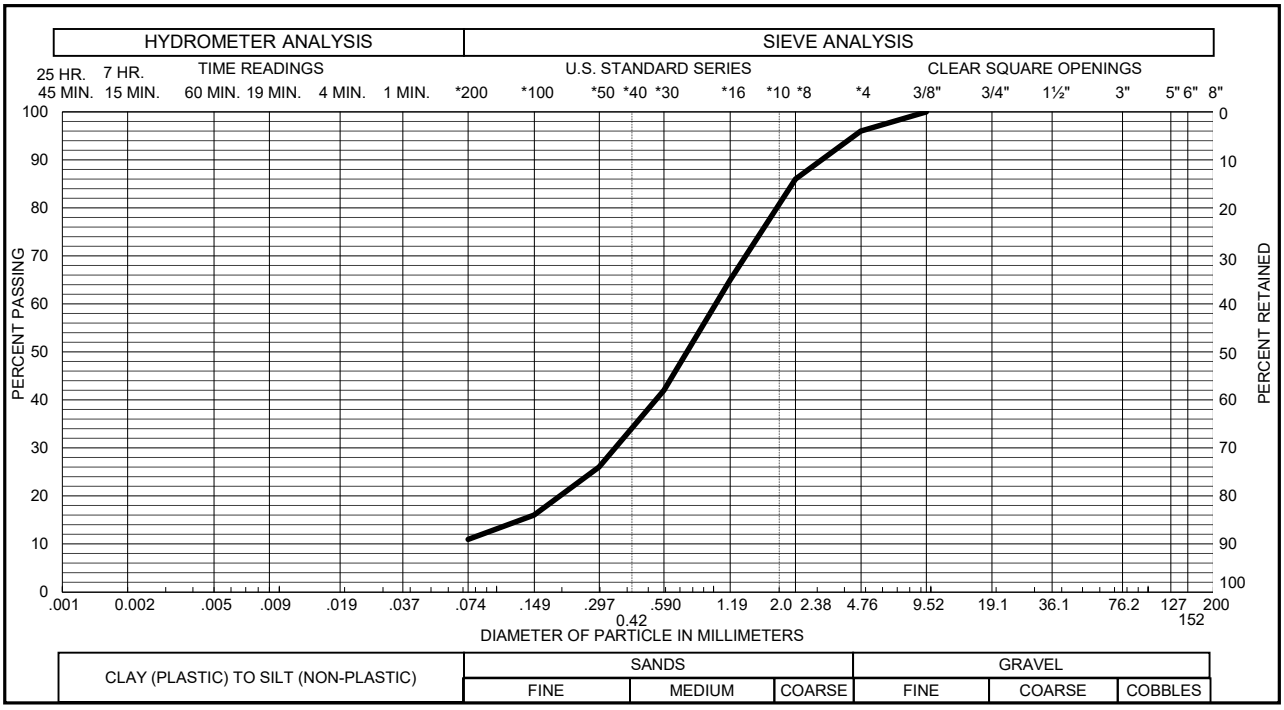
Sample of SANDSTONE, CLAYEY
From TH - 102 AT 14 FEET

GRAVEL 2 % SAND 71 %
SILT & CLAY 27 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

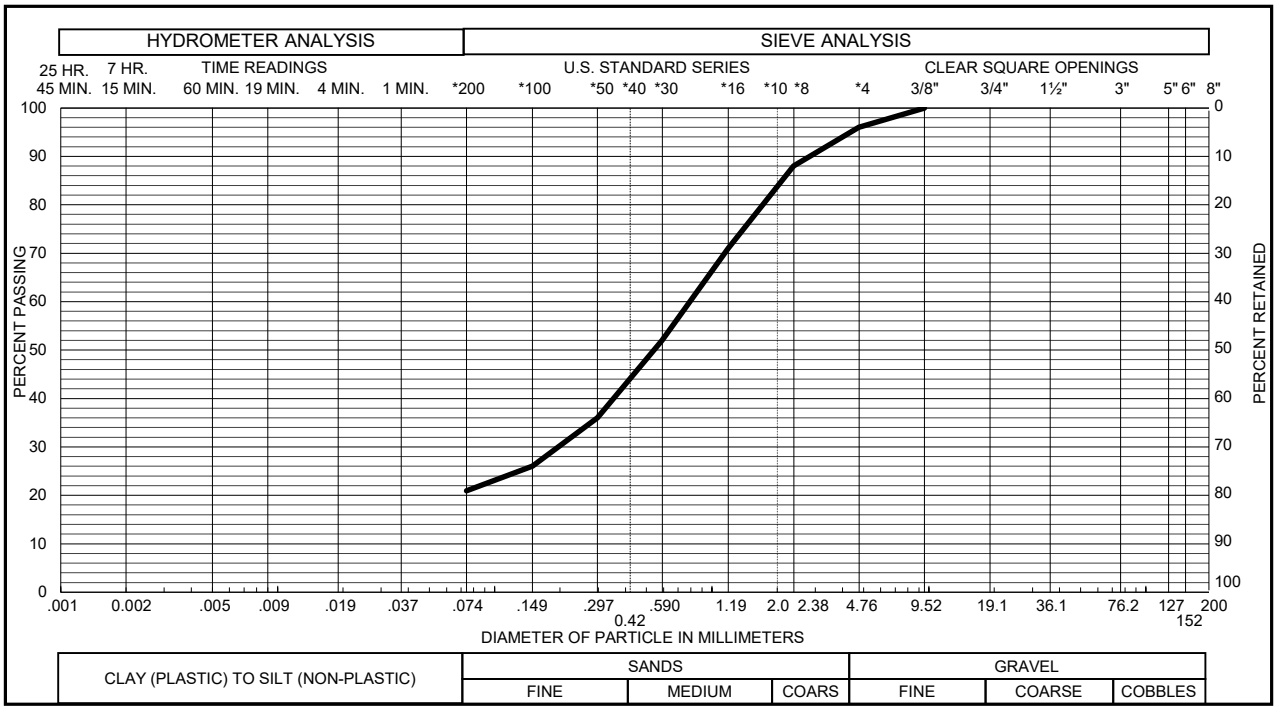
FIG. B-4

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2



Sample of SAND, SLIGHTLY SILTY (SP-SM)
From TH - 103 AT 4 FEET

GRAVEL 4 % SAND 85 %
SILT & CLAY 11 % LIQUID LIMIT
PLASTICITY INDEX



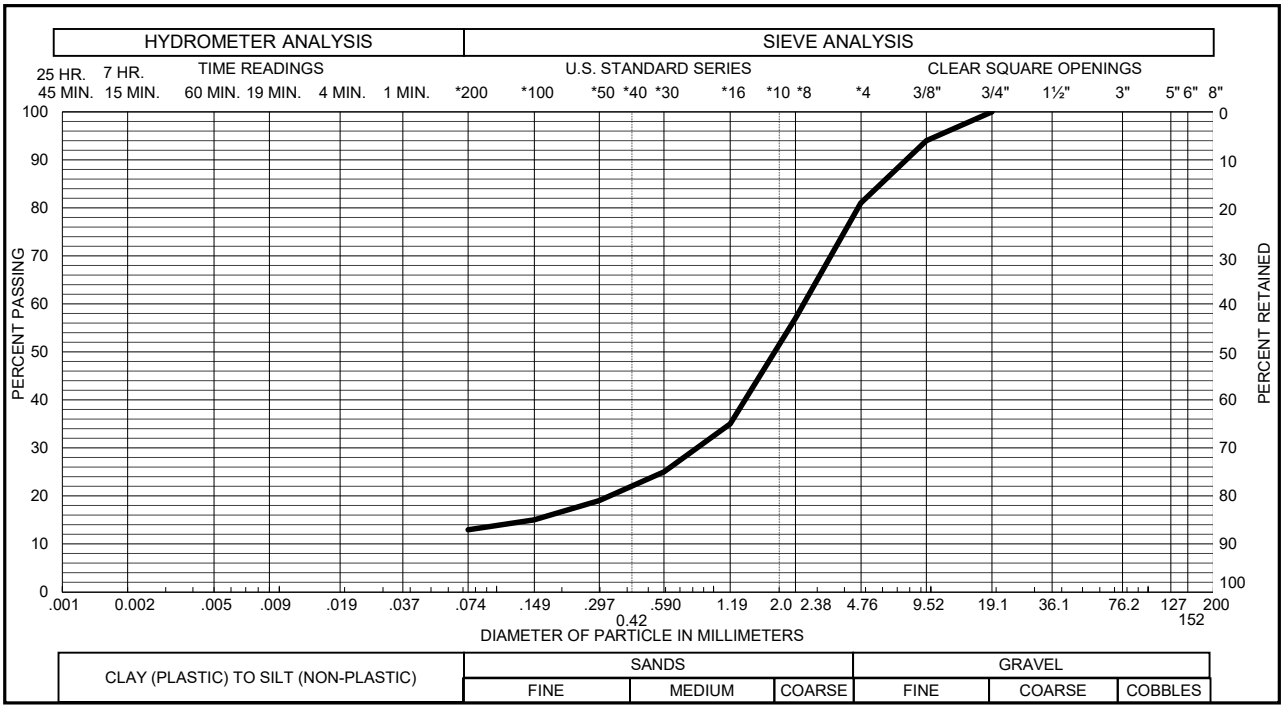
Sample of SANDSTONE, CLAYEY
From TH - 103 AT 9 FEET

GRAVEL 4 % SAND 75 %
SILT & CLAY 21 % LIQUID LIMIT 31
PLASTICITY INDEX 15

Gradation Test Results

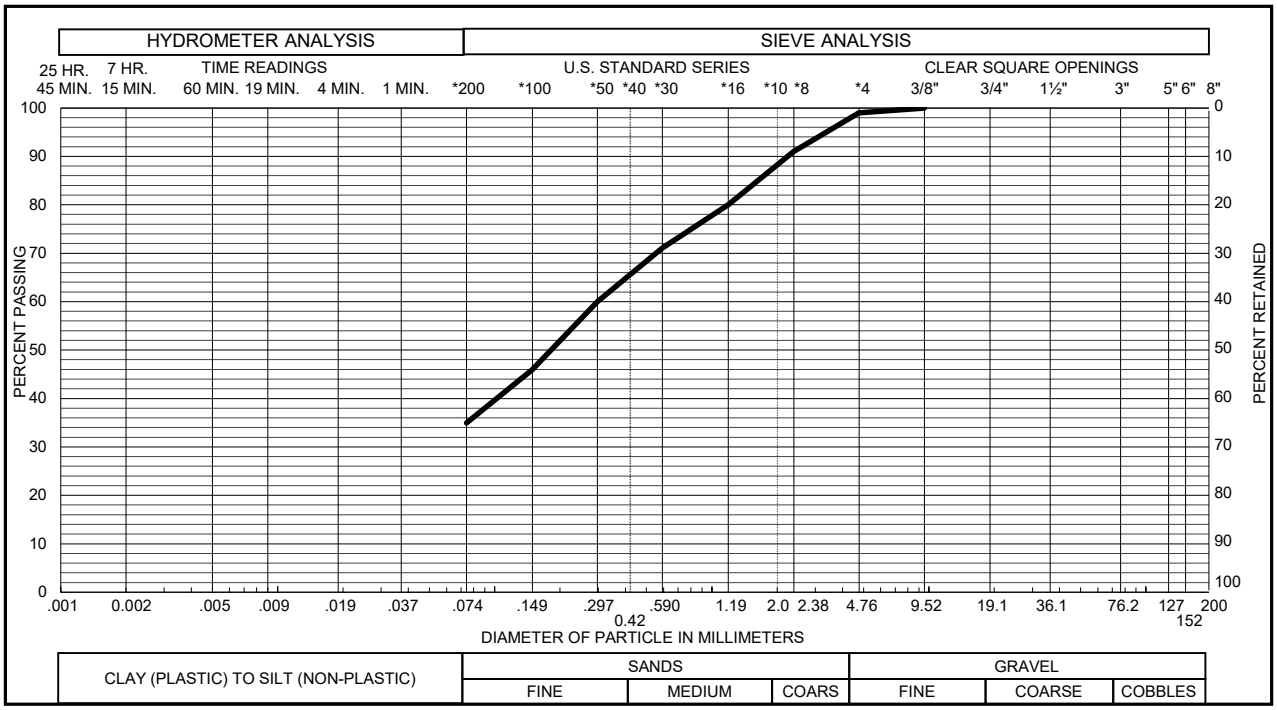
FIG. B-5

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2



Sample of SAND, SILTY (SM)
From TH - 105 AT 9 FEET

GRAVEL 19 % SAND 68 %
SILT & CLAY 13 % LIQUID LIMIT
PLASTICITY INDEX



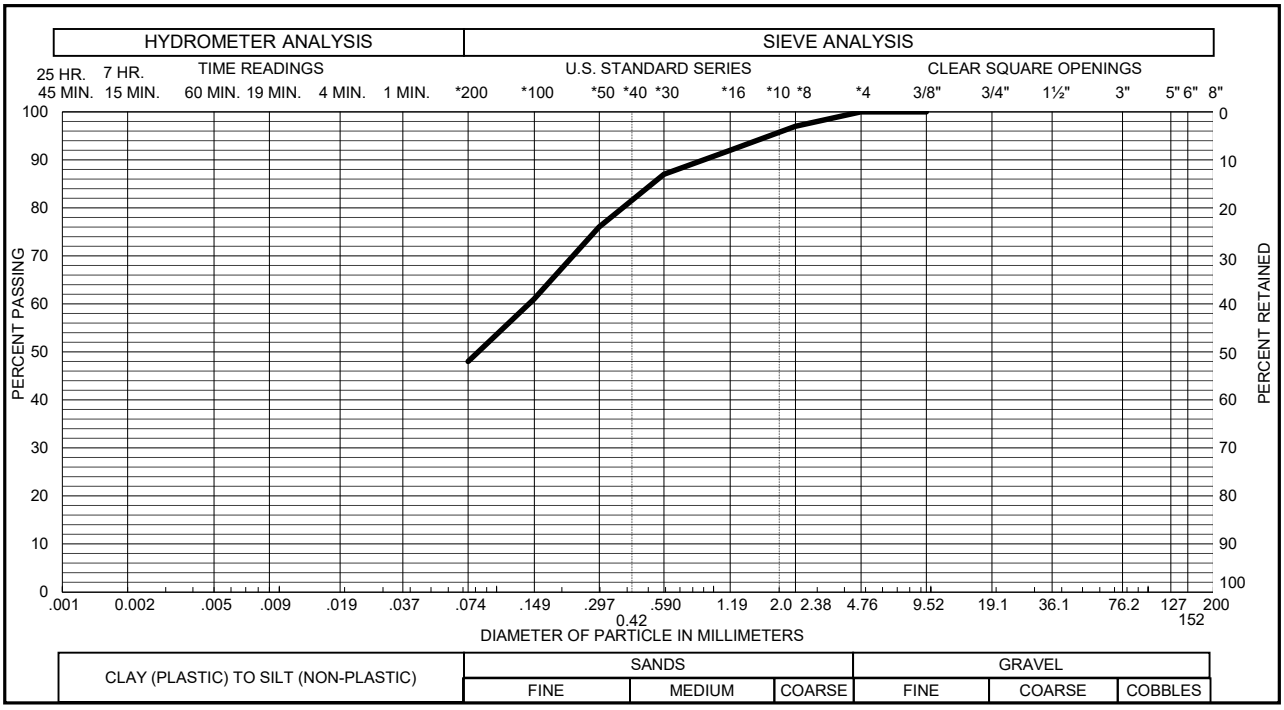
Sample of SAND, CLAYEY (SC)
From TH - 106 AT 4 FEET

GRAVEL 1 % SAND 64 %
SILT & CLAY 35 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

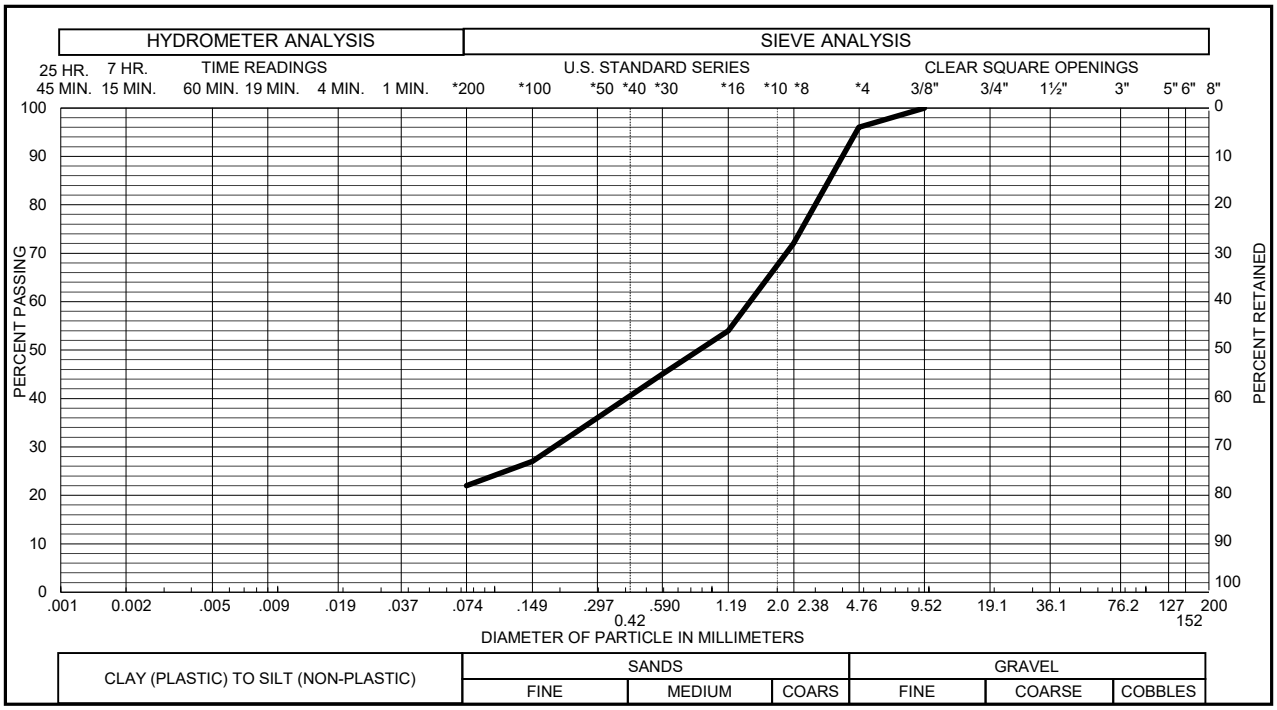
FIG. B-6

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2



Sample of SAND, VERY CLAYEY (SC)
From TH - 106 AT 9 FEET

GRAVEL 0 % SAND 52 %
SILT & CLAY 48 % LIQUID LIMIT 34
PLASTICITY INDEX 15



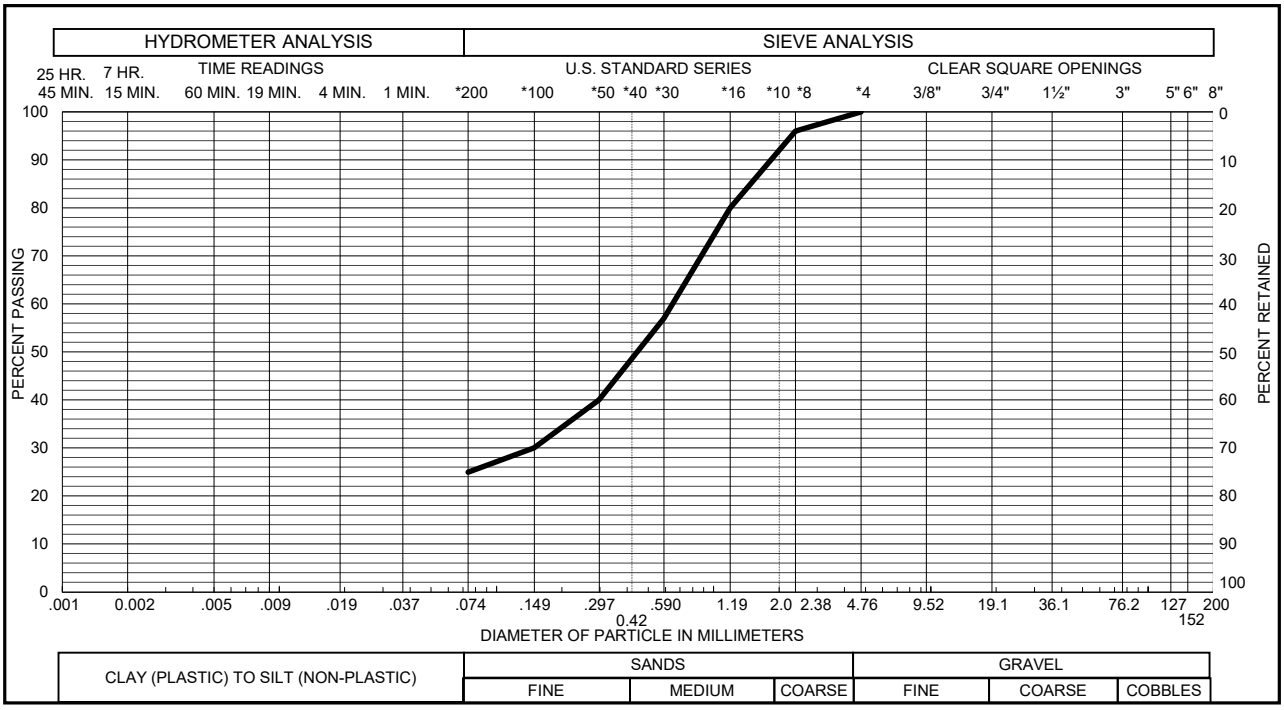
Sample of SANDSTONE, SILTY
From TH - 108 AT 4 FEET

GRAVEL 4 % SAND 74 %
SILT & CLAY 22 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

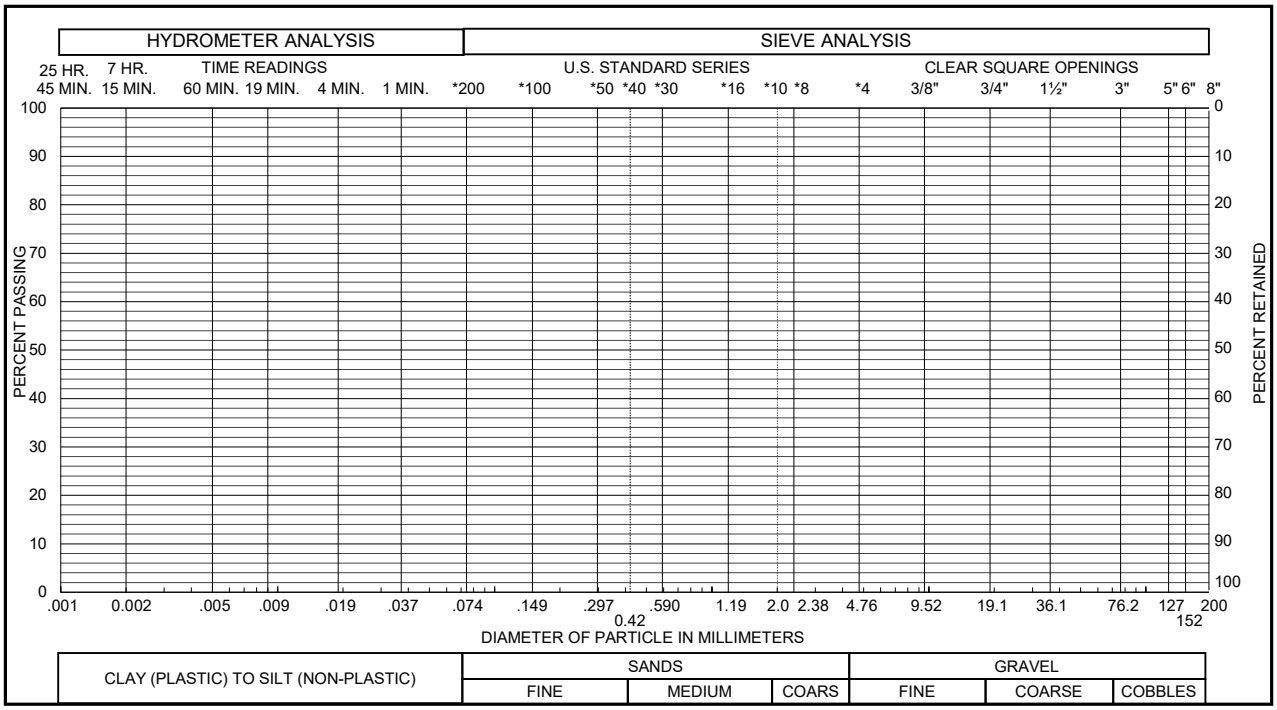
FIG. B-7

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2



Sample of SANDSTONE, SILTY
From TH - 109 AT 14 FEET

GRAVEL 0 % SAND 75 %
SILT & CLAY 25 % LIQUID LIMIT
PLASTICITY INDEX



Sample of
From

GRAVEL % SAND %
SILT & CLAY % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

FIG. B-8

D.R. HORTON
GRANDVIEW RESERVE, FILING 1
CTL|T PROJECT NO. CS19345-115-R2

TABLE B - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA		ATTERBERG LIMITS		PASSING NO. 200 SIEVE (%)	SOIL TYPE
				SWELL (%)	APPLIED PRESSURE (psf)	LIQUID LIMIT	PLASTICITY INDEX		
TH-1	4	2.8	107					22	SAND, SILTY (SM)
TH-4	4	3.6	105					9	SAND, SLIGHTLY SILTY (SP-SM)
TH-7	4	13.4	118	0.8	500			68	CLAYSTONE, SANDY
TH-10	4	9.1				NL	NP	24	SAND, SILTY (SM)
TH-101	9	11.8	119					16	SAND, SILTY (SM)
TH-102	14	12.3	123					27	SANDSTONE, CLAYEY
TH-103	4	2.2	115					11	SAND, SLIGHTLY SILTY (SP-SM)
TH-103	9	9.2	127			31	15	21	SANDSTONE, CLAYEY
TH-104	14	16.2	114	0.7	1,800			84	CLAY, SANDY (CL)
TH-105	9	12.8	117					13	SAND, SILTY (SM)
TH-106	4	3.5	109					35	SAND, CLAYEY (SC)
TH-106	9	15.1	115			34	15	48	SAND, VERY CLAYEY (SC)
TH-107	9	11.8	121	2.2	1,100			54	CLAYSTONE, VERY SANDY
TH-107	14	8.3	121	-0.2	1,800			31	SANDSTONE, CLAYEY
TH-108	4	6.4						22	SANDSTONE, SILTY
TH-109	14	9.8	126					25	SANDSTONE, SILTY