Mannik Smith

August 11, 2023

Karin Winchester, MMC
Clerk/Zoning Administrator – Holly Twp.
102 Civic Drive
Holly, MI 48442

RE: Trilogy Health Care of Holly
Special Land Use Review Response

Dear Ms. Winchester:

Please accept the following letter as disposition of comments associated with the Special Land Use Review letter prepared by McKenna dated May 23, 2023. Comment and corresponding responses are provided below:

Comment 2 – *"We look forward to reviewing the applicant's architectural renderings that will be provided with their next submission to determine compliance with this section. Proposed materials must be durable and consistent with the rural character of the township and the intent of the overlay district."*

Color Architectural renderings of the Campus Building, Community Center and Villas and Exterior Color Palette Exhibit have been included in the Planning Commission Submittal Package.

Comment 5 – *"Additional information is required to determine compliance with this standard, such as designation of fire lanes and a fire protection plan, a grading plan and details on the capacity of retention ponds, and any additional details that the Township Engineer deems necessary. We believe this standard can be met."*

A complete Site Plan Set which includes Site, Grading, Utility, Pond, Landscaping and Photometric Plans have been included in the Planning Commission Submittal Package.

Sincerely,

Greg Schunck, P.E., P.S.
Senior Project Manager

CC: File
Joe Nawrocki – Trilogy Director of Development

2800 Chapel Boulevard, Suite 100, Sharon Heights, OH 44214 Tel: 330.670.0990 Fax: 330.670.0994 www.MannikSmith.com

Mannik Smith GROUP

August 11, 2023

Matt Weil, CFI
Assistant Fire Chief
North Oakland County Fire Authority
P.O. Box 129
Holly, MI 48442

RE: Trilogy Health Care of Holly
Fire Dept. Review Response

Dear Mr. Weil:

Please accept the following letter as disposition of comments associated with the Site Plan Review letter prepared by North Oakland County Fire Authority (NOCFA) dated July 26, 2023. NOCFA comments and corresponding responses are provided below:

"We oppose the large back to back parking areas that are up against the building, with the area of most concern being the north side of the building.. This restricts access to the building for emergency work and circulation of emergency vehicles. However, we understand there may be zoning restrictions that drive this design."

A portion of proposed parking along the north side of the building was inadvertently shown across the access driveway/courtyard. The revised site plan shows free access from the north side driveway into the building through the service courtyard.

"Parking spaces need to be sized to accommodate pick-up trucks and SUVs. These are preferred and common modes of transportation in our area."

The parking space dimensions for the Proposed Trilogy Development are 9.5' wide x 20' deep. The parking dimensions are prescribed by Holly Township Zoning Requirements, Section 32-425.

"The entire roadway for circulation and Fire Lane use needs to be 26.5 wide from the face of the curb and include a mountable curb. The dimensions of the "thru lanes" in the back-to-back parking areas are not identified, Proper signage and marking is required"

The ring road around the Campus Building and the private street around the villa development are proposed to be 26.5' wide from face of curb to face of curb, with a 4" rolled style, mountable curb. Typical Pavement Section Detail has been included in the site plan package.

Fire Lane has been denoted on the Site Plan.

20600 Chagrin Boulevard, Suite 500, Shaker Heights, OH 44122 Tel: 216.378.1490 Fax: 216.378.1497 www.MannikSmithGroup.com

"The single 24' access from Fish Lake Road needs to be a split boulevard type entrance or another means of ingress and egress needs provided. We understand there may not be available access to another roadway from this parcel without further development of the surrounding land. This should be designed into the overall plan of the area."

The entrance driveway geometry has been updated to align with request from NOCFA, the County commercial driveway detail and the site island.

"The parking areas for the townhouses are not clearly identified."

Each villa unit has individual garage and driveway for parking. See site plan and Villa elevation Exhibits.

"Location of Hydrants and FDC are not identified"

The Hydrants and FDC have been circled in blue and the distance between hydrants has been provided.

Height of canopies are not identified - they need to accommodate apparatus - which we assume they are at min 13'-6" height.

The canopy clear heights are 13'-6". We have attached an architectural section view of the proposed canopies.

Sincerely,

Greg Schunck, P.E., P.S.
Senior Project Manager

CC: File
Joe Nawrocki – Trilogy Director of Development
Karin Winchester- Holly Township Administrator

August 11, 2023

Simon Yousif, P.E.
Permit Review Engineer
Roadway Commission of Oakland County
2420 Pontiac Lake Road
Waterford, MI 48328

RE: Trilogy Health Care of Holly
Roadway Commission Review Response

Dear Mr. Yousif:
Please accept the following letter as disposition of comments associated with the Preliminary Review letter 23P0008 prepared by Roadway Commission of Oakland County (RCOC), dated June 16, 2023. Comment and corresponding responses are provided below:

"The RCOC Master ROW Plan indicates a 60-foot wide half width ROW for Fish Lake Rd. The existing ROW is shown to be 33-foot wide half width. Please contact Right-of-Way Department, at (248) 645-2000 to discuss dedicating the ROW or establishing a dedicated highway easement."

Trilogy Health Services will not be pursuing dedication of additional Fish Lake Right –of-way at this time. The Team will follow up with the Commission regarding easement.

"Provide current ADT traffic counts and add the background traffic counts for the reminder of the Riverside Development (see attached RCOC Review Letter #23P0010 along with marked-up plan)."

"The submitted Trip Generation must be revised to include the shift overlap of arriving and departing employees."

Per conference call held on July 20, 2023 with RCOC, Trilogy and Mannik & Smith Traffic Engineers. The team agreed to update the Trip Memo and provide the following:

a. **Updated overview text to note construction 2024 and occupancy/opening year 2025.**

b. **Added two sensitivity analyses. A 25% to show the unrealized North Oakland County post pandemic traffic growth yet to be counted. A 40% to show unrealized traffic volumes from potential large developments yet to be planned or committed to be complete.**

   Both analyses show no need for right or left turn lanes. Trilogy will be installing right turn lane and taper at the request of RCOC.

c. **The updated memo contains a left turn lane warrant analysis. Left turn lanes remain unwarranted for all scenarios evaluated.**

20600 Chagrin Boulevard, Suite 500, Shaker Heights, OH 44122 Tel: 216.378.1490 Fax: 216.378.1497 www.MannikSmithGroup.com

"The proposed drive approach should include a Right Turn Lane (RTL) and taper for system wide consistency."

Trilogy will be installing right turn lane and taper at the request of RCOC.

"It is not uncommon for emergency services to request a secondary access point in cases where the primary access point becomes unavailable."

The team submitted site plan to the North Oakland County Fire Authority (NOCFA) for review and received the following comment:

"The single 24' access from Fish Lake Road needs to be a split boulevard type entrance or another means of ingress and egress needs provided. We understand there may not be available access to another roadway from this parcel without further development of the surrounding land. This should be designed into the overall plan of the area."

The team has updated the entrance driveway to "boulevard" style, one-way entrance and exit.

"All future correspondence related to the above referenced project will be sent to the address provided by the applicant. Separate applications will be required for:

a. *Drive approach and Road Improvements*
b. *Utility connections*

Sincerely,

Greg Schundk, P.E., P.S.
Senior Project Manager

CC: File
Joe Nawrocki – Trilogy Director of Development
Karin Winchester- Holly Township Administrator
Matt Weil - North Oakland County Fire Authority

2365 Haggerty Road South, Canton, Michigan 48188
Tel: 734.397.3100 Fax: 734.397.3131
www.MannikSmithGroup.com

To: Simon Yousif, P.E.
Permit Review Engineer
Oakland County Road Commission

From: Daniel Helou, P.E. – Mannik & Smith Group, Inc.
Greg Schunck, P.E., P.S. – Mannik & Smith Group, Inc.

CC: Joe Nawrocki – Trilogy Health Services

Date: July 27, 2023
Project #: T1730071
Re: Trilogy Health Service
Fish Lake Road – North of Grange Hall Road
Holly Township, Oakland County, Michigan

Overview:
Trilogy Health Services, LLC (Trilogy) is proposing to develop a 13.7± acre parcel located on the east side of Fish Lake Road, north of Grange Hall Road. The development will consist of a 62,000± square feet, single story, 80± unit, 99± bed assisted living building, and 28 retirement villas. The proposed health services site is expected to break ground for construction in 2024 with full occupancy and operational for an opening year of 2025.

Traffic Data:
Peak hour and ADT traffic counts were provided through the Southeast Michigan Council of Governments Traffic Counts Database (SEMCOG TCDS) count database. The available 2019 traffic data presents a Fish Lake Road ADT of 1,456 vehicles per day. Using SEMCOG's Traffic Volume Forecast model, an annual traffic growth rate of 0.50% per year was applied to develop a 2025 Opening Day ADT.

- 2019 Existing ADT – 1,456
- 2025 Opening Day ADT – 1,514

Sensitivity Analysis:
The SEMCOG TCDS count database provided traffic counts taken prior to the Covid19 pandemic. It is our understanding that the Holly Township and North Oakland County has experienced a region wide traffic growth that has not been captured in recent counts within the vicinity of the proposed Trilogy site. A sensitivity analysis of 25% was conducted to capture the expected region wide growth due to post-Covid19 pandemic growth. A 40% sensitivity analysis was also conducted to capture background traffic generated by future large scale developments within the vicinity of the Fish Lake Road and Grange Hall Road intersection.

Average Daily Traffic:

- 2019 Existing ADT – 1,456
- 2025 Opening Day ADT – 1,514
- 2025 Opening Day ADT + 25% Sensitivity Analysis ADT – 1,882
- 2025 Opening Day ADT + 40% Sensitivity Analysis ADT – 2,110

Trip Generation:
The proposed assisted living development will consist of a 62,000 square foot main complex building with 28 standalone dwelling apartments. Trilogy Health Service is expected to maintain a peak shift of 40 employees and is not expected to generate an appreciable number of new trips separate of employee trips. Traditional methodology for determining the expected number of driveway trips generated by a proposed development following the trip rates found within the ITE Trip Generation Manual, 11th Edition; the ITE land use category that most closely matches the operation of the proposed development is Land Use #254 (assisted Living) and Land Use #253 (Congregate Care Facility). ITE Land Use #254 and Land Use #253 is expected to generate 26 and 37 trips in the AM and PM peak periods, respectively.

Trilogy Health Service expected peak hour trips:

- AM Peak Hour: 50 trips
  - 40 entering, 10 exiting driveway trips
- PM Peak Hour: 50 trips
  - 40 entering, 10 exiting driveway trips

Driveway Lane Warrants:

Driveway access to/from the proposed development is expected to be located off Fish Lake Road approximately 900-feet north of Grange Hall Road. The following analysis applies the RCOC 'Warrant for Right Turn Deceleration Lane or Taper' and 'Warrant for Left Turn Passing Lane' to determine the driveway lane geometry required to appropriately service the proposed development. Additionally the analysis assumes a trip distribution of 90% of all trips entering/existing the site to/from the south of the site on Fish Lake Road. As shown on the following figures, the proposed development under the 2025 opening day volumes, and volumes under the 25%/40% sensitivity analysis, do not meet the threshold for a left-turn passing lane nor do they meet the MDOT warrants for a full width left-turn lane. Additionally, the 2025 opening day volumes, and volumes under the 25%/40% sensitivity analysis, meet the requirements for a radius only driveway; however, RCOC is requesting that this driveway have a full width right-turn lane along Fish Lake Road at the site driveway. MSG concurs with RCOC as this design implementation will help reduce the potential turn conflict to the Trilogy site from Fish Lake Road with the advancing roadway traffic.

Figure 1 – RCOC Warrant for Left Turn Passing Lane

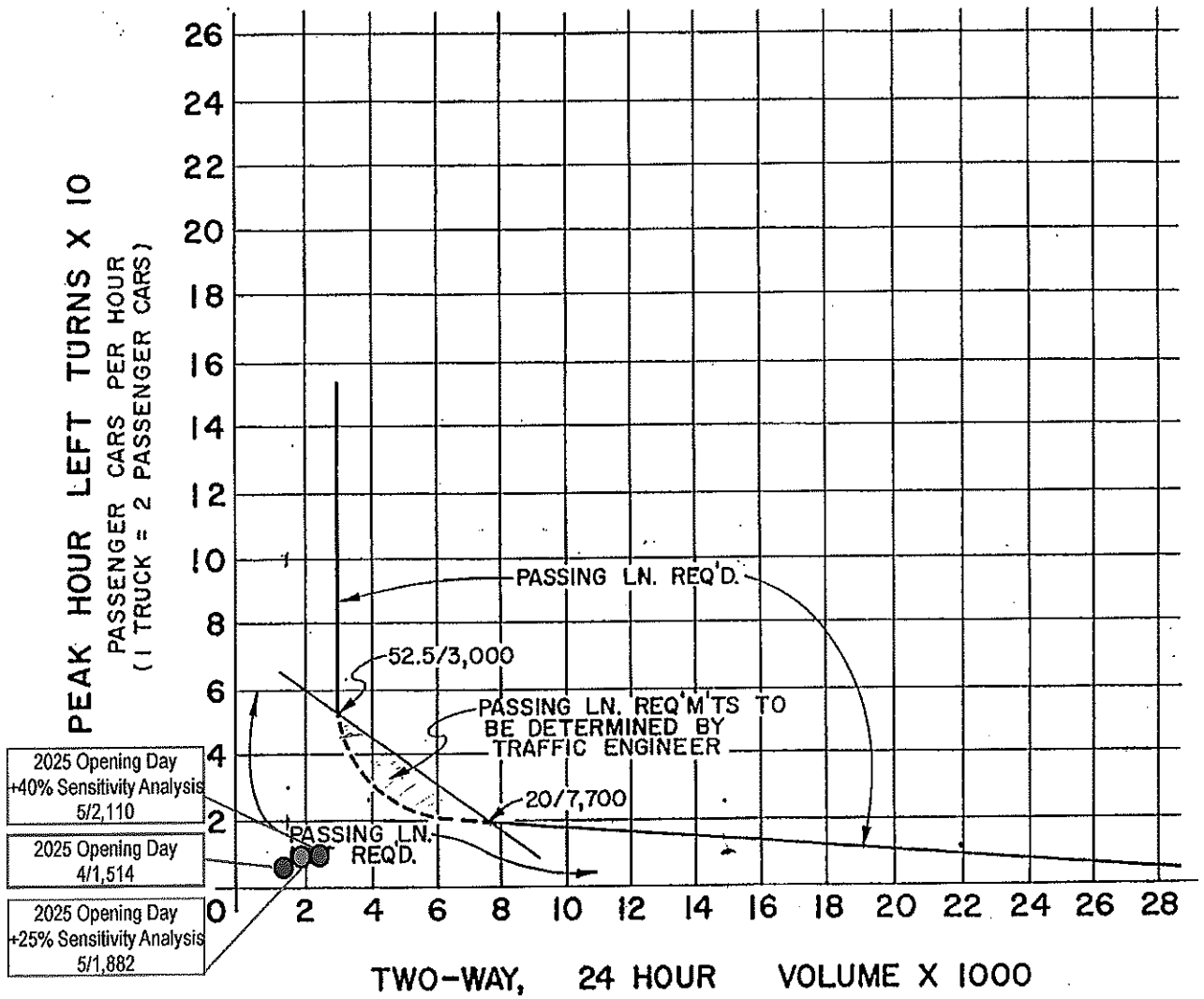


Figure 2 – MDOT Warrant for Left-Turn Lanes

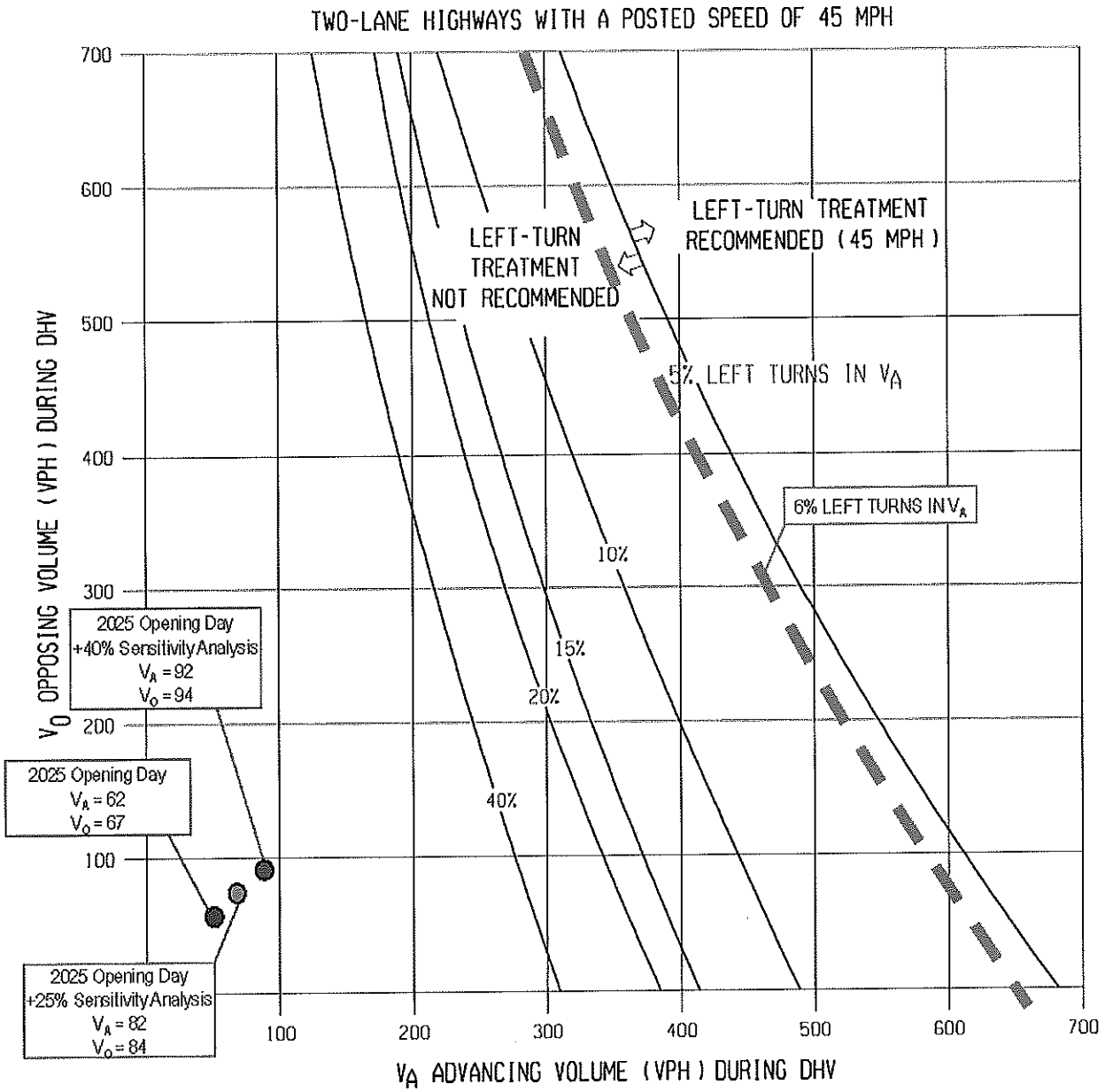
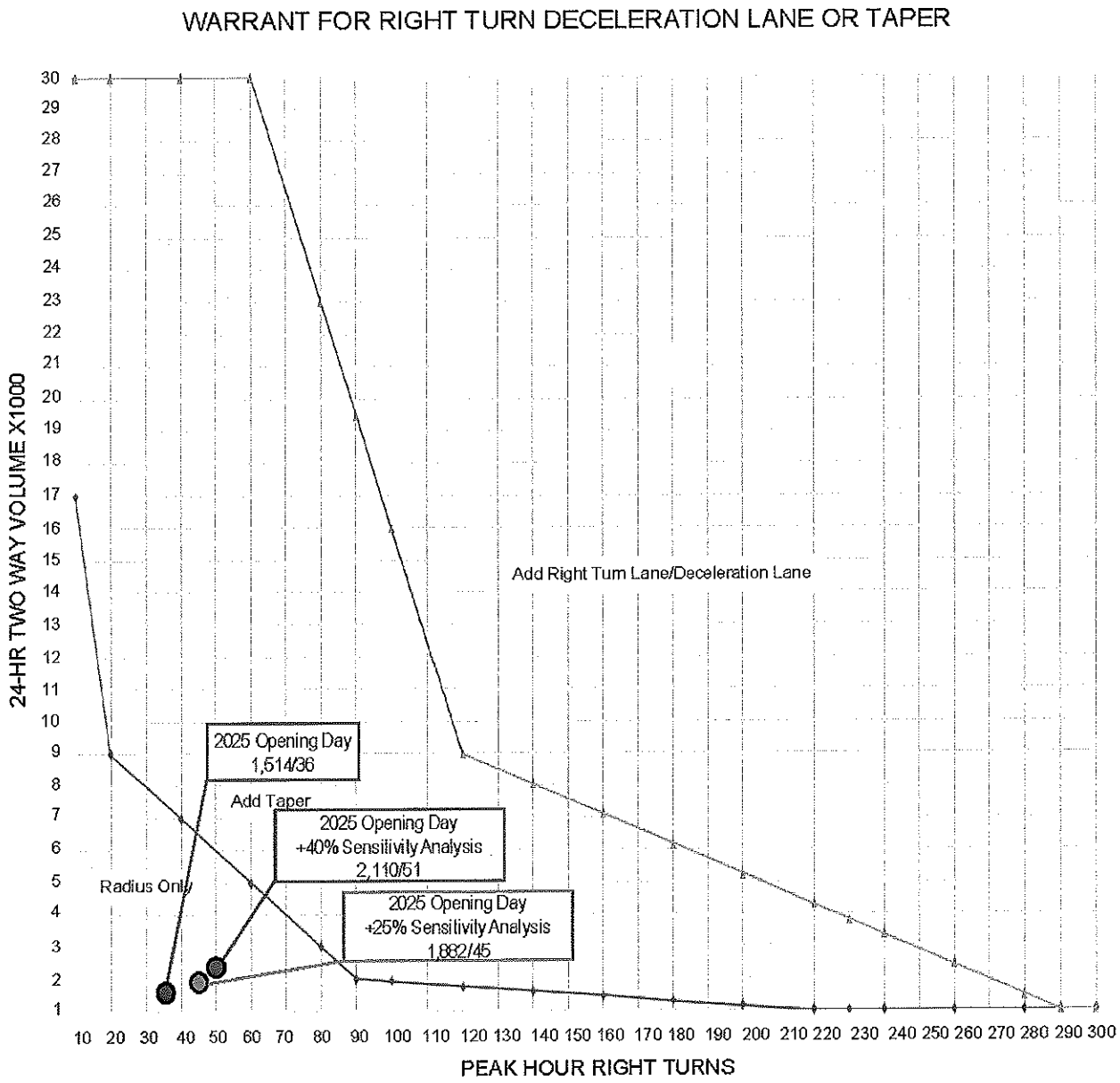


Figure 3 – Warrant for Right Turn Deceleration Lane or Taper

FIGURE 6-3



Assisted Living
(254)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

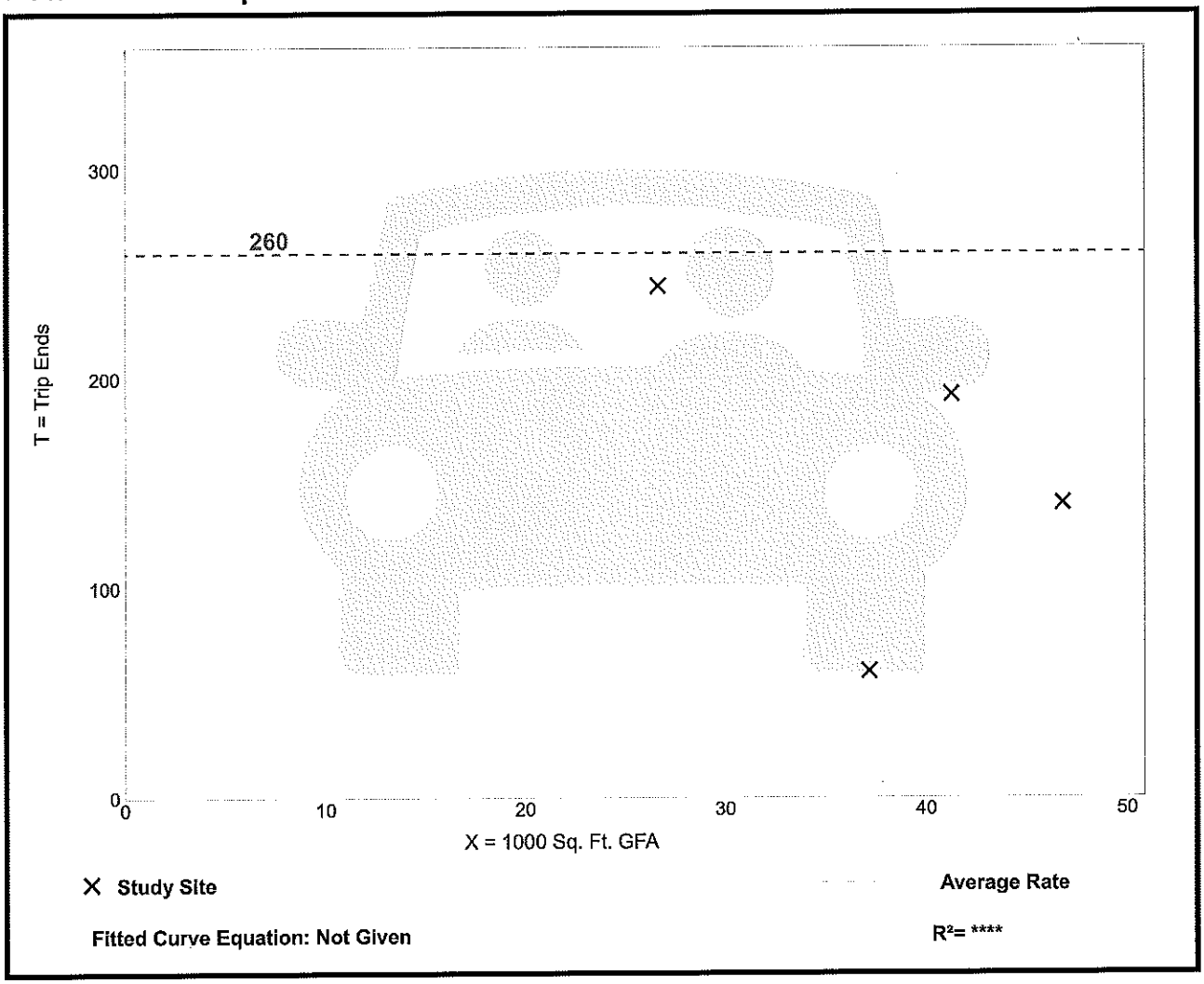
Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. 1000 Sq. Ft. GFA: 38
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.19	1.61 - 9.17	2.94

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

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Assisted Living
(254)

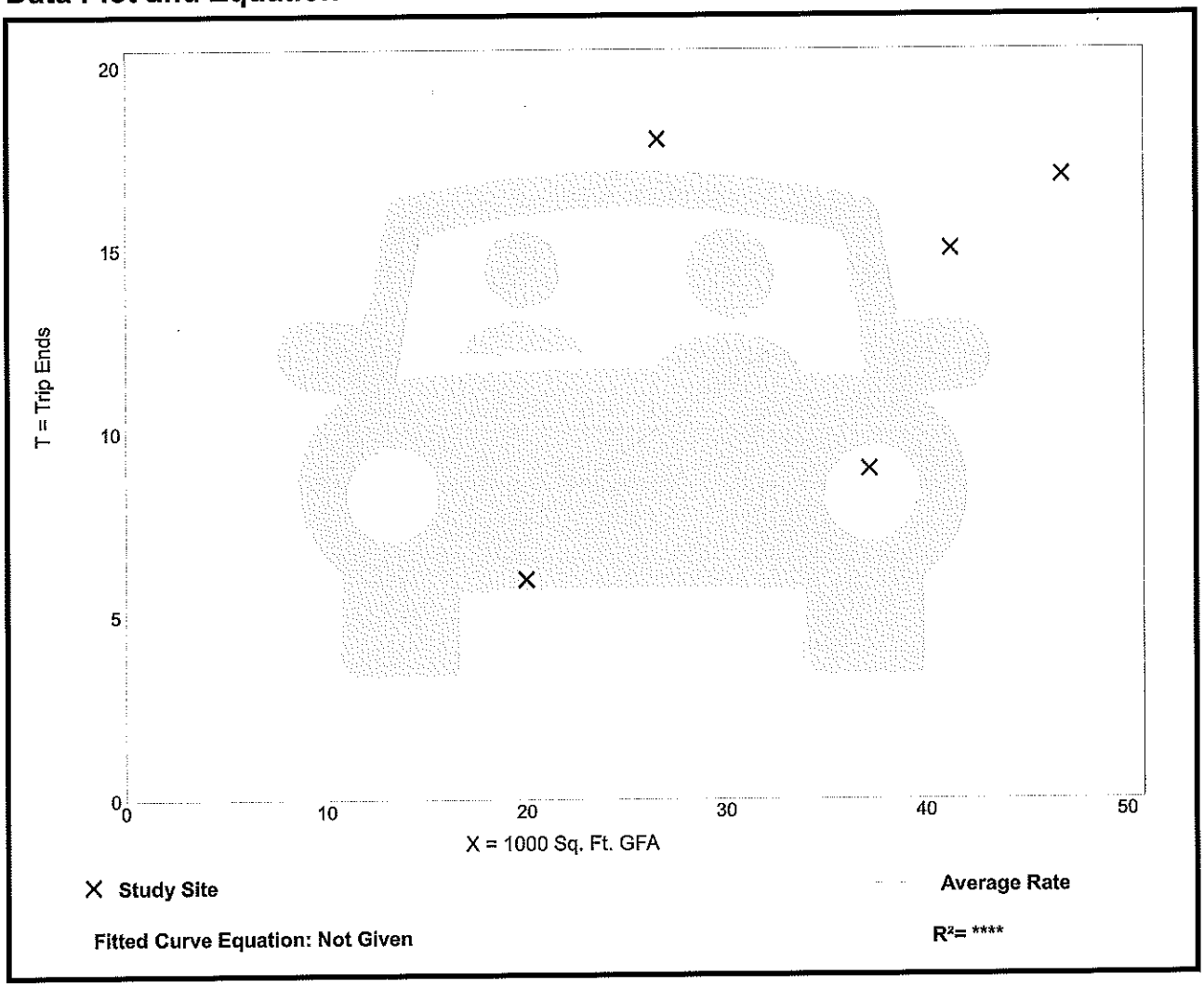
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 34
Directional Distribution: 75% entering, 25% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.38	0.24 - 0.68	0.15

Data Plot and Equation

Caution – Small Sample Size



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Assisted Living
(254)

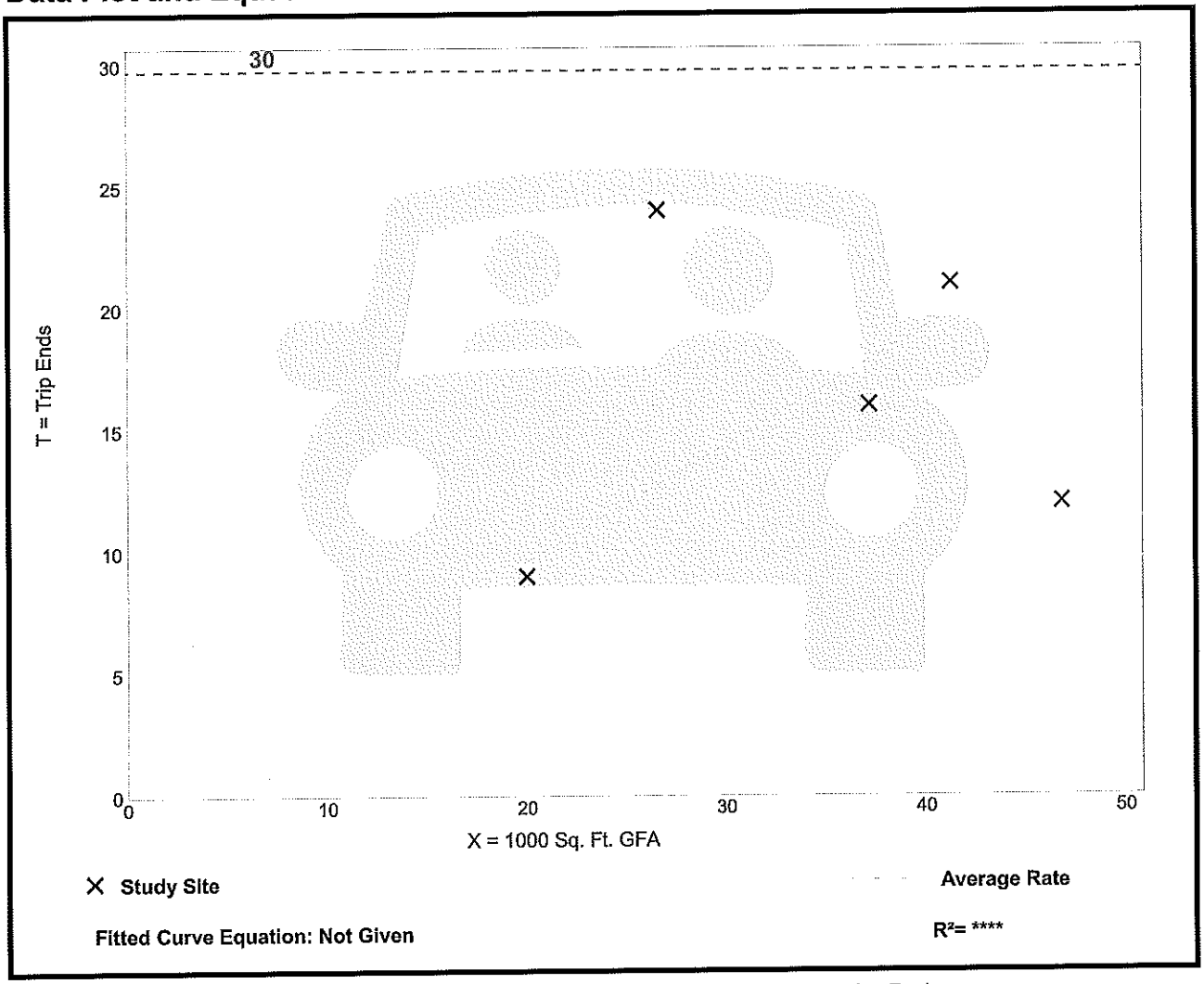
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 34
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.48	0.26 - 0.90	0.23

Data Plot and Equation

Caution – Small Sample Size



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Congregate Care Facility
(253)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

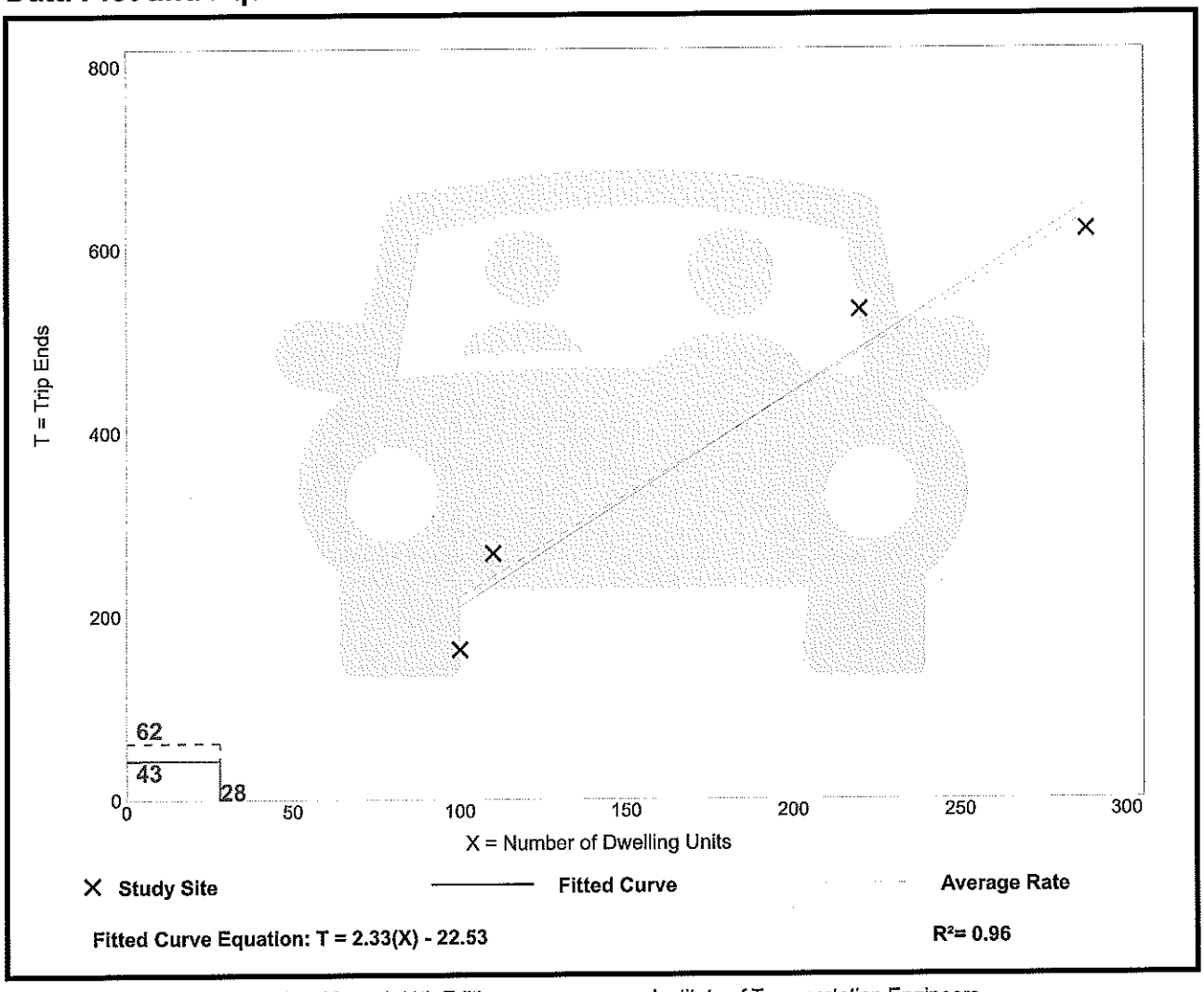
Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Dwelling Units: 180
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
2.21	1.63 - 2.44	0.31

Data Plot and Equation

Caution – Small Sample Size



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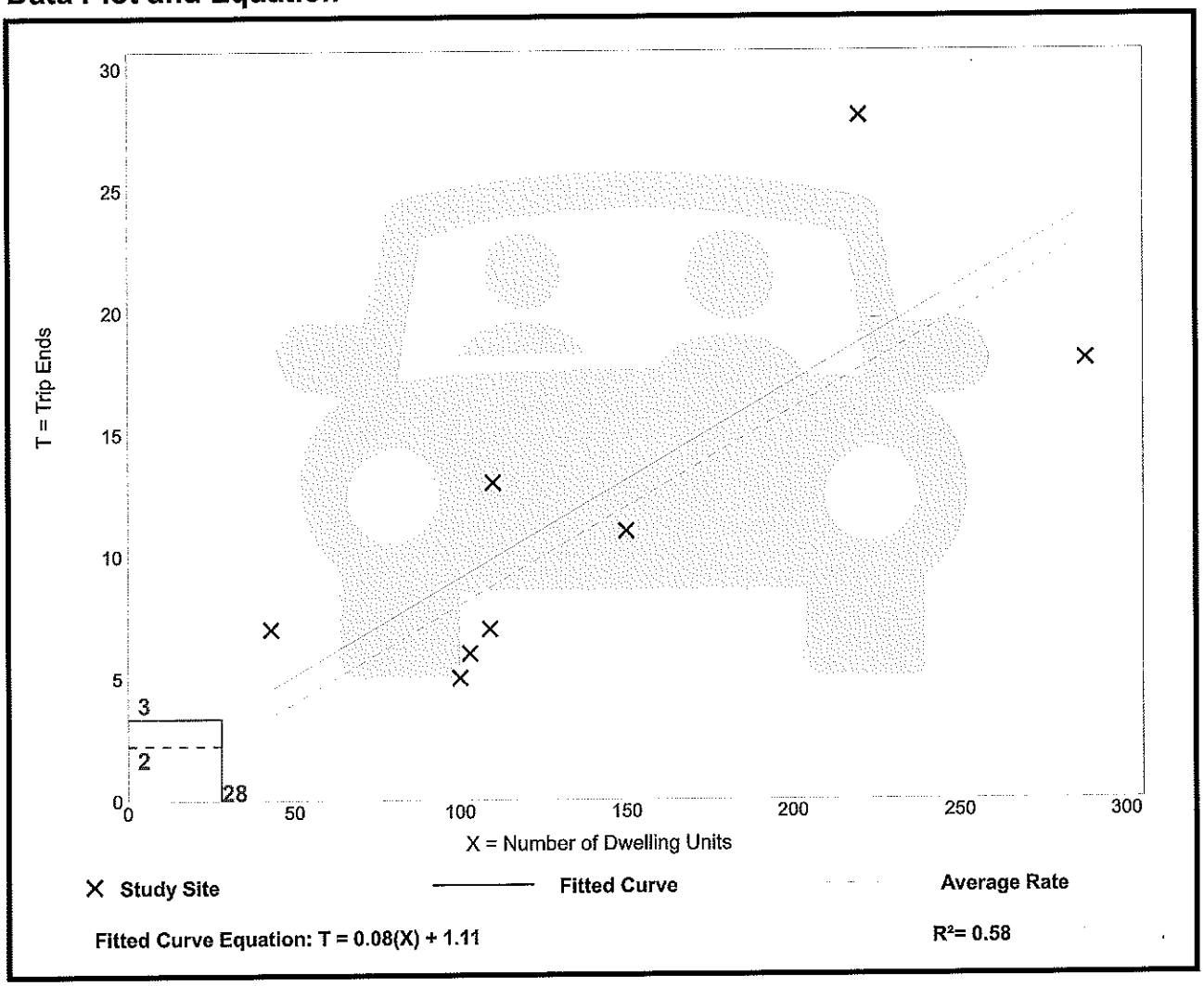
Congregate Care Facility
(253)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 8
Avg. Num. of Dwelling Units: 140
Directional Distribution: 58% entering, 42% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.08	0.05 - 0.16	0.03

Data Plot and Equation



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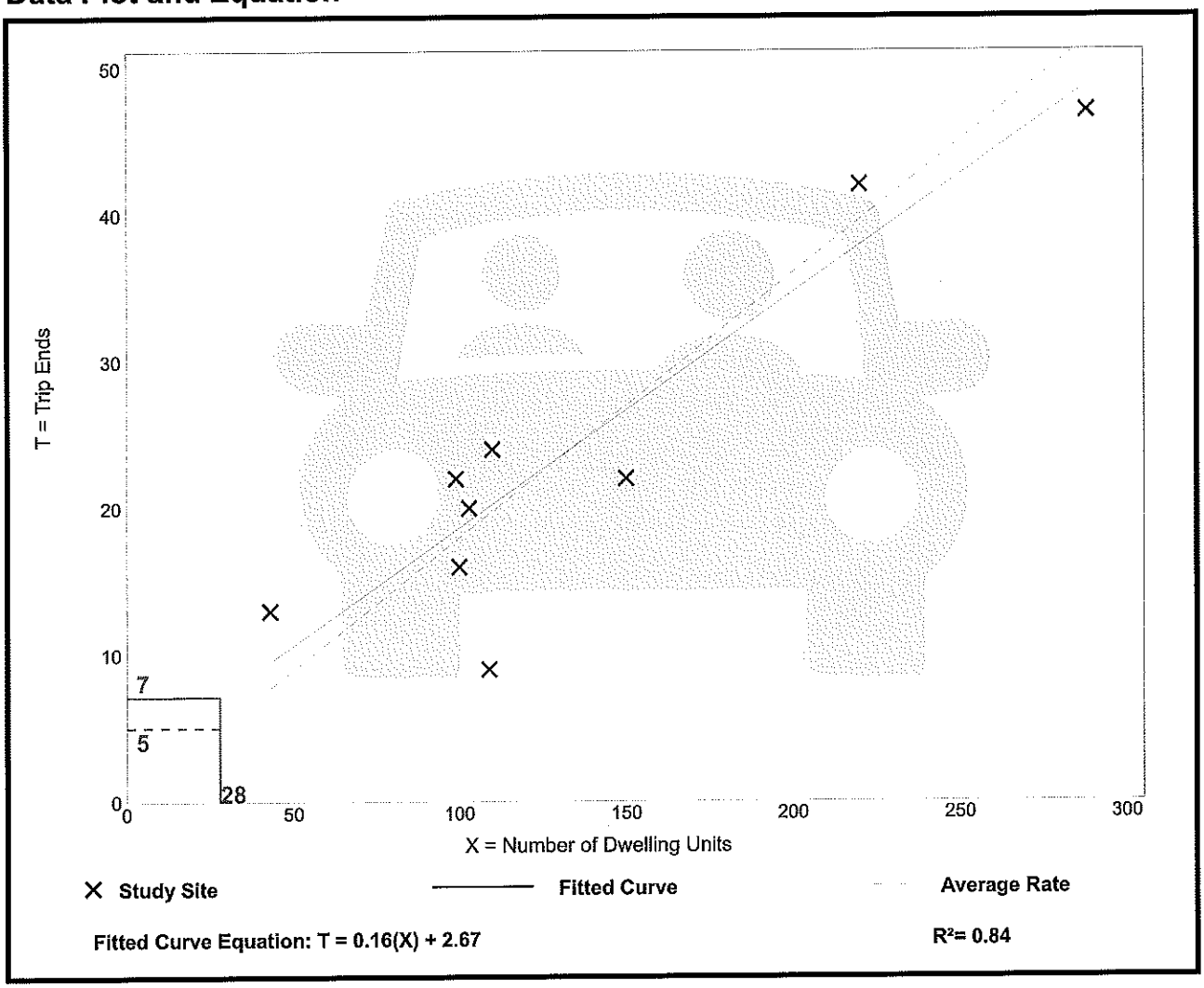
Congregate Care Facility
(253)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 9
Avg. Num. of Dwelling Units: 136
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.18	0.08 - 0.30	0.05

Data Plot and Equation



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STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

AARON B. KEATLEY
ACTING DIRECTOR

June 26, 2023

VIA EMAIL

Joe Nawrocki
303 North Hurstbourne Parkway
Suite 200
Louisville, Kentucky 40222

Dear Joe Nawrocki:

SUBJECT: Wetland Identification Report
MiEnviro Site Name: 63-15231 Fish Lake Rd-Holly Twp
MiEnviro WIP Application Submission Numbers: HPS-VDCT-YNREN

The Department of Environment, Great Lakes, and Energy's (EGLE) Water Resources Division (WRD) conducted a Level 3 Wetland Identification Program (WIP) review of an assessment area consisting of approximately 13.75 acres on property (Property Tax ID numbers: 01-28-101-014 and 01-28-101-013) located in Town 05N, Range 07E, Section 28; Holly Township (Figure 1) during May 25, 2023. The review was conducted in accordance with Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); and Rule 4(1), Wetland Identification and Assessment (R 281.924), of the Administrative Rules for Part 303. This is a report of our findings in response to your WIP application.

Staff from the WRD reviewed pertinent information such as historical aerial imagery, topographic mapping data, soils survey data, and surface hydrology data. The on-site investigation was conducted with your wetland consultant present and included a review of plants, hydrology, and soils.

Staff confirm, in part, the wetland boundary lines delineated by your consultant. One small wetland area was overlooked and omitted by the consultant; this wetland area is part of a small, depressional wetland (previously-delineated) located within the northeast portion of the site. Evidence showed that the area exhibits wetland hydrology during a typical growing season.

The site map (Figure 2) of the WIP assessment area was created by combining information from your consultant and the WRD. The new map identifies areas containing unregulated wetland and non-wetland (upland).

All wetlands within the assessment area are not regulated by the WRD because they are not contiguous to the Great Lakes, an inland lake or pond, or a river or stream; and are less than 5 acres in size. For those areas identified as non-wetland (upland) on the

site map (Figure 2), the WRD lacks jurisdiction under Part 303 for activities occurring there.

This Wetland Identification Report is limited to findings pursuant to Part 303 and does not constitute a determination of jurisdiction under other programs administered by EGLE. Any land use activities undertaken within the assessment area may be subject to regulation pursuant to the NREPA under Part 91, Soil Erosion and Sedimentation Control.

Please be aware that this Wetland Identification Report does not constitute a determination of the jurisdiction under local ordinances or federal law. The United States Army Corps of Engineers (USACE) retains regulatory authority over certain wetlands pursuant to Section 404 of the federal Clean Water Act (CWA), and specifically those wetlands associated with traditionally navigable waters of the state. Navigable waters are generally the Great Lakes, their connecting waters, and river systems and lakes connected to these waters. In other areas of the state, the WRD is responsible for identification of wetland boundaries for purposes of compliance with the CWA under an agreement with the United States Environmental Protection Agency. Your assessment area is unlikely to be within those areas also regulated by the USACE. Additional information may be obtained by contacting the USACE at 313-226-2218.

You may request the WRD reassess the wetland boundaries and regulatory status of wetlands within any portion of the assessment area, should you disagree with the findings, within 60 days of the date of this report. A written request to reassess the Wetland Identification assessment area must be accompanied by supporting evidence with regard to wetland vegetation, soils, or hydrology that are different from, or in addition to, the information relied upon by WRD staff in preparing this report. The request should be submitted to:

Wetland Identification Program
Department of Environment, Great Lakes, and Energy
Water Resources Division
P.O. Box 30458
Lansing, Michigan 48909-7958

Please use the MiEnviro submission number assigned to this project site if submitting a permit application or otherwise corresponding with our office.

The findings contained in this report do not convey, provide, or otherwise imply approval of any governing act, ordinance, or regulation, nor does it waive the obligation to acquire any applicable federal, state, county, or local approvals. This Wetland Identification Report is not a permit for any activity that requires a permit from EGLE.

The findings contained in this report are binding on EGLE until June 26, 2026, a period of three years from the date of this Wetland Identification Report unless a reassessment has been conducted. Please contact me at GyekisK@Michigan.gov; 517-243-5002; or EGLE, P.O. Box 30458, Lansing, Michigan 48909-7958, if you have any questions regarding this report.

Sincerely,

Keto Gyekis
Wetland Identification Program Coordinator
Water Resources Division

Enclosures
cc: Holly Township Clerk
Oakland County Soil Erosion Enforcement Agent (CEA)
Oakland County Health Department
Jonathon DeNike, Mannik-Smith Group
Andy Hartz, EGLE
Sue Tepatti, EGLE

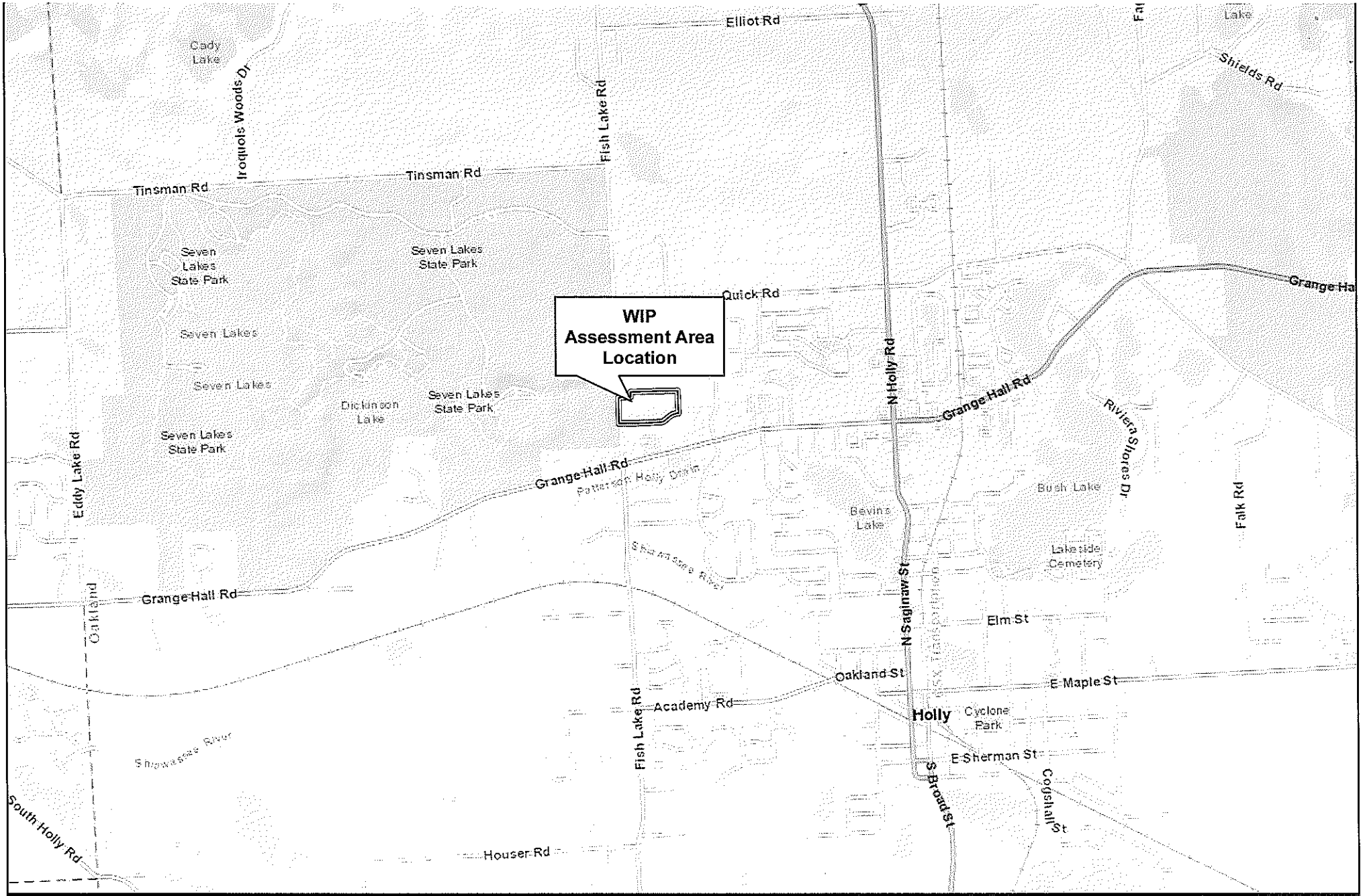
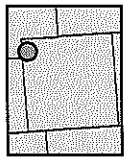


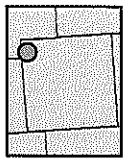
Figure 1.
EGLE Wetland Identification Location
15231 Fish Lake Rd
Holly Twp
WIP - HPS-VDCT-YNREN



EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

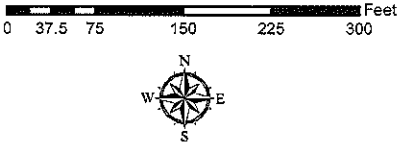
Map created: June 2023
K. Gyekis,
Wetlands, Lakes,
and Streams Unit, EGLE WRD

Figure 2.
EGLE Wetland Identification Detail
15231 Fish Lake Rd
Holly Twp
WIP - HPS-VDCT-YNREN



EGLE Unregulated Wetland

WIP Assessment Area



This drawing showing those areas containing wetland and not containing wetland is an approximation of the boundaries flagged on-site.

This drawing does not authorize or permit activities requiring a permit in accordance with Part 303 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Map created: June 2023
K. Gyekis,
Wetlands, Lakes,
and Streams Unit, EGLE WRD

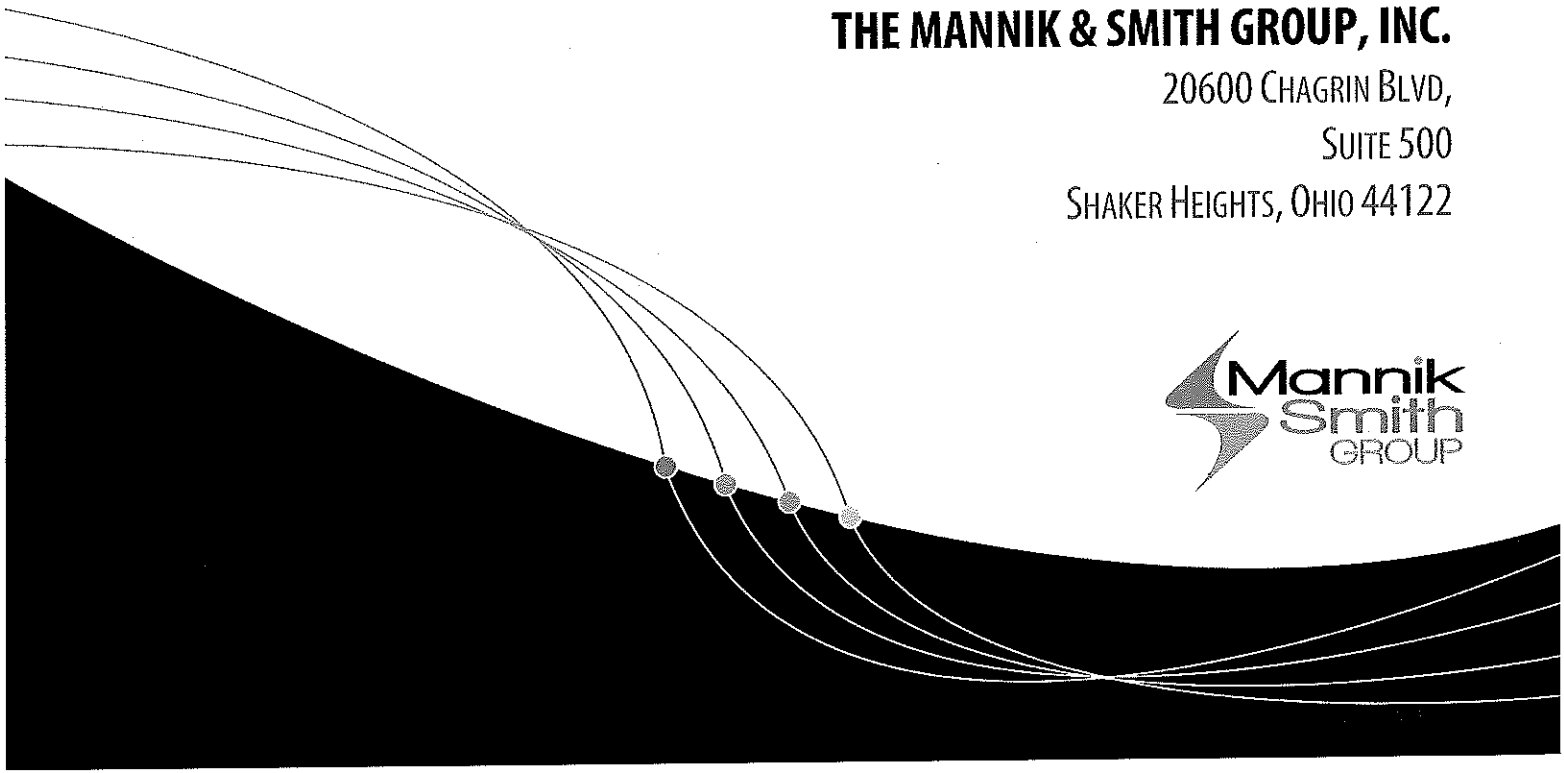
GEOTECHNICAL INVESTIGATION REPORT

TRILOGY – HOLLY TOWNSHIP
HOLLY TOWNSHIP, MICHIGAN
MSG PROJECT NO.: T1730071

MAY 2023

PREPARED FOR:
TRILOGY HEALTH SERVICES, LLC
303 N. HURSTBOURNE PARKWAY, SUITE 200
LOUISVILLE, KENTUCKY 40222

PREPARED BY:
THE MANNIK & SMITH GROUP, INC.
20600 CHAGRIN BLVD,
SUITE 500
SHAKER HEIGHTS, OHIO 44122



Mannik Smith GROUP

May 1, 2023

Mr. Joe Nawrocki
Trilogy Health Services, LLC
3030 N. Hurstbourne Parkway, Suite 200
Louisville, Kentucky 40222

RE: Geotechnical Investigation Report
Trilogy – Holly Township Michigan
MSG Project Number: T1730071

Dear Mr. Nawrocki:

The Mannik & Smith Group, Inc. has finalized the field investigation, the geotechnical analyses, and completed the Geotechnical Investigation Report for the proposed Trilogy Facility in Holly Township, Michigan. This report presents the results of our geotechnical investigation, laboratory test results, our geotechnical recommendations and construction considerations for the proposed project.

We trust that this report addresses your project needs. We appreciate the opportunity to work with you on this very important project. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
The Mannik & Smith Group, Inc.

John Ivoke, PhD
Geotechnical Engineer

Greg A. Buhoveckey, PE
Geotechnical Engineer

Kevin D. Brown, PE
Geotechnical Engineer

EXECUTIVE SUMMARY

The Mannik & Smith Group, Inc. (MSG) was retained by Trilogy Health Services, LLC to conduct a geotechnical investigation for a proposed facility located in Holly Township, Michigan. The subsurface investigation consisted of completing twenty-five (25) soil borings designated SB-01 to SB-25. All soil borings were located within the proposed development footprint and were advanced to depths of 10 feet to 45 feet below ground surface. Surveying of the boring locations was not performed and elevations were estimated from Google Earth Map. Bulk samples and infiltration tests were completed at soil boring locations SB-02, SB-07 and SB-24.

Surface material consisting of 1 to 8 inches of topsoil was encountered at all the soil boring locations. Very loose to loose granular material was encountered below the surficial layer at six soil boring locations. Soft to hard clay material was encountered at all the boring locations with the exception of boring location SB-02. This material was generally underlain or interbedded by very loose to medium dense sand material at varying depths. The depths and elevations at which these materials were encountered are presented in the soil boring logs attached in Appendix B. Groundwater encountered during drilling and at the end of drilling operations and is summarized in Table 3.2.1.

Based upon our review of the existing soil conditions in the planned foundation areas, it is recommended that the shallow foundations bearing on native stiff to very stiff silty clay or on well-compacted engineered fill be designed for an allowable bearing capacity of 2,500 psf.

The observed infiltration rate of on-site clay material tested is on the order of 0.03 in/hr. The observed infiltration rate of the on-site sandy silt material tested is on the order of 6.30 in/hr. According to NRCS Hydrologic Soil Group Classifications, we classify the sandy silt material as Group A and the clay material as Group D.

According to ASCE 7-22 Table 20.2-1, the proposed Site is designated as "Site Class D" based on the average soil shear strength for the upper 45 feet. It should be noted that Stratum 3 may be liquefiable with potential for failure or collapse under seismic loading. Additional laboratory testing of Stratum 3 is required to fully determine if it is a liquefiable soil.

This summary briefly discusses major findings covered within the body of the report. The intent of this executive summary is to provide a general summary. The report must be read carefully in its entirety before using any recommendations described herein.

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 General

The Mannik & Smith Group, Inc. (MSG) was retained by Trilogy Health Services, LLC to complete a geotechnical investigation for a proposed facility located in Holly Township, Michigan. The approximate site location is depicted in Figure 1 Site Location Map in Appendix A. This geotechnical investigation was performed in general accordance with MSG Proposals No. OP230269, dated February 7 and February 8, 2023.

1.2 Project Information and Site Conditions

As we understand, the expansion project consists of the design and construction of a new Trilogy Health facility located in Holly Township, Michigan. The proposed development will consist of multiple buildings, associated parking lots, access drives and storm water detention ponds.

The site of the proposed development is located on the northeast quadrant of the intersection of Fish Lake and Grange Hall Roads approximately 800 feet north of Grange Hall Road. The site is approximately 13.75 acres of undeveloped land area consisting of grassy field, tall brushes and trees. The existing topography at the site ranges from 960.0 to 944.0 feet above mean sea level as depicted from Google Earth and plan sheets provided.

2.0 SUBSURFACE INVESTIGATION

2.1 Field Exploration

The subsurface investigation consisted of completing twenty-five (25) soil borings designated SB-01 to SB-25. Soil borings SB-01, SB-11, SB-14, SB-18 and SB-21 were located within the pavement area and extended to a depth of 10 feet below the ground surface (bgs). Soil borings, SB-04 to SB-06, SB-08 to SB-10, SB-12, SB-13, SB-15 to SB-17, SB-19, SB-20 and SB-22 were located within the proposed building footprints and extended to depths ranging from 19 to 45 feet bgs. Soil borings, SB-02, SB-03, SB-07 and SB-23 to SB-25 were located within the proposed storm pond and were advanced to a maximum depth of 15 feet bgs. Representative bulk soil samples were collected from borings SB-02, SB-07 and SB-24 at depths extending to 5 feet bgs. In addition, three infiltration tests were completed at soil boring locations SB-02, SB-07 and SB-24 at a depth of approximately 10 feet bgs. Surveying of the boring locations was not completed and elevations were estimated using Google Earth. A Site Location Map and Soil Boring Location Plan are presented as Figures 1 and 2 in Appendix A.

The drilling operations for this investigation were performed from March 27 to April 4, 2023. The soil borings were completed using a track-mounted Geoprobe 7822DT drill rig. The borings were advanced by hydraulically pushing 3.25-inch inner diameter steel casing into the soil. Upon completion, the boreholes were backfilled to the surface using soil cuttings and bentonite chips.

During drilling operations, Standard Penetration Test (SPT) and soil sampling were conducted in accordance with ASTM D1586 procedures ("Standard Method for Penetration Tests and Split Barrel Sampling of Soils"). SPT and soil sampling were completed at a 2.5-foot interval to a depth of 10 feet and at a 5-foot interval thereafter in all the borings with the exception of borings SB-02, SB-07 and SB-24 where sampling was completed at 5-foot intervals. During the SPT testing, soil samples were obtained with a 2-inch outer diameter split spoon sampler driven 18 inches into the soil with blows of a 140-pound hammer falling 30 inches. The sampler is generally driven in three successive 6-inch increments with the blows for each 6-inch increment being recorded. The number of blows required to advance the sampler through 12 inches after an initial penetration of 6 inches is termed as the Standard Penetration Test resistance (N-value) and is presented graphically on individual Soil Boring Logs.

Collected soil samples were labeled with the soil boring designation and a unique sample number. The samples were sealed in glass jars in the field to protect the soil and maintain the soil's natural moisture content. All samples were transferred to MSG's laboratory for further analysis. Three thinned-walled Shelby tubes samples were collected in accordance with ASTM D1587 at soil boring locations SB-09, SB-15 and SB-19.

The soil samples collected from this investigation will be retained in our laboratory for a period of 30 days after the date of submission of the final report, after which they will be discarded unless we are notified otherwise. A sample storage charge may apply for samples requested to be stored beyond 30 days.

Whenever possible, groundwater level observations were made during the drilling operations and are shown in the Soil Boring Logs. In addition, prior to backfilling, each open borehole was observed again for groundwater. During drilling, the depth at which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. In cohesive soils, groundwater observations are not necessarily indicative of the static water table due to low permeability rates of the soils and due to the sealing off of natural paths of groundwater during drilling operations. It should be noted that seasonal variations and recent rainfall conditions may influence the groundwater table significantly.

2.2 Laboratory Testing

Each split-spoon sample recovered from the borings was examined and visually classified according to ASTM D2488. This examination was completed to verify conditions identified within field boring logs, to select samples for further laboratory evaluation, and to perform visual-manual classification of samples not subject to further laboratory testing. During the examination process, the geotechnical engineer finalized the soil boring logs.

Representative soil samples were subjected to laboratory tests consisting of the Pocket Penetrometer Test, Moisture Content Tests (ASTM D2216), Grain Size with Hydrometer Test (ASTM D422), Atterberg Limits Test (ASTM D4318), Unconfined Compression Strength Test (ASTM D2166) and Modified Proctor (ASTM D1557). A brief description of each test performed by MSG is provided in Laboratory Test Procedures in Appendix C.

All soil samples were classified in general accordance with the Unified Soil Classification System (USCS). The USCS group symbol determined from the visual-manual classification is shown in parentheses at the end of the sample description for each layer shown on the Soil Boring Logs.

The results of the soil classification and the laboratory test results are included on the Soil Boring Logs and Soil Laboratory Test Data, which are presented in Appendices B and C, respectively. Also included in Appendix B are General Soil Sample Notes and a Boring/Well Log Key that illustrates the soil classification criteria and terminology used on the Soil Boring Logs.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Classification

The following sections describe the subsurface conditions in terms of major soil strata for the purposes of geotechnical exploration. The soil boundaries indicated are inferred from non-continuous sampling and observations of the drilling operations and/or sampling resistance. The subsurface conditions discussed in the following sections and those shown on the boring logs represent an evaluation of the subsurface conditions based on interpretation of the field and laboratory data using normally accepted geotechnical engineering judgement and common engineering practice standards. The subsurface conditions described herein may vary beyond the boring locations and at different times of

the year. A generalized soil profile of the subsurface conditions encountered across the site of the proposed site improvements, beginning at the ground surface and extended downward is as follows:

Surficial Material – Topsoil

One to eight inches of topsoil was encountered at all the soil boring locations a surface material.

Stratum 1 – Very Loose to Loose to Granular Material (SC, SM, or ML)

Very loose to loose granular material consisting of brown sand or silt with variable amounts of clay and gravel was encountered below the surficial layer at soil boring locations SB-02, SB-06, SB-13, SB-16, SB-18, and SB-22 at varying depths.

Stratum 2 – Medium Stiff* to Hard Silty Clay Material (CL) mst-h 3.5-8.5

Medium stiff to hard brown silty clay with variable amounts of sand and gravel was encountered at all the soil boring locations beneath the surficial material with the exception of soil boring location SB-02 where Stratum 2 was not encountered. This material was generally underlain by Stratum 3 at varying depths at all the soil boring locations where encountered.

***Soft clay material was encountered in the upper 2.5 feet at soil boring location SB-15 and at depth ranging from 6 to 13.5 feet at soil boring location SB-06.**

Stratum 3 – Very Loose to Very Dense Granular Material (SP, SW, SM, SP-SM, SW-SM or ML)

Very loose to very dense granular material consisting of brown sand or silt with variable amounts of clay and gravel was encountered at varying depths at most of the soil boring locations. In several borings, Stratum 3 was found interbedded with Stratum 2. Stratum 3 was not encountered at boring locations SB-02, SB-07, SB-11, SB-14, SB-18, SB-21, and SB-23 to SB-25.

3.2 Groundwater Observations

Groundwater was encountered during drilling and at the end of drilling operations and is summarized in Table 3.2.1. For soil borings that are not included in Table 3.2.1, no groundwater was encountered either during or after drilling. Water levels reported are accurate only for the time and date the borings were drilled. The borings were backfilled and sealed the same day that they were completed. Long term monitoring of the boreholes was not included as part of the scope of our subsurface investigation.

Table 3.2.1 Summary of Encountered Groundwater Conditions

Boring No.	Depth (ft.) At Time of Drilling	Elevation (ft.) At Time of Drilling	Depth (ft.) End of Drilling	Elevation (ft.) End of Drilling
SB-01	8.5	943.5	8.5	943.5
SB-02	4.0	946.0	4.0	946.0
SB-03	8.5	950.5	-	-
SB-04	4.0	951.0	-	-
SB-05	4.0	948.0	-	-
SB-06	9.5	942.5	-	-
SB-08	12.0	937.0	-	-
SB-09	13.5	941.5	-	-
SB-10	13.5	946.5	-	-
SB-13	6.0	946.0	17.0	935.0
SB-15	13.0	945.0	20.0	938.0
SB-19	30.0	921.0	30.0	921.0
SB-20	9.0	945.0	10.0	944.0

It should be noted that the elevation of the natural groundwater table, and the elevation and quantity of the perched groundwater, is likely to vary throughout the year depending on the amount of precipitation, runoff, evaporation and percolation in the area. Long term monitoring with monitoring wells or piezometers is necessary to accurately assess the groundwater levels and fluctuation patterns at the site.

4.0 ANALYSES AND RECOMMENDATIONS

4.1 Structure Recommendations

The following sections discuss in detail the results of our analyses and geotechnical recommendations with respect to the design and construction of the proposed site development. Structural loading information was not provided at the time this report was prepared. Once structural loading information is available, MSG should be allowed to review such information and its effects to our recommendations contained in this report.

MSG has developed the foundation recommendations presented herein based on the above project's background information, the subsurface conditions encountered during our field investigation, the results of our laboratory testing, and the results of our geotechnical analyses.

4.1.1 SHALLOW FOUNDATIONS

Based upon our review of the existing soil conditions in the planned foundation areas, it is recommended that the shallow foundations bearing on native stiff to very stiff silty clay or on well-compacted engineered fill be designed for an allowable bearing capacity of 2,500 psf. Soft clay material encountered below the foundation bearing elevation at soil boring SB-06 should be completely removed or removed to a minimum depth of twice the foundation width below the bearing surface and replaced with engineered fill. Very loose to loose material encountered in soil borings SB-05 and SB-08 at the foundation depth should be densified (compacted) in-place. We recommend MSG be retained to evaluate the foundation subgrades to determine any undercut locations and depths and perform the compaction testing of any engineered fill.

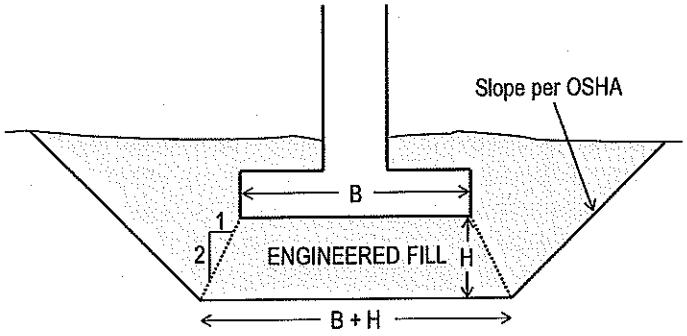
By using proper construction techniques, the consolidation settlement underneath the proposed shallow foundations in the cohesive soil layers is anticipated to be less than 1 inch and the differential settlement is

expected to be ¾ of the total settlement. Settlement should be reevaluated once structural loading is available.

The aforementioned recommended soil bearing capacity and the associated settlement estimation are based on footing elevations with regards to existing and proposed preliminary site elevations. The required footing sizes are dependent on the column and wall loads in comparison to the above recommended allowable bearing capacity of the bearing soil. However, wall footings should be at least 18 inches wide and column footings should have a minimum dimension of 30 inches. Exterior footing bottoms and footings in unheated areas should be no less than 3.5 feet (typical frost depth per local codes for Southeast Michigan) below final exterior grade for protection against possible frost damage. Interior footings, which should not be subject to frost action, may bear at shallower depths, provided they are supported on native compact soil or engineered fill capable of supporting the design load.

Prior to the placement of reinforcing steel and concrete, an MSG geotechnical engineer or his/her designated representative should evaluate foundation excavations to verify that an adequate bearing material is present and that all debris, mud, loose, frozen or water-softened soils, and unsuitable soils are removed. All footings should bear in the undisturbed natural soils or in well-compacted engineered fill. In addition, MSG recommends that a DCP test or Housel Penetrometer Test, or similar field testing, be performed by the geotechnical engineer representative to assure a suitable bearing capacity for all foundations prior to concrete placement.

Where foundation subgrade undercutting and replacement is required, the undercuts should extend laterally at a slope of 1(Horizontal):2(Vertical) from the edge of the footing as shown in the typical undercutting diagram below:



Foundations should be constructed as soon as is practical after foundation excavation activities. If the foundation excavations will be left open for an extended period of time, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation. Foundation concrete should not be placed on frozen or flooded subgrade.

The final grade adjacent to the building exterior should be sloped at a minimum 2 percent grade away from the building foundations and roof drains should be routed away from the foundation soils. Shallow groundwater was encountered at the site and exhibited artesian conditions. Foundation drains will assist in ensuring the foundation subgrade soils are not adversely impacted by moisture changes that could result in differential settlement of the foundations. To prevent moisture against the exterior footings, a perforated matted edge drain may be used around the perimeter of the footings and placed at the base of the footings. The underdrain

should be backfilled with free draining material. A waterproofing membrane with a protection layer should extend from the top to the base of the footings along the exterior edge where the concrete is in direct contact with the natural or backfilled material.

If a two-pour system is used for footings and slab, the cold joint at the interface of the exterior footings and slab on grade should be located at least 4 inches above the adjacent finish exterior grade. As an alternative, the use of a waterstop between the two pours will minimize the moisture penetration through the cold joint and migration of water under the slab. A monolithic pour will eliminate the need of a waterstop.

4.1.2 SLAB-ON-GRADE

Based on the existing subsurface conditions and subgrade preparation as outlined below, an estimated modulus for subgrade reaction of 125 pci should be used for subgrade consisting of the existing native clay. For a prepared non-cohesive sand subgrade or a subgrade composed of well-compacted engineered fill, a modulus of subgrade reaction of 175 pci may be used. The final design thickness of any floor slabs, the joint spacing, and slab reinforcement should be determined by the structural engineer based on the above recommended subgrade modulus, the floor loading conditions, and local building code requirements.

The subgrade of the slab-on-grade areas should be inspected and tested to assure proper preparation. The building pad shall be proof rolled as described in Section 4.3 and backfilled as described in Sections 4.3 and 4.4. The subgrade soils should be protected against frost action if construction takes places during the winter. Frozen soils should be thawed, moisture conditioned and recompacted or undercut and replaced prior to commencement of slab-on-grade construction. We recommend that the floor slabs-on-grade bear directly on a minimum of 6 inches of capillary resistant, open-graded granular engineered fill compacted to 98 percent of Standard Proctor or 95 percent of Modified Proctor maximum dry density within 2 percent of the Optimum Moisture Content (OMC); the remainder of the undercut can be backfilled with a dense-graded material such as MDOT 21AA.

A waterproof membrane (vapor retarder) should be placed directly beneath the concrete to minimize infiltration of water and delamination of the concrete floor slab. The moisture condition of the floor slab should be tested prior to placement of floor coverings to verify they are within tolerable limits for the floor coverings. Precautionary measures such as concrete mixture with low water-cement ratio of no more than 0.50 should be implemented to reduce the residual moisture in the slab. The vapor retarder should be sealed at all seams and pipe penetrations and connected to all footings. Water reducing admixtures may be used to obtain workability of the concrete. Sufficient time should be provided to moist cure the slabs for a minimum of 3 days or use other equivalent curing methods identified by the structural engineer.

In order to minimize the potential impacts caused by differential settlement, the slab-on-grade should be kept structurally separate from walls and columns and saw cut control joints (expansive joints) should be provided at suitable intervals. A minimum of 6 inches of engineered fill should be placed between the slab bottom and the top of the footings below.

4.2 Pavements

4.2.1 SUBGRADE ANALYSIS AND REMEDIATION RECOMMENDATIONS

MSG recommends that if it is determined that 30 percent or more of the pavement subgrade area requires stabilization, then consideration should be given to performing a global remediation of the subgrade within the entire pavement limits. MSG's analysis indicates that approximately 10 to 15 percent of the total project area

contains soils at the estimated pavement subgrade elevation may require stabilization due to the presence of unstable soils with low strength (low blow counts readings) and high moisture contents.

Excavation and replacement of up to 12 inches below the pavement subgrade elevation may be required in some areas depending on the final pavement grades. A site grading plan was not available for this analysis. Final pavement grades should be evaluated with respect to the excavation and replacement depths to accurately estimate undercut depths.

If excavating and replacement with imported granular material is preferred, then the natural filter criteria for the subgrade must be met or a geotextile filter fabric is required for undercut areas. The following criteria are considered:

1) (D_{15} 304)/ (D_{85} subgrade) is less than or equal to 5; and
2) (D_{50} 304) / (D_{50} subgrade) is less than or equal to 25.

Based on our laboratory testing results, both the above criteria are not met for this site based on typical granular fill materials. Therefore, a geotextile filter fabric is recommended for the pavement section at the interface of the subgrade and a typical granular fill material. If a non-typical gradation of granular material is specified for use, then the use of a geotextile filter fabric should be re-evaluated.

If during construction it is determined that greater than 30 percent of the subgrade may require remediation, consideration should be given to performing global chemical stabilization using lime over the limits of the entire pavement area. Global chemical remediation consisting of 12 inches of cement stabilization is recommended and possible, should it be necessary. If chemical stabilization is determined to be the preferred method for remediation, then additional soil samples should be taken from the proposed subgrade elevation and laboratory sulfate testing should be performed. It should be noted that MSG does not recommend chemical stabilization if the amount of sulfates present in the subgrade soils exceeds 5,000 parts per million (ppm).

The actual depths and limits of subgrade stabilization, excavate and replacement should be determined during proof rolling operations and should be performed under the direction of the project geotechnical engineer or his/her designated on-site representative. Final proof rolling of the subgrade surface can be used to determine acceptability. For global stabilization, only final proof rolling shall be performed after the stabilization has been implemented.

MSG recommends that construction traffic be minimized once the proposed subgrade level has been attained. If construction traffic is allowed to traverse over the exposed subgrades, the quantity of soil identified as potentially requiring remediation based on proof rolling operations may increase.

4.2.2 PAVEMENT SECTION RECOMMENDATION

Site preparation recommendations presented in Section 4.3 shall be followed to provide subgrade conditions suitable for pavement support. Adequate drainage should be provided to the pavement structure to ensure a successful pavement service life is achieved. MSG recommends that underdrains be utilized around catch basins and in other low areas of the proposed pavements to limit the accumulation of water below the pavement structures if an asphalt pavement is preferred.

California Bearing Ratio (CBR) testing was not performed. Based on the soil characteristics from the geotechnical investigation and anticipated proposed elevations, a design CBR value of 5 was estimated using

parameters obtained from laboratory testing. The pavement design input parameters are established based on the procedures contained in the 1993 Guide for Design of Pavement Structures by AASHTO. For the basis of the design, MSG assumed the following input parameters:

4.2.1 Assumed Pavement Design Parameters

Design Life	20 Years
Design ESAL	100,000 (Light Duty); 850,000 (Heavy Duty)
Reliability	80 %
Original Serviceability Index	4.2 (Flexible Paving); 4.5 (Rigid Paving)
Terminal Serviceability Index	2.0
Overall Standard Deviation	0.45 (Flexible Paving); 0.35 (Rigid Paving)

For flexible pavement design, MSG assumed structural number coefficients of 0.42 and 0.14 for asphalt concrete and aggregate base, respectively. Based on the above assumptions, recommended flexible pavement sections are provided in the following table.

4.2.2 Recommended Flexible Pavement Sections

Pavement Materials*	Light Duty (in.)	Heavy Duty (in.)
Surface Course	1.25	1.75
Intermediate Course	1.75	2.25
Aggregate Base (MDOT 21AA)	8.0	10.0

For rigid pavement design, MSG assumed a concrete elastic modulus (E_c) of 5,000,000 psi, a concrete rupture modulus (S'_c) of 700 psi and a load transfer coefficient (J) of 2.7. Based on the above assumptions, recommended rigid pavement sections are provided in the following table.

4.2.3 Recommended Rigid Pavement Sections

Pavement Materials*	Light Duty (in.)	Heavy Duty (in.)
Portland Cement Concrete	6.0	6.0
Aggregate Base (MDOT 21AA)	6.0	8.0

* Use pavement materials as outlined above, or engineer/owner approved equivalent.

4.3 Site Preparation

Before proceeding with construction, surface soils, vegetation, topsoil, root systems, refuse, asphalt, concrete including any existing abandoned buried foundations, and other deleterious materials should be stripped from the proposed development/construction areas. Depending on the time of year of construction and the Contractor's Means and Methods at controlling surface water, it may be possible that portions of the upper 12 to 18 inches of the site material within development/construction areas will be considered unsuitable and/or unstable and will be required to be stripped during site preparation activities.

Cohesive soils are moisture sensitive and could become unstable if proper site water controls are not implemented and/or if they are subject to construction traffic. Every effort should be taken to minimize disturbance during compaction or over excavation. Where possible, free standing water should be diverted away from the construction perimeters or pumped out using a sump to accommodate the proper compaction techniques.

Due to relatively shallow groundwater, moisture conditioning of the subgrade soils for compaction operations may be difficult without groundwater control. The pathways for groundwater infiltration through the granular soils may be limited by temporary retaining walls or dewatering of the site.

Generally, areas exposed by stripping operations on which subgrade preparations are to be performed should be compacted in place to 98 percent of Standard Proctor or 95 percent of Modified Proctor MDD within 2 percent of the OMC. If there are areas where the building floor slabs will be located partially on a fill area and partially on a cut area, it is recommended that the depth of subgrade compaction in the cut area be increased to 18 inches, in order to provide uniform support of the rigid slab.

It is recommended that the prepared subgrade slab-on-grade areas be proof-rolled to detect any unstable areas. Proof rolling should be accomplished by making a minimum of two complete passes in each of two perpendicular directions with a fully-loaded tandem-axle dump truck, or other approved pneumatic-tired vehicle, with a minimum weight of 20 tons. If proof rolling reveals the presence of unstable areas within the subgrade, certain remedial measures will be required to stabilize the subgrade. Depending on the severity of distress encountered during proof rolling, undercutting of 12 to 18 inches below subgrade and backfilling with engineered fill as outlined in Section 4.4 may be performed. If an undercut and replacement of the top 12 to 18 inches fails to stabilize the subgrade, use of granular backfill with geogrid stabilization may be required. Undercuts may be reduced 6 inches if geogrid and granular backfill is utilized. Granular soils at the subgrade surface may be reworked in place in order to pass a proof roll. Alternately, chemical stabilization of the upper 12 inches with cement may be performed. The actual undercut depths and/or subgrade remediation measures required should be determined by the on-site Geotechnical Engineer or a designated representative.

Existing abandoned utilities within the project site could be encountered during construction. Where utilities are present, they should be removed and relocated or abandoned in place. If abandoned in place, it is recommended that the utility pipe be filled with cement grout to mitigate the potential for collapse in the future. Should the utility lines be removed from the site, the resultant trench excavations should be backfilled with well-compacted granular material, placed and compacted in accordance with the recommendations of Section 4.4.

4.4 Fill Placement and Engineered Fill Requirements

The fill material should be verified by an approved testing laboratory or by a geotechnical engineering firm. All new fill should consist of inorganic soil that is free from all deleterious materials and construction debris. Fill materials should not be placed in a frozen condition or upon frozen subgrades. Proper drainage should be maintained during and after fill placement to prevent water from impacting compaction efforts or long-term fill integrity. All fine grained fill soils

should be checked for plasticity index and liquid limit before placement. Cohesive fill materials should have a liquid limit less than 40 percent and plasticity index less than 20 percent (i.e., non-expansive).

Coarse crushed granular material is preferred as fill for replacement of undercut areas, utility trench backfill and as aggregate base material for pavement and slab-on-grade areas. The coarse crushed granular material may consist of natural aggregate materials or geotechnical engineer approved equivalent. Typical lift thickness utilized for this material is 8 inches. In utility trenches, granular backfill material should extend at least two pipe diameters above the pipe's crown. If a working platform for the new building construction is needed, and prior to footing excavation, it is recommended that at least 6 inches of granular base material meeting the gradation requirements MDOT 21AA aggregate be placed and compacted. As an alternative to imported granular fill, excavated soil material may be recompacted back in place so long as the excavated soil material is determined to be suitable.

Fill should be compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor MDD and should be compacted within 2 percent of OMC. Fill materials should be placed in horizontal lifts and adequately keyed into stripped and scarified subgrade soils and adjacent fill. A qualified geotechnical consultant should be retained to monitor fill placement in order to assure compaction requirements are achieved. Soil density testing should be performed during fill placement activities to assure proper fill compaction. A commonly used testing criterion is one test per 2,500 square feet per lift in areas to support proposed structures and one test per 5,000 square feet in parking lots, drive ways, exterior slabs, etc., with a minimum of three tests per lift. Areas that do not achieve compaction requirements after initial placement should be recompacted to meet project requirements.

The actual lift thickness suitable for fill placement is dependent upon the soil type, compaction equipment, and the compaction specification. In general, fill should be placed in a 9-inch loose lift thickness (8-inch compacted); assuming appropriately weighted and ballasted compaction equipment is utilized. In confined areas where hand operated compaction equipment is required, 4-inch and 6-inch loose lift thickness should be utilized for hand operated vibratory plate compactors and hand operated vibratory drum rollers weighing at least 1,000 pounds, respectively. Sand fills should be compacted using smooth vibratory rollers. Clay fills should be compacted using a sheep foot compactor. The geotechnical engineer, as part of the construction monitoring, should review the equipment utilized for compaction to confirm suitability relative to the specified loose lift thickness. If necessary, the geotechnical engineer will recommend a revised lift thickness suitable to the equipment performing compaction.

4.5 Excavation and Slope

Familiarity with applicable local, state and federal safety regulations, including current OSHA excavation and trench safety is vital. Therefore, it should be a requisite for both the Owner and Contractor with the Contractor by and large being responsible for the safety of the site. Activities at the site, such as utilities or building demolition and site preparation, may require excavations at significant depths below the ground surface. Slope height, slope inclination, and excavation depth (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety (OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 Subpart P) regulations. Such regulations are strictly enforced and, if not followed, the Owner, Contractor, or earthwork or utility Subcontractors could be liable for substantial penalties.

The overburden soils encountered during our investigation were composed of a mixture of materials, including very loose granular soils. Based upon the data obtained, we anticipate OSHA will classify site soils as **Type C** soil, which will require a maximum temporary excavation slopes of 1 ½ (H):1(V). Flatter slopes will be required once groundwater is encountered. For permanent excavations and slopes, the grades should be no steeper than 4(H):1(V) without further geotechnical review of the finalized grading plan. If any excavation, including a utility trench, is extended to a depth of more than 20 feet, OSHA requires that a Professional Engineer design the side slopes of such excavations. However,

we recommend that any excavation extending to a depth of more than 5 feet below existing grade be done under the supervision of a qualified engineer.

4.6 Lateral Earth Pressures

Lateral earth pressures (horizontal stresses) are developed during soil displacements (strains). Lateral earth pressure for design is determined utilizing an earth pressure coefficient to relate horizontal stress to vertical stress. Three separate earth pressure coefficients are used to determine lateral earth pressure: at-rest; active; and passive.

Applied horizontal stress can be determined by multiplying the appropriate earth pressure coefficient by the applied vertical stress. Earth pressure coefficients are a direct function of the internal friction of a soil. Laboratory testing to determine internal friction angles for soil was not performed. However, index laboratory and field data obtained can be utilized to approximate earth pressure coefficients based upon empirical relationships.

To minimize lateral earth pressures, MSG recommends the zone adjacent to any walls be backfilled with granular fill. To provide effective drainage, a zone of free-draining gravel (similar to MDOT 6AA gravel) should be used directly adjacent to the walls with a minimum thickness of 18 inches. This granular zone should drain to weepholes or a pipe drainage system to prevent hydrostatic pressures from developing against the walls.

The type of backfill beyond the free-draining granular zone will govern the magnitude of the pressure to be used for structural design. Clean granular soil is recommended as the backfill material against retaining structures to minimize lateral earth pressure. Lateral earth pressure coefficients for engineered fill are provided in Table 4.6.1.

Table 4.6.1 Recommended Lateral Earth Parameters

Soil Parameters	Engineered Fill	
	Clean Granular Soil	Clay Soil
Total Unit Weight (pcf)	125	130
Internal Friction Angle (°)	30	25.0
At-rest Pressure Coefficient, K_o	0.5	0.75
Active Pressure Coefficient, K_a	0.3	0.6
Passive Coefficient, K_p	3.0	1.7
Concrete/Soil Friction Coefficient	0.5	0.0
Concrete/Soil Adhesion Factor	0	0.2

The coefficients of friction between concrete and soil subgrade were also provided in the table above. These coefficients can be used for evaluating the factor of safety against sliding of foundations. The recommended minimum safety factor against sliding is 1.5. Passive pressure resistance of the top 3 feet below final grade should generally be neglected in designing the retaining walls to resist sliding failure due to the freeze-thaw cycle that can significantly weaken soils and the potential for the material to be removed at a future date for installation of utilities or other construction-related activities.

Any additional lateral earth pressure due to surcharge loading conditions including, but not limited to, floor loads, column loads, sloping backfill, traffic loading, and construction loads, should be incorporated into the wall design. MSG should be retained to perform other detailed geotechnical evaluations for retaining walls, as necessary, including but not limited to, settlement and global stability. A detailed geotechnical evaluation and structural design of retaining walls is beyond the scope of this report.

4.7 Site Seismic Classification

According to ASCE 7-22 Table 20.2-1, the proposed site is designated as "Site Class D" based on the average number of the Standard Penetration Test N values and the soil shear strength for the upper 45 feet of soil (the maximum depth the borings were advanced for this investigation) and assumed subsurface conditions to a depth of 100 feet.

It should be noted that Stratum 3 may be liquefiable with potential for failure or collapse under seismic loading. Additional laboratory testing of Stratum 3 is required to fully determine if it is a liquefiable soil. If Stratum 3 is determined to be liquefiable, then the site will be designated as "Site Class F" and a site response analysis in accordance with Section 21.1 of ASCE 7-22 will be required. However, if the proposed building at the site has a fundamental period of vibration less than 0.5 then a site response analysis will not be required. In this case, the property will be designated as "Site Class E" (even with the presence of a potentially liquefiable soil) and the corresponding values of Seismic parameters S_{MS} and S_{M1} provided in Section 22.1. If the proposed building fundamental period of vibration exceeds 0.5, then additional laboratory testing of Stratum 3 should be conducted along with more rigorous seismic analysis for this layer to fully determine the liquefaction potential.

4.8 Soil Infiltration Test

The soil infiltration rate indicates how quickly water moves through soil and helps evaluate the ability of the soil to absorb and treat effluent. The percolation test consists of:

- Advancing three holes using the direct push method in the proposed detention pond areas to a depth of 10 feet,
- Presoaking the holes by maintaining a high water level in the holes,
- Running the test by filling the holes with water to the ground surface; and
- Measuring the water level as it drops in 20-minute increments as the water percolates into the surrounding soil.

The observed infiltration rate of on-site clay material tested is on the order of 0.03 in/hr in borings SB-07 and SB-24. The observed infiltration rate of on-site sandy silt material tested is on the order of 6.30 in/hr in soil boring SB-02. According to NRCS Hydrologic Soil Group Classifications, we classify the sandy silt material as Group A and the clay material as Group D.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Groundwater Control

Groundwater was encountered during and after drilling operations as presented in Table 3.2.1. Typically, the groundwater elevation fluctuates and is higher during the winter and spring and lower in summer and early fall. It should be noted that groundwater seepage may have a significant impact on construction activities.

The excavations and undercuts, as required for construction of the project, may be situated below the groundwater level. A temporary earth retention system, such as a bentonite wall, may be required to limit groundwater pathways through the granular soils that allow infiltration into the excavations. The use of steel sheeting embedded in the clay layer can cut off groundwater flow to reduce infiltration. It may then be feasible to control groundwater inside these structures by using a standard granular drainage layer and sump pit.

There may be more groundwater infiltrating excavations than the boring logs indicate. The Contractor should be prepared for more elaborate dewatering procedures for deeper excavations. To protect against the settlement of surrounding structures, pavement, and utilities, geotextile filter fabric should be installed around any underdrains to limit the loss of fines through the dewatering system.

The amount and type of dewatering required during construction will be further impacted by the weather, groundwater levels at the time of construction, the effectiveness of the Contractor's techniques in preventing surface water runoff from entering open excavations, and their ability to lower the groundwater table. The final design of any temporary earth support structures for excavations, as well as the associated dewatering and groundwater control plan, should be completed by the contractor and approved by a professional geotechnical engineer.

To minimize surface water, slopes in pavement areas should consist of 1.5 percent slopes towards inlets or drainage structures, building exteriors should have a minimum of 2 percent slopes away from the building and discharge points (i.e. roof down spouts) should consist of closed conduits and divert away from the buildings to inlets or drainage structures. The project civil engineer is responsible for designing the surface drainage improvements.

6.0 GENERAL QUALIFICATIONS AND LIMITATIONS

The evaluations, conclusions and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the geotechnical investigation, our understanding of the project and our experience during previous work, with similar sites and subsurface conditions. Data used during this exploration included:

- Twenty-five (25) exploratory and test borings performed during this investigation;
- Observations of the project site by our staff;
- Published historic soil and geologic data for the project area;
- Results of laboratory soil testing; and,
- Results of the geotechnical analyses.

The subsurface conditions discussed in this report and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. MSG is not responsible for independent conclusions, opinions, or recommendations made by others based upon information presented in this report.

We strongly recommend the final project plans and specifications be reviewed by MSG's geotechnical engineer to confirm that the geotechnical aspects are generally consistent with the recommendations of this report. In particular, the specifications for excavation and foundation construction should be prepared and/or reviewed by MSG's Geotechnical Engineer of Record. In addition, we recommend site subgrade preparation, fill compaction activities, and foundation installation activities should be monitored by MSG's geotechnical engineer or his/her representative.

This report and evaluation reflects only the geotechnical aspects of the subsurface conditions at the site. Review and evaluation of environmental aspects of subsurface conditions are beyond the scope of this report.

APPENDIX A

FIGURE 1 – SITE LOCATION MAP

FIGURE 2 – SOIL BORING LOCATION PLAN

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Figure 1: Site Location Map
Trilogy – Holly Township
Holly Township, Michigan
MSG Project Number: T1730071

Map Adapted from Google Earth Map

N

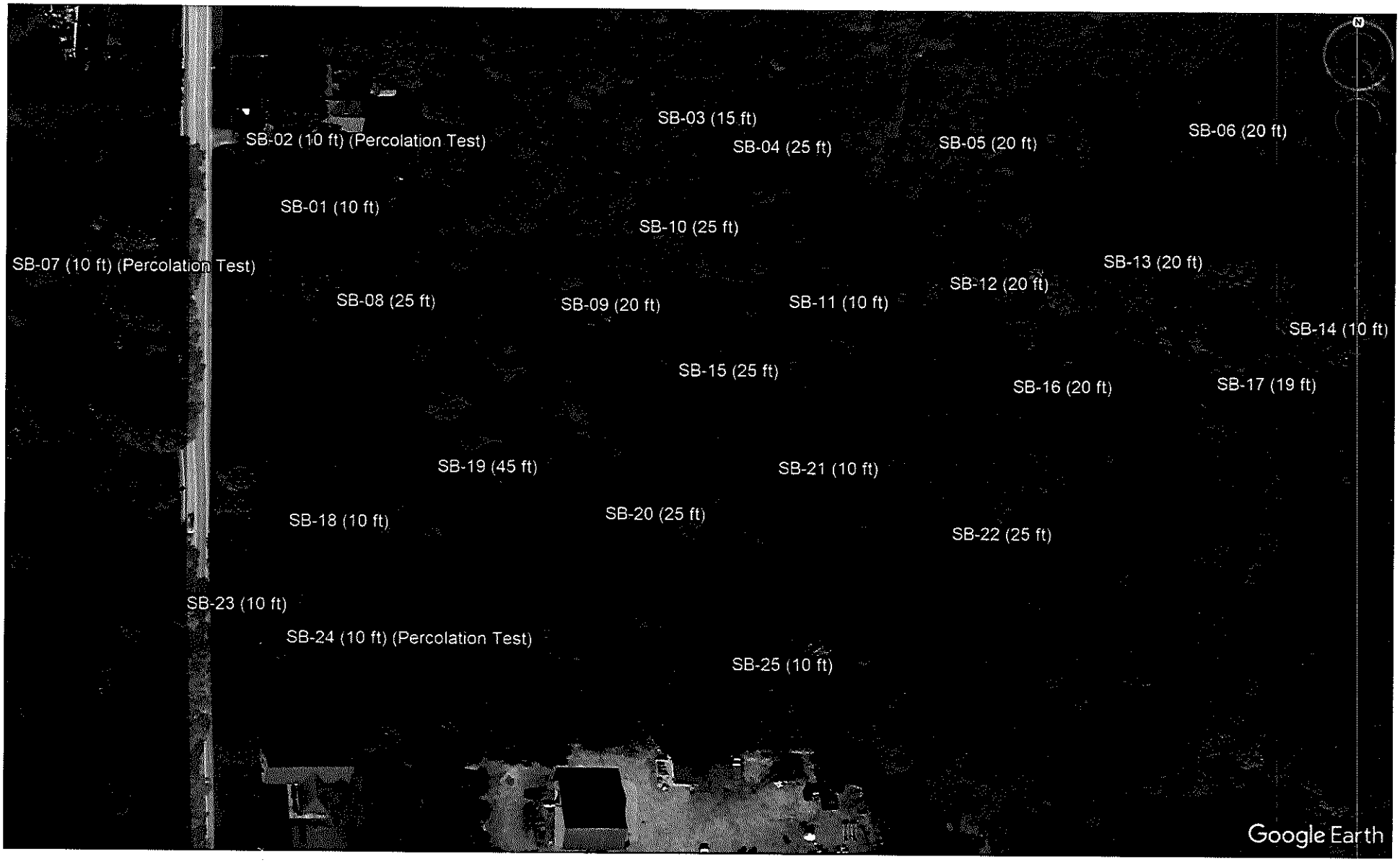

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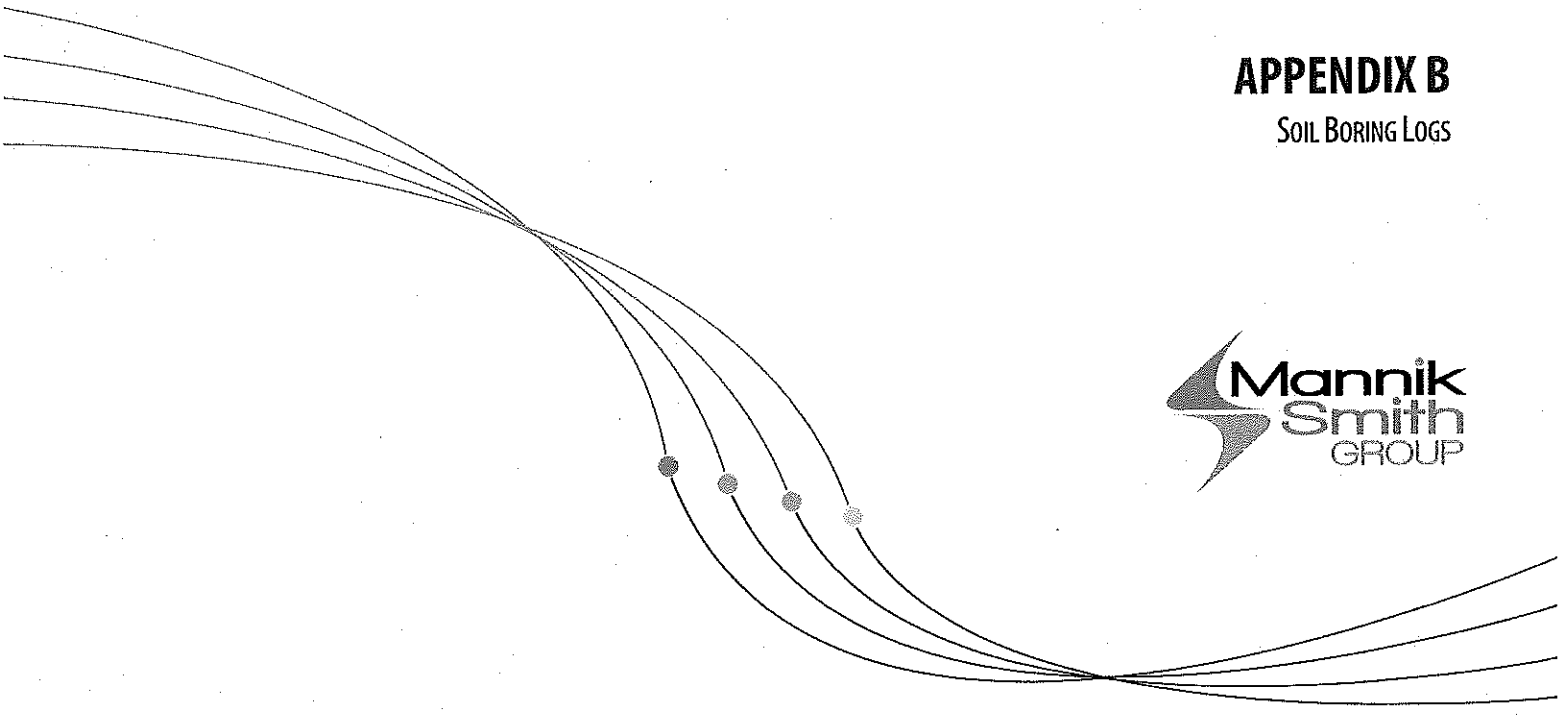
Figure 2: Soil Boring Location Plan
Trilogy – Holly Township
Holly Township, Michigan
MSG Project Number: T1730071

Map Adapted from Google Earth Map

N

APPENDIX B

SOIL BORING LOGS



GENERAL SOIL SAMPLE NOTES

Unless noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D653.

Standard Penetration Test (ASTM D1586): A 2.0-inch outside-diameter (O.D.), 1-3/8-inch inside-diameter (I.D.) split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

COHESIVE SOILS

Consistency	Approximate Range of N	Unconfined Compressive Strength (psf)
Very Soft	0 – 1	Below 500
Soft	2 – 4	500 – 1,000
Medium Stiff	5 – 8	1,000 – 2,000
Stiff	9 – 15	2,000 – 4,000
Very Stiff	16 – 30	4,000 – 8,000
Hard	31 – 50	8,000 – 16,000
Very Hard	Over 50	Over 16,000

COHESIONLESS SOILS

Density Classification	Approximate Range of N
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	Over 50

CLASSIFICATION

The major soil constituent is the principal noun, i.e. sand, silt, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)
Trace – 1% to 11%	Trace – 1% to 11%
Adjective – 12% to 35% (clayey, silty, etc.)	Little – 12% to 22%
And – Over 35%	Some – 23% to 33%

PARTICLE SIZES

Boulders		- Greater than 12 inches (305 mm)
Cobbles		- 3 inches (76.2 mm) to 12 inches (305 mm)
Gravel:	Coarse	- ¾ inches (19.05 mm) to 3 inches (76.2 mm)
	Fine	- No.4 (4.75 mm) to ¾ inches (19.05 mm)
Sand:	Coarse	- No. 10 (2.00 mm) to No. 4 (4.75 mm)
	Medium	- No. 40 (0.425 mm) to No. 10 (2.00 mm)
	Fine	- No. 200 (0.074 mm) to No. 40 (0.425 mm)
Silt		- 0.005 mm to 0.074 mm
Clay		- Less than 0.005 mm

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier: i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils: i.e., silty clay, trace sand, little gravel.

If sand particle size is greater than 11% by weight of the total sample weight, the adjective (i.e., fine, medium or coarse) is added to the soil description for the sand portion of the sample, provided sand is the major or second major constituent.

SAMPLE DESIGNATIONS

AS	Auger Sample - directly from auger flight	ST	Shelby Tube Sample - 3-inch diameter unless otherwise noted
BS	Miscellaneous Samples - Bottle or Bag	PS	Piston Sample - 3-inch diameter unless otherwise noted
MC	Macro-Core Sample - 2.25-inch O.D., 1.75-inch I.D., 5 feet long polyethylene liner	RC	Rock Core - NX core unless otherwise noted
LB	Large-Bore (Micro-Core) Sample - 1-inch diameter, 2 feet long polyethylene liner	CS	CME Continuous Sample - 5 feet long, 3-inch diameter unless otherwise noted
SS	Split Spoon Sample - 1-inch or 2-inch O.D.	HA	Hand Auger
LS	Split Spoon (SS) Sampler with 3 feet long liner insert	DP	Drive Point
NR	No Recovery	CM	Coring Machine

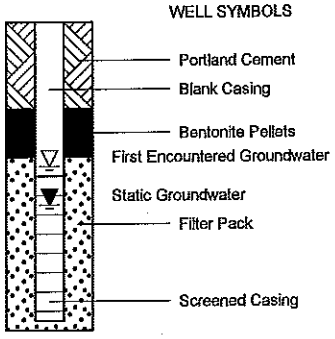
MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW	WELL-GRADED GRAVELS WITH OR WITHOUT SAND
			GP	POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM	SILTY GRAVELS WITH OR WITHOUT SAND
			GC	CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW	WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP	POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SM	SILTY SANDS WITH OR WITHOUT GRAVEL
			SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OL	ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CH	INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OH	ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

SYMBOLS KEY

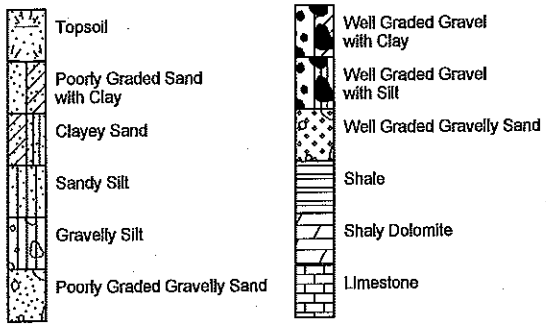
SAMPLE TYPES

Split Spoon sample, 1 inch or 2 inch outer-diameter.

WELL SYMBOLS



OTHER MATERIAL SYMBOLS



BORING / WELL LOG USCS KEY

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BORING / WELL LOG KEY

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BORING ID: SB-01

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/28/23 **COMPLETED** 3/28/23
BORING COORDINATES N/A
DRILLING METHOD Direct Push
GROUND ELEVATION 952.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
951.9		TOPSOIL (1 inch)	0								
		Very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-3-4	7	42		6500^{PP}		
948.5		Very stiff to hard, brown LEAN CLAY, some sand, trace gravel, moist (CL)	5	SS 2	6-7-9	16	45		9000+^{P}	20	
946.0		Very loose, brown SILTY SAND, damp (SM)		SS 3	3-1-2	3	55				
		@8.5 feet, wet									
942.0			10	SS 4	0-0-1	1	100				
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING 8.5 FEET
- ▼ WATER LEVEL AT END OF DRILLING 8.5 FEET
- ▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-02

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/4/23 **COMPLETED** 4/4/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 950.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
949.5		TOPSOIL (6 inches)	0								
		Loose, brown SANDY SILT, moist (ML)		GRAB 1							
		@4 feet, wet	5	SS 1	0-3-4	7	100				
				GRAB 2							
		@8.5 feet, medium dense	10	SS 2	4-5-10	15	100			19	
940.0		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
☐ DRY DENSITY (PCF) ☐ (100 110 120 130)

LEGEND:
▽ WATER LEVEL AT TIME OF DRILLING 4 FEET
▽ WATER LEVEL AT END OF DRILLING 4 FEET
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

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BORING ID: SB-03

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/29/23 **COMPLETED** 3/29/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 959.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 15.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
958.8		TOPSOIL (2 inches)	0								
		Stiff, brown LEAN CLAY, little sand, trace gravel, moist (CL)		SS 1	1-1-2	3	89		3000^{PP}		
		@3.5 feet, very stiff to hard	5	SS 2	2-7-9	16	100		9000+^{P}		
953.0		Very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 3	2-10-8	18	61		7000^{PP}	10	
950.5		Loose, brown POORLY GRADED SAND WITH SILT, trace gravel, wet (SP-SM)	10	SS 4	1-4-5	9	100				
945.5		Stiff to very stiff, gray SANDY LEAN CLAY, trace gravel, wet (CL)	15	SS 5	4-4-6	10	100		8000^{PP}		
944.0		Bottom of borehole at 15.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 8.5 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
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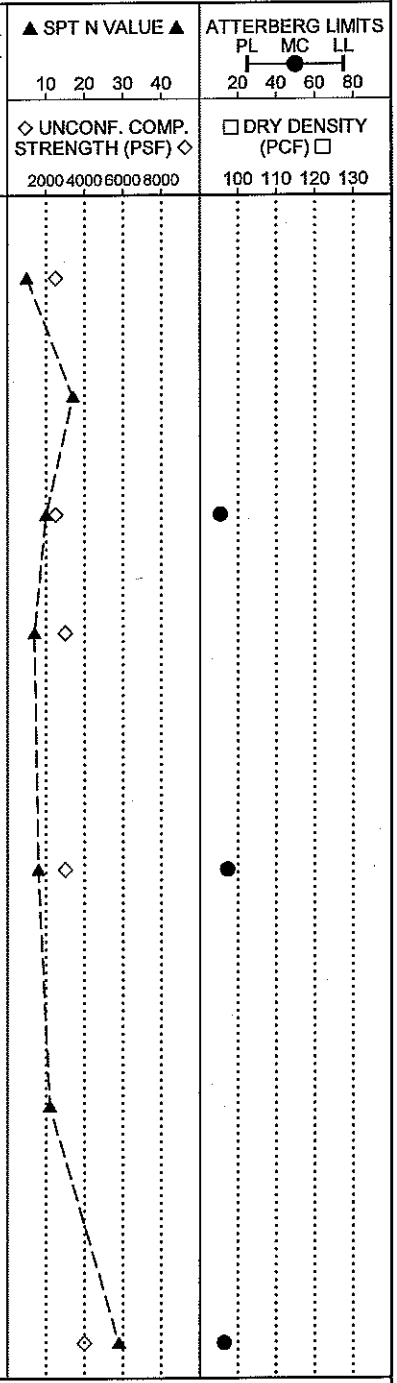
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/29/23 **COMPLETED** 3/29/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 955.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
954.8		TOPSOIL (2 inches)	0								
		Medium stiff to stiff, brown LEAN CLAY, little sand, trace gravel, damp (CL)		SS 1	0-2-3	5	100		2500^{PP}		
951.5		▽ Medium dense, brown SILTY SAND, wet (SM)	5	SS 2	4-7-10	17	100				
949.0		Medium stiff to stiff, brownish gray LEAN CLAY, little sand, trace gravel, damp (CL)		SS 3	2-5-5	10	95		2500^{PP}	11	
			10	SS 4	2-3-4	7	95		3000^{PP}		
			15	SS 5	0-3-5	8	95		3000^{PP}	14	
			20	SS 6	4-4-7	11	0				
931.5		Very stiff, gray LEAN CLAY, some sand, trace gravel, moist (CL)	25	SS 7	5-9-20	29	100		4000^{PP}	13	
930.0		Bottom of borehole at 25.0 feet.									



LEGEND:
▽ WATER LEVEL AT TIME OF DRILLING 4 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
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BORING ID: SB-05

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/29/23 **COMPLETED** 3/29/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 952.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
951.9		TOPSOIL (1.5 inches)	0								
		Medium stiff to stiff, brown LEAN CLAY, little sand, trace gravel, moist (CL)		SS 1	1-2-3	5	78		3000^{PP}		
948.5		▽ Loose, brown SANDY SILT, wet (ML)	5	SS 2	2-3-5	8	100				
		@6 feet, medium dense		SS 3	2-5-6	11	55				
			10	SS 4	2-7-10	17	95				
938.5		Medium dense, brown SILTY SAND, trace gravel, damp (SM)	15	SS 5	5-5-6	11	31				
		@18.5 feet, dense	20	SS 6	16-24-19	43	100				
932.0		Bottom of borehole at 20.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 4 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-06

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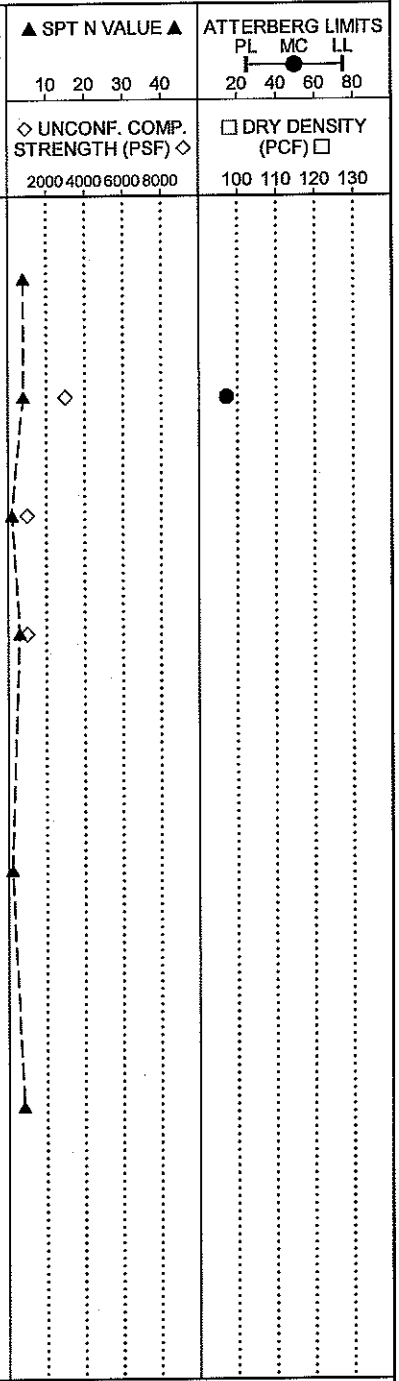
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/29/23 **COMPLETED** 3/29/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 952.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
951.8		TOPSOIL (2 inches)	0								
		Very loose, brown CLAYEY SAND, trace gravel, damp (SC)		SS 1	1-2-2	4	83				
948.5		Stiff, brown LEAN CLAY, little sand, trace gravel, damp (CL)	5	SS 2	0-2-2	4	100		3000^{PP}	14	
946.0		Very soft to soft, brown SANDY LEAN CLAY, trace gravel, damp (CL)		SS 3	0-0-1	1	83		1000^{PP}		
		▽	10	SS 4	2-1-2	3	89		1000^{PP}		
938.5		Very loose, brown SILTY SAND, wet (SM)	15	SS 5	0-0-1	1	83				
932.0		Bottom of borehole at 20.0 feet.	20	SS 6	2-1-3	4	78				



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 9.5 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-07

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/4/23 **COMPLETED** 4/4/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 956.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
955.8		TOPSOIL (2 inches)	0								
		Very stiff to hard, brown LEAN CLAY, little sand, trace gravel, moist (CL)		GRAB 1							
			5	SS 1	6-9-12	21	100		9000+^{P}	14	
				GRAB 2							
946.0			10	SS 2	9-12-17	29	100		9000+^{P}	13	
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▽ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-08

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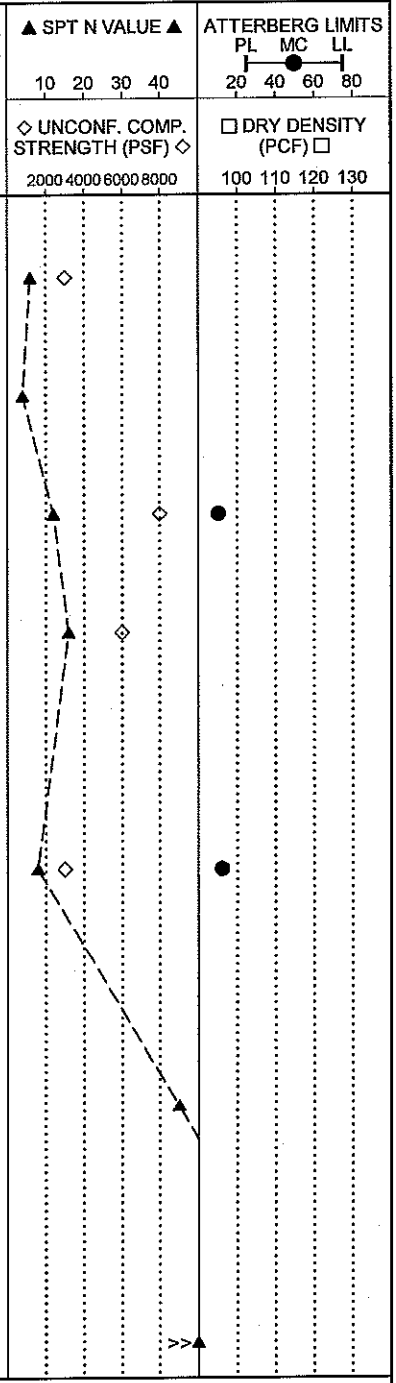
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/28/23 **COMPLETED** 3/28/23
BORING COORDINATES N/A
DRILLING METHOD Direct Push
GROUND ELEVATION 949.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
948.8		TOPSOIL (2 inches)	0								
		Medium stiff to stiff, dark brown SANDY LEAN CLAY, trace gravel and organics, moist (CL)		SS 1	0-2-4	6	50		3000^{PP}		
945.5											
		Very loose, brown SILTY SAND, trace gravel, damp (SM)	5	SS 2	1-2-2	4	78				
943.0											
		Stiff to very stiff, brown LEAN CLAY WITH SAND, trace gravel, moist (CL)		SS 3	2-5-7	12	78		8000^{PP}	10	
		@8.5 feet, damp	10	SS 4	7-7-9	16	89		6000^{PP}		
935.5											
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, wet (CL)	15	SS 5	0-2-6	8	100		3000^{PP}	12	
930.5											
		Dense to very dense, brown WELL-GRADED SAND WITH SILT, some gravel, damp (SW-SM)	20	SS 6	18-20-25	45	55				
			25	SS 7	44-36-44	80	50				
924.0		Bottom of borehole at 25.0 feet.									



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 12 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-09

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 955.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
954.8		TOPSOIL (2 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, damp (CL)		SS 1	0-2-3	5	100		3000^{PP}	22	
951.5		Very stiff to hard, brown LEAN CLAY, some sand, trace gravel, moist (CL)	5	SS 2	5-9-12	21	100		8000^{PP}		
				ST 1			100	120	8050	15	
946.5		Very loose, brown POORLY GRADED SAND WITH SILT, trace gravel, damp (SP-SM)	10	SS 3	1-2-2	4	100				
941.5		Loose, brown SANDY SILT, wet (ML)	15	SS 4	2-3-4	7	100				
936.5		Stiff to very stiff, gray LEAN CLAY, little sand, trace gravel, moist (CL)	20	SS 5	3-6-9	15	100		6000^{PP}	15	
935.0		Bottom of borehole at 20.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 13.5 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

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BORING ID: SB-10

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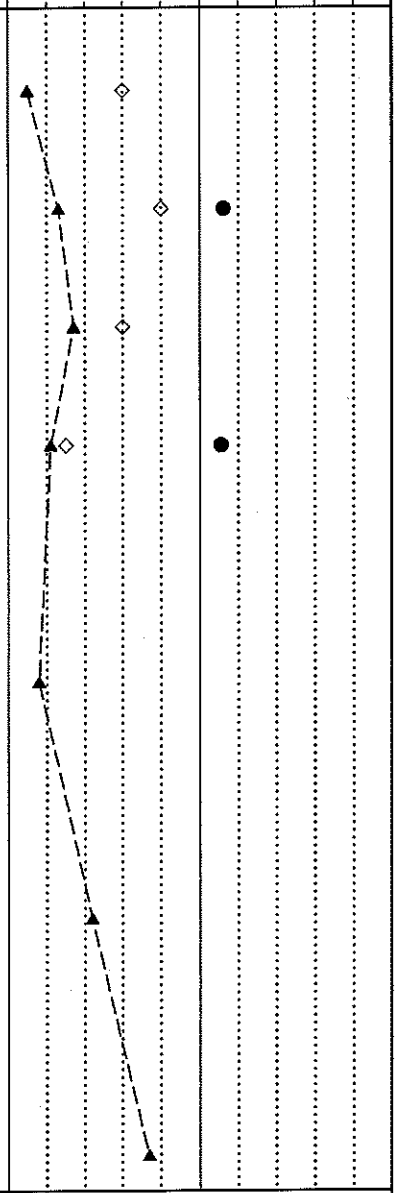
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/28/23 **COMPLETED** 3/29/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 960.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP/WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
959.8		TOPSOIL (2 inches)	0								
		Stiff to very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-2-3	5	33		6000^{PP}		
			5	SS 2	2-5-8	13	100		8000^{PP}	12	
				SS 3	2-7-10	17	95		6000^{PP}		
		@8.5 feet, stiff, damp	10	SS 4	3-5-6	11	95		3000^{PP}	11	
946.5		Loose, SILTY SAND, wet (SM)	15	SS 5	4-4-4	8	89				
		@18.5 feet, medium dense, little gravel	20	SS 6	12-10-12	22	67				
936.5		Dense, brown POORLY GRADED SAND WITH GRAVEL, little silt, moist (SP)	25	SS 7	13-16-21	37	89				
935.0		Bottom of borehole at 25.0 feet.									



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 13.5 FEET
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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(Continued Next Page)

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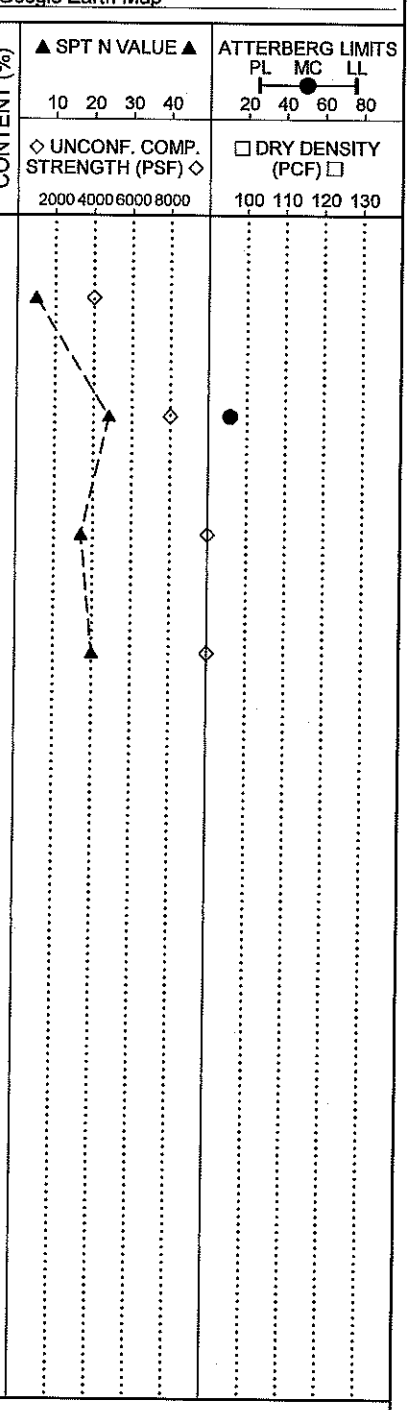
BORING ID: SB-11

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/31/23 **COMPLETED** 3/31/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 954.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
953.8		TOPSOIL (2 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-2-3	5	89		4000^{PP}		
950.5		Very stiff, mottled brown and gray SANDY LEAN CLAY, trace gravel, dry (CL)	5	SS 2	6-12-12	24	100		8000^{PP}	11	
948.0		Very stiff to hard, brown LEAN CLAY, little sand, trace gravel, dry (CL)		SS 3	5-8-9	17	100		9000+^{P}		
944.0		Bottom of borehole at 10.0 feet.	10	SS 4	4-9-11	20	100		9000+^{P}		



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-12

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/31/23 **COMPLETED** 3/31/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 951.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
950.8		TOPSOIL (2 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-2-3	5	100		3000^{PP}		
947.5		Stiff to very stiff, brown LEAN CLAY, little sand, trace gravel, damp (CL)	5	SS 2	2-5-6	11	100		7000^{PP}		
				SS 3	3-8-10	18	45		2000^{PP}	14	
			10	SS 4	4-4-7	11	100		4000^{PP}		
		@13.5 feet, medium stiff to stiff	15	SS 5	4-3-4	7	17		2500^{PP}		
932.5											
931.0		Medium dense, light brown SILTY SAND, damp (SM)	20	SS 6	4-4-15	19	100				
		Bottom of borehole at 20.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
☐ DRY DENSITY (PCF) ☐ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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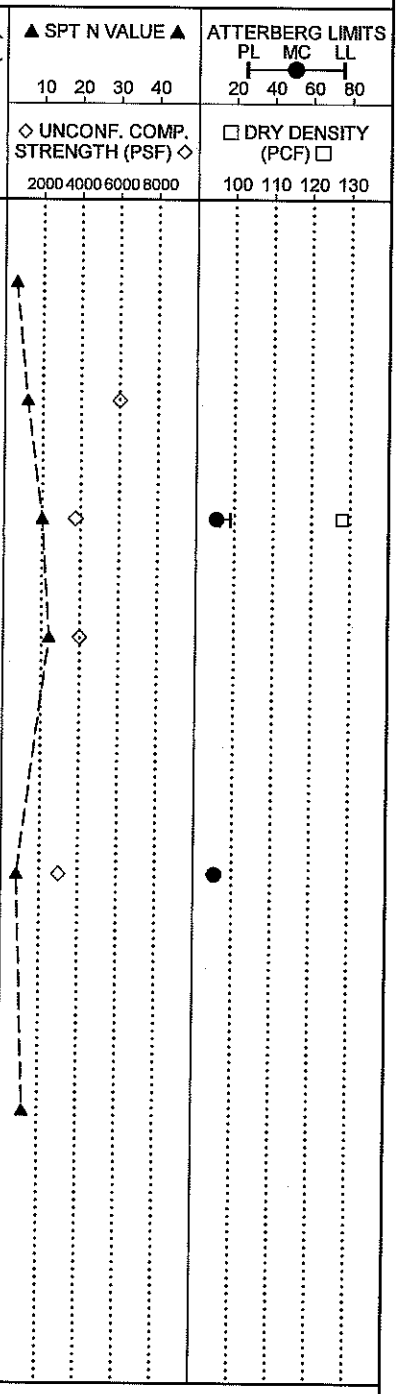
BORING ID: SB-13

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/30/23 **COMPLETED** 3/30/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 952.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
951.9		TOPSOIL (1 inch)	0								
		Very loose, brown CLAYEY SAND, trace gravel, damp (SC)		SS 1	1-2-1	3	95				
948.5		Stiff to very stiff, brown SANDY LEAN CLAY, trace gravel, damp (CL)	5	SS 2	1-2-4	6	67		6000^{PP}		
		@6 feet, wet		SS 3	2-4-6	10	100	128	3800	11	
			10	SS 4	3-5-7	12	83		4000^{PP}		
938.5		Stiff, gray LEAN CLAY, little sand, trace gravel, damp (CL)	15	SS 5	0-1-3	4	100		3000^{PP}	11	
933.5		Loose, grayish brown SILTY SAND, wet (SM)									
932.0		Bottom of borehole at 20.0 feet.	20	SS 6	3-3-3	6	100				



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 6 FEET
▽ WATER LEVEL AT END OF DRILLING 17 FEET
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-14

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/30/23 **COMPLETED** 3/30/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 951.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
950.8		TOPSOIL (2.5 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	2-2-3	5	89		3000^{PP}		
		@3.5 feet, damp	5	SS 2	1-4-4	8	83		2500^{PP}	18	
945.0		Hard, brown SANDY LEAN CLAY, little gravel, dry (CL)		SS 3	1-5-9	14	100		9000+^{P}		
941.0			10	SS 4	4-6-6	12	95		9000+^{P}		
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
☐ DRY DENSITY (PCF) ☐ (100 110 120 130)

LEGEND:
▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

GEOTECH STANDARD LOG - GINT MSG STD BBH 2020.07.21 LIB.GDT - 5/1/23 12:40 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

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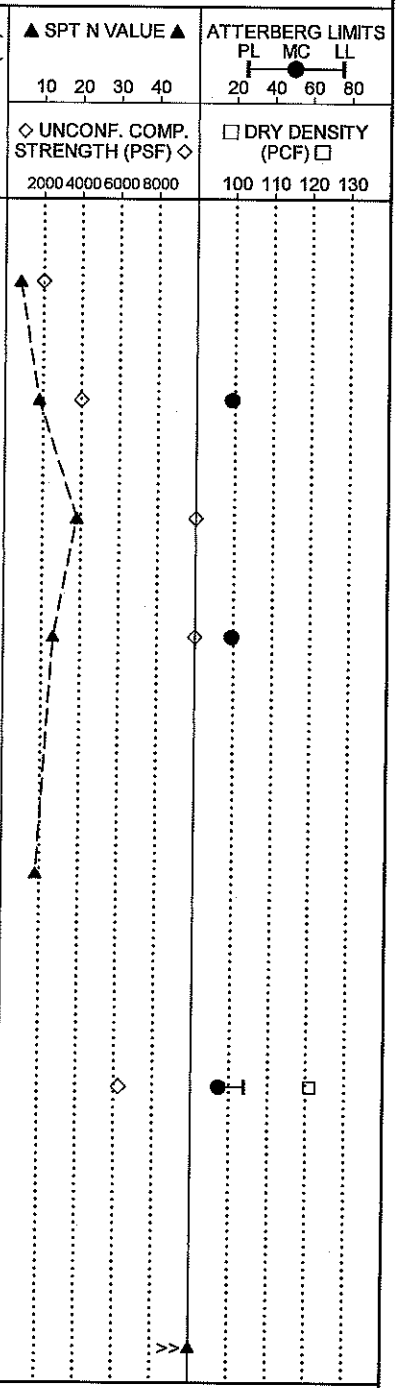
BORING ID: SB-15

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 958.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
957.5		TOPSOIL (6 inches)	0								
		Soft to medium stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-2-2	4	95		2000^{PP}		
		@3.5 feet, stiff	5	SS 2	2-3-6	9	100		4000^{PP}	19	
952.0		Very stiff to hard, mottled brown and gray LEAN CLAY, little sand, trace gravel, dry (CL)		SS 3	6-9-10	19	89		9000+^{P}		
		@8.5 feet, brown, moist	10	SS 4	2-6-7	13	89		9000+^{P}	19	
944.5		Loose, brown SANDY SILT, some clay, wet (ML)	15	SS 5	3-3-6	9	100				
940.0		Very stiff, gray LEAN CLAY, little sand, trace gravel, damp (CL)	20	ST 2			100	121	6100	15	
934.5		Very hard, brownish gray LEAN CLAY, trace gravel, damp (CL)	25	SS 6	11-28-29	57	89				
933.0		Bottom of borehole at 25.0 feet.									



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 13 FEET
▽ WATER LEVEL AT END OF DRILLING 20 FEET
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-16

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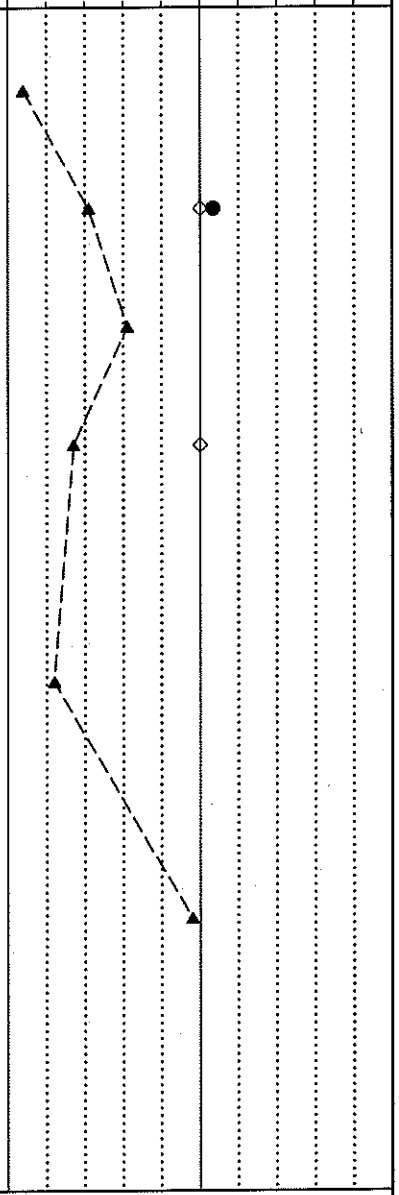
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/30/23 **COMPLETED** 3/30/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 948.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
947.5		TOPSOIL (6 inches)	0								
		Very loose, brown CLAYEY SAND, trace gravel, damp (SC)		SS 1	0-2-2	4	78				
944.5		Very stiff to hard, brown SANDY LEAN CLAY, trace gravel, dry (CL)	5	SS 2	2-9-12	21	95		9000+^{P}	7	
942.5		Dense, brown SANDY SILT, trace gravel, dry (ML)		SS 3	7-14-17	31	100				
939.5		Very stiff to hard, brown LEAN CLAY, some sand, trace gravel, dry (CL)	10	SS 4	3-7-10	17	100		9000+^{P}		
934.5		Medium dense to dense, brown POORLY GRADED SAND WITH SILT, little gravel, moist (SP-SM)	15	SS 5	3-6-6	12	89				
928.0		@18.5 dense	20	SS 6	12-20-28	48	100				
		Bottom of borehole at 20.0 feet.									



LEGEND:

WATER LEVEL AT TIME OF DRILLING N/A
WATER LEVEL AT END OF DRILLING N/A
WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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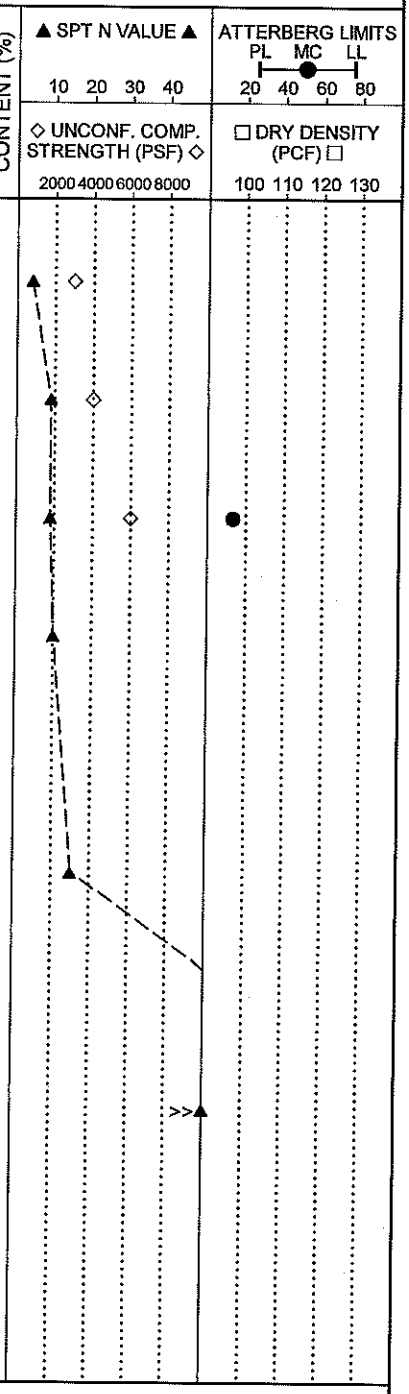
BORING ID: SB-17

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/30/23 **COMPLETED** 3/30/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 946.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 19.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
946.0		TOPSOIL (1.5 inches)	0								
		Stiff, brown LEAN CLAY, little sand, trace gravel, moist (CL)		SS 1	2-2-2	4	78		3000^{PP}		
942.5		Stiff to very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)	5	SS 2	2-6-3	9	100		4000^{PP}		
				SS 3	1-3-6	9	83		6000^{PP}	13	
937.5		Loose to medium dense, brown SILTY SAND, trace gravel, damp (SM)	10	SS 4	4-5-5	10	100				
		@13.5 feet, medium dense	15	SS 5	4-7-8	15	95				
927.5											
927.0		Very dense, brown WELL GRADED SAND WITH GRAVEL, little silt, moist (SW)		SS 6	50/6	50+	50				
		Refusal at 19.0 feet. Bottom of borehole at 19.0 feet.									



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▽ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-18

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/27/23 **COMPLETED** 3/27/23
BORING COORDINATES N/A
DRILLING METHOD Direct Push
GROUND ELEVATION 946.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
945.9		TOPSOIL (1.5 inches)	0								
		Very loose, brown SILTY SAND, trace gravel, damp (SM)		SS 1	0-1-2	3	78				
942.5		Very stiff, brown SANDY LEAN CLAY, trace gravel, damp (CL)	5	SS 2	4-6-12	18	95		4500^{PP}	20	
940.0		Hard, brown LEAN CLAY, little sand, trace gravel, moist (CL)		SS 3	10-16-21	37	95		9000+^{P}		
936.0			10	SS 4	11-16-20	36	100		9000+^{P}		
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
☐ DRY DENSITY (PCF) ☐ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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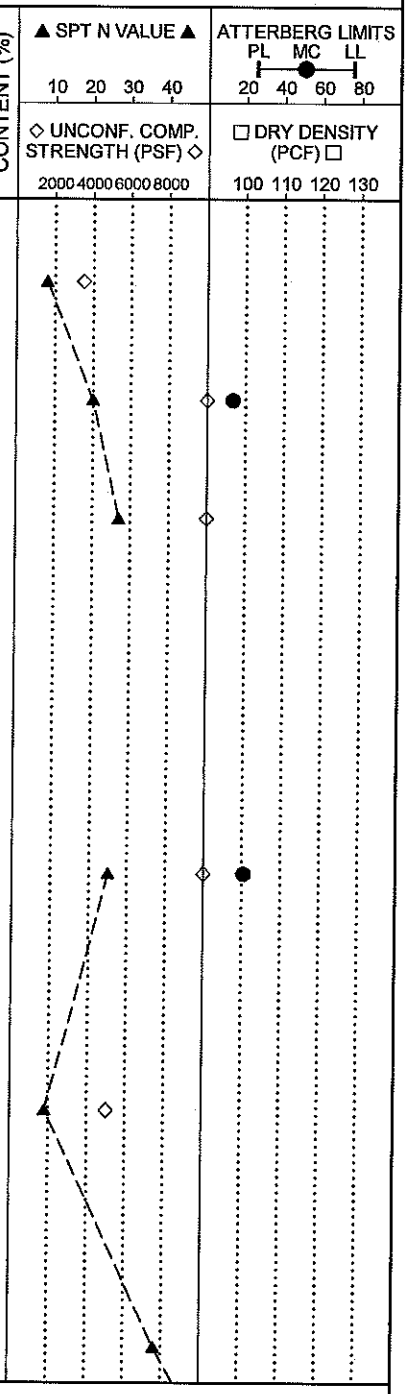
BORING ID: SB-19

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 951.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 45.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
950.5		TOPSOIL (6 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	0-3-5	8	100		3500^{PP}		
947.5		Very stiff to hard, brown LEAN CLAY, little sand, trace gravel, dry (CL)	5	SS 2	3-8-12	20	100		9000+^{P}	13	
				SS 3	5-10-17	27	100		9000+^{P}		
			10	ST 3			0				
932.5			15	SS 4	12-12-13	25	5		9000+^{P}	21	
		Stiff to very stiff, grayish brown SANDY LEAN CLAY, trace gravel, moist (CL)	20	SS 5	4-5-4	9	78		5000^{PP}		
927.5		Dense, brown SILTY SAND, trace gravel, damp (SM)	25	SS 6	14-17-21	38	67				



LEGEND:

- WATER LEVEL AT TIME OF DRILLING 30 FEET
- WATER LEVEL AT END OF DRILLING 30 FEET
- WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 951.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 45.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
		Dense, brown SILTY SAND, trace gravel, damp (SM) *(continued)*	25								
922.5		Very dense, brownish-gray WELL GRADED SAND WITH SILT, trace to little gravel, wet (SW-SM)	30	SS 7	22-35-37	72	78				
			35	SS 8	23-30-43	73	100				
			40	SS 9	25-31-39	70	83				
906.0		@43.5 feet, dense	45	SS 10	12-21-27	48	100				
		Bottom of borehole at 45.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
☐ DRY DENSITY (PCF) ☐ (100 110 120 130)

LEGEND:
▽ WATER LEVEL AT TIME OF DRILLING 30 FEET
▽ WATER LEVEL AT END OF DRILLING 30 FEET
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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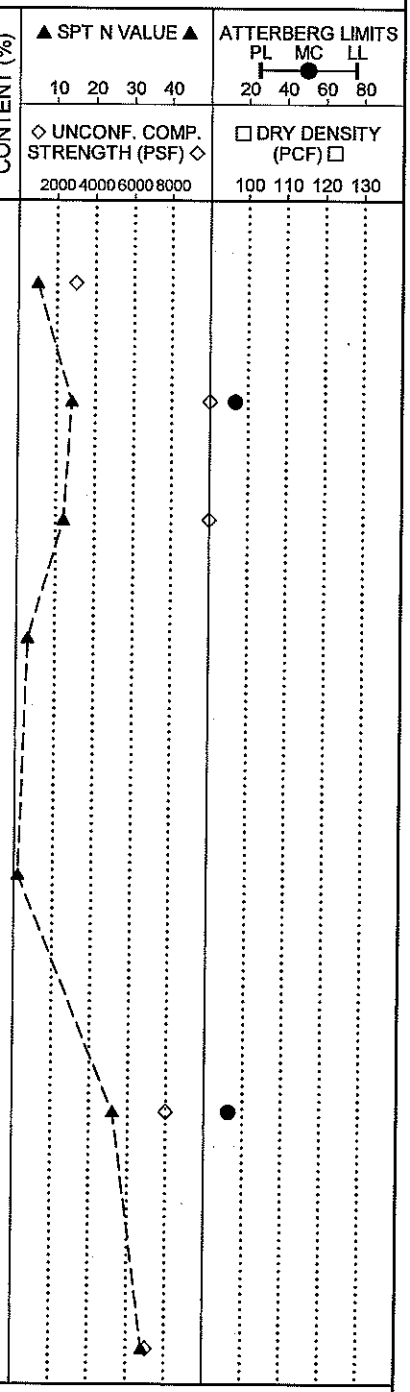
BORING ID: SB-20

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 954.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
953.5		TOPSOIL (6 inches)	0								
		Medium stiff to stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	0-2-3	5	100		3000^{PP}		
950.5		Hard, brown LEAN CLAY WITH SAND, trace gravel, moist (CL)	5	SS 2	3-6-8	14	100		9000+^{P}	13	
				SS 3	3-5-7	12	100		9000+^{P}		
945.5		Very loose, brown SILTY SAND, trace gravel, wet (SM)	10	SS 4	2-2-1	3	100				
940.5		Very loose, brownish gray SANDY SILT, wet (ML)	15	SS 5	2-1-0	1	100				
935.5		Very stiff to hard, gray LEAN CLAY, little sand, trace gravel, moist (CL)	20	SS 6	7-12-14	26	100		8000^{PP}	13	
929.0		Bottom of borehole at 25.0 feet.	25	SS 7	6-15-19	34	100		7000^{PP}		



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING 9 FEET
▽ WATER LEVEL AT END OF DRILLING 10 FEET
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

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BORING ID: SB-21

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/31/23 **COMPLETED** 3/31/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 953.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
952.9		TOPSOIL (1.5 inches)	0								
		Very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-2-2	4	100		4500^{PP}		
949.5		Hard, brown LEAN CLAY, little sand, trace gravel, dry (CL)	5	SS 2	2-5-9	14	100		9000+^{P}	12	
				SS 3	2-6-9	15	100		9000+^{P}		
		@8.5 feet, moist	10	SS 4	4-6-7	13	100		9000+^{P}		
943.0		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
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AASHTO R18

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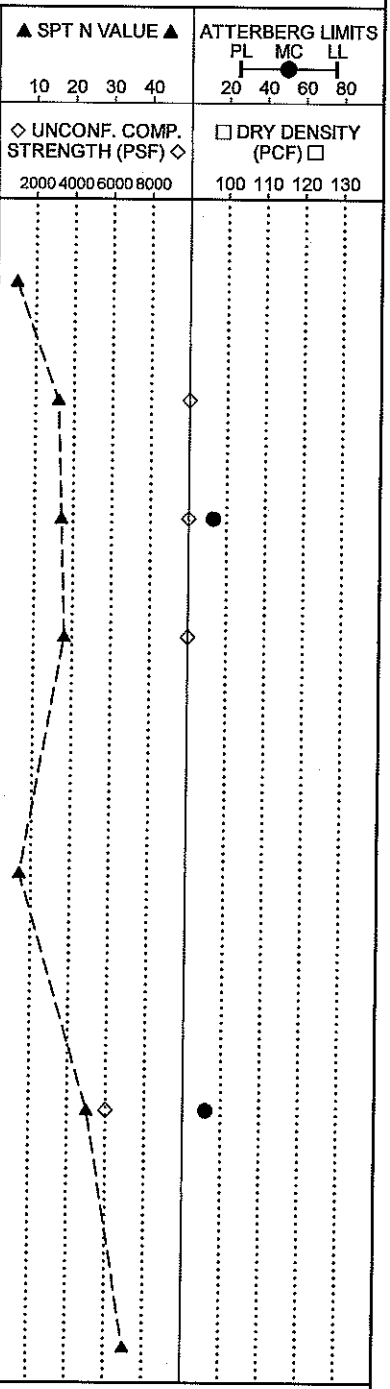
www.manniksmithgroup.com

BORING ID: SB-22

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/31/23 **COMPLETED** 3/31/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 945.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 25.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY WD **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
944.9		TOPSOIL (1.5 inches)	0								
941.5		Loose, brown SILTY SAND, trace gravel, moist (SM)		SS 1	0-2-3	5	89				
		Very stiff to hard, brown LEAN CLAY WITH SAND, trace gravel, dry (CL)	5	SS 2	3-5-11	16	100		9000+^{P}		
				SS 3	4-7-10	17	100		9000+^{P}	13	
			10	SS 4	4-8-10	18	100		9000+^{P}		
931.5		Loose, brown POORLY GRADED SAND WITH SILT, damp (SP-SM)	15	SS 5	3-4-3	7	95				
926.5		Very stiff, brown SANDY LEAN CLAY, trace gravel, damp (CL)	20	SS 6	3-6-19	25	100		6000^{PP}	12	
921.5		Dense, gray POORLY GRADED SAND WITH SILT, little gravel, moist (SP-SM)	25	SS 7	15-15-20	35	89				
920.0		Bottom of borehole at 25.0 feet.									



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A

▽ WATER LEVEL AT END OF DRILLING N/A

▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
PP = POCKET PENETROMETER TEST
T = LAB / FIELD TORVANE SHEAR TEST

AASHTO R18

GEOTECH STANDARD LOG - GINT MSG STD BBH 2020.07.21 LIB.GDT - 5/1/23 12:40 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

(Continued Next Page)

BORING ID: SB-23

The Mannik & Smith Group, Inc.
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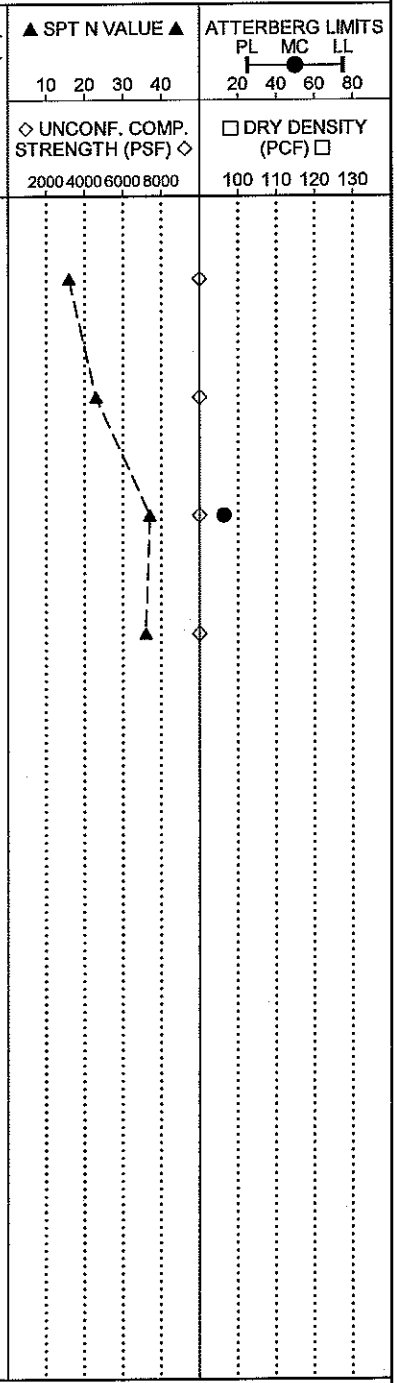
CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 3/27/23 **COMPLETED** 3/27/23
BORING COORDINATES N/A
DRILLING METHOD Direct Push
GROUND ELEVATION 946.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
945.3		TOPSOIL (8 inches)	0								
		Very stiff to hard, brown LEAN CLAY WITH SAND, trace gravel, dry (CL)		SS 1	3-7-9	16	55		9000+^{P}		
			5	SS 2	6-10-13	23	72		9000+^{P}		
				SS 3	9-15-22	37	100		9000+^{P}	13	
936.0			10	SS 4	10-18-18	36	100		9000+^{P}		
		Bottom of borehole at 10.0 feet.									



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
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T = LAB / FIELD TORVANE SHEAR TEST

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BORING ID: SB-24

CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/4/23 **COMPLETED** 4/4/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 948.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY AP **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
947.8		TOPSOIL (2 inches)	0								
		Very stiff to hard, brown LEAN CLAY, little sand, trace gravel, moist (CL)		GRAB 1							
			5	SS 1	3-9-15	24	100		9000+^{P}	15	
				GRAB 2							
938.0			10	SS 2	4-10-21	31	100		9000+^{P}		
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▽ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
DCP = DYNAMIC CONE PENETROMETER
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BORING ID: SB-25

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
PROJECT NUMBER T1730071
PROJECT LOCATION Holly Township, Michigan
DATE STARTED 4/3/23 **COMPLETED** 4/3/23
BORING COORDINATES N/A
DRILLING METHOD 3.25 inch Hollow Stem Auger
GROUND ELEVATION 953.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Bentonite
DRILL RIG Geoprobe 7822DT **HAMMER TYPE** Automatic
LOGGED BY JS **CHECKED BY** KDB
DRILLER BM
REMARKS El. was estimated from Google Earth Map

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)
952.5		TOPSOIL (6 inches)	0								
		Very stiff, brown SANDY LEAN CLAY, trace gravel, moist (CL)		SS 1	1-3-2	5	83		6000^{PP}		
			5	SS 2	1-3-4	7	100		6000^{PP}	14	
947.0		Hard, brown LEAN CLAY WITH SAND, trace gravel, damp (CL)		SS 3	2-3-6	9	100		9000+^{P}		
943.0			10	SS 4	2-6-8	14	100		9000+^{P}		
		Bottom of borehole at 10.0 feet.									

▲ SPT N VALUE ▲ (10 20 30 40)
◇ UNCONF. COMP. STRENGTH (PSF) ◇ (2000 4000 6000 8000)
ATTERBERG LIMITS PL MC LL (20 40 60 80)
□ DRY DENSITY (PCF) □ (100 110 120 130)

LEGEND:

- WATER LEVEL AT TIME OF DRILLING N/A
- WATER LEVEL AT END OF DRILLING N/A
- WATER LEVEL AFTER DRILLING N/A

UCS = UNCONFINED COMPRESSIVE STRENGTH TEST
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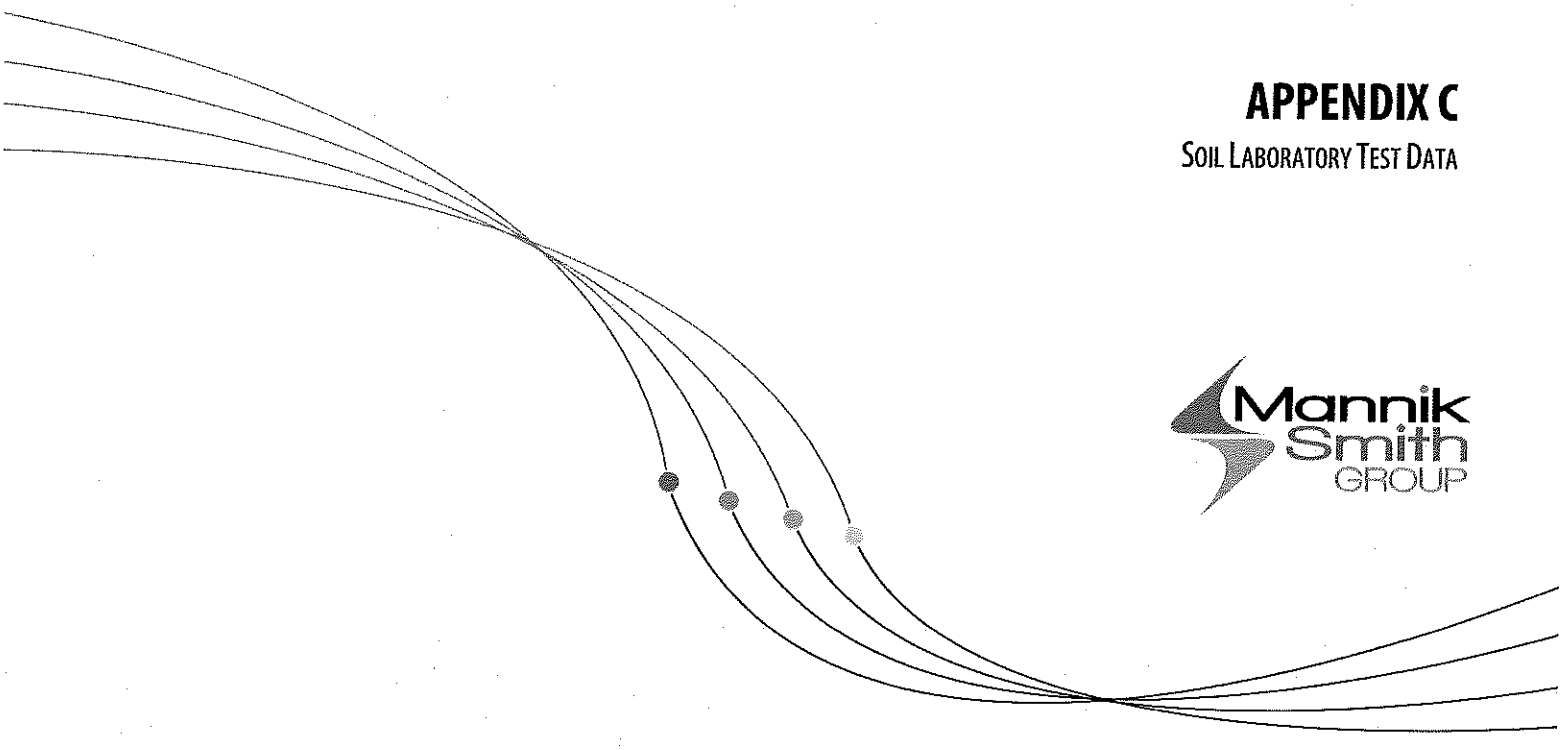
GEOTECH STANDARD LOG - GINT MSG STD BBH 2020.07.21 LIB.GDT - 5/1/23 12:40 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

APPENDIX C

SOIL LABORATORY TEST DATA



LABORATORY TEST PROCEDURES

A brief description of the most common laboratory tests performed at the Geotechnical Engineering Laboratory at the Mannik Smith Group is provided in the following sections.

DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D2488)
The visual classification of soil samples are performed in accordance with ASTM D2488 standard. Our engineers use this test method to describe each soil sample using visual examination and simple manual tests. Visual classification helps grouping similar soil samples so that only a minimum number of laboratory tests are required for positive soil classification.

POCKET PENETROMETER
In the pocket penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small, calibrated spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square foot.

NATURAL MOISTURE CONTENT (ASTM D2216)
Natural moisture content represents the ratio of the weight of water in a given amount of soil to the weight of solid particles. Natural moisture content is expressed as a percentage (%). In this test method the water content is measured in the laboratory by noting the weight loss after drying the soil at specific temperature for 24 hours.

ATTERBERG LIMITS (ASTM D4318)
The Atterberg Limits test is performed in accordance with ASTM D4318. Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) of the soil sample are determined using this test method. The Liquid Limit is the moisture content at which the soil begins to behave as a liquid material and starts to flow. The Plastic Limit is the moisture content at which the soil changes from plastic to semi-solid stage. The Plasticity Index (PI = LL - PL) is the range of moisture content at which the soil is in a plastic stage. Typically, a soil's potential for volume change increases with increase of plasticity indices.

PARTICLE SIZE ANALYSIS (ASTM D421, D422 and D1140)
These tests are performed to determine the partial soil particle size distribution. The soil sample is prepared according to ASTM D421 test method. The amount of material finer than the openings on the No. 200 sieve (0.075 mm) is determined by wash sieve method according to ASTM D1140. The hydrometer test is used to determine particle size distribution of material finer than 0.075 mm according to ASTM D422 test method.

STANDARD PROCTOR COMPACTION TEST (ASTM D698)
The Standard Proctor compaction test is used to determine maximum dry density and optimum moisture content of the soil sample. In this test, the soil is compacted in the Proctor mold in three lifts of equal volume using a standard effort by the free falling of a 5.5 lb rammer from 12 inches above soil surface. The test procedure is repeated on samples at several different moisture contents and a parabolic graph showing the relationship between moisture content and dry density of the soil is established. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

MODIFIED PROCTOR COMPACTION TEST (ASTM D1557)
Modified Proctor compaction is similar to the Standard Proctor test. In this test, the soil is compacted in the Proctor mold in five lifts of equal volume using a standard effort by the free falling of a 10 lb rammer from 18 inches above the soil surface. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

LABORATORY CALIFORNIA BEARING RATIO (ASTM D1883)
The CBR value is the ratio of forces required for 0.1-inch penetration of a 2-inch diameter circular plunger at the rate of 0.05 inch/min into a compacted soil sample compared to the same penetration in a certain standard crushed stone.

LOSS ON IGNITION TEST (LOI) (ASTM D2974)
LOI tests are performed on peat or suspected organic soils. An oven-dried sample is ignited in a furnace at 440°C (Method C) or 750°C (Method D). The ash content of the soil sample is determined as a percentage of the weight of the oven-dried sample. The organic content is the loss of weight due to ignition and reported as a percentage of the weight of the oven-dried sample.

ONE-DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)
The consolidation test data is used to estimate the magnitude and rate of both differential and total settlement of a structure. A one-dimensional consolidation test is performed in a consolidation ring that does not allow lateral displacement of the sample. The sample is subjected to various vertical loading and unloading cycles. The deformation of the sample due to loading and unloading is recorded and used for the plotting a void ratio-applied pressure graph. The pre-consolidation pressure for the soil can also be determined from this test.

UNCONFINED COMPRESSION TEST ON ROCK SAMPLES (ASTM D7012)
In the unconfined compression test, the unconfined compressive strength (q_u) of a rock sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of approximately 2) to reach the failure condition.

UNCONFINED COMPRESSION TEST ON SOIL SAMPLES (ASTM D2166)
In the unconfined compression test, the unconfined compressive strength (q_u) of a cohesive soil sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of 2 to 2.5) to reach the failure condition or 15 percent (%) of axial deformation, whichever is secured first.

UNCONSOLIDATED-UNDRAINED (UU) TRIAXIAL COMPRESSION TEST (ASTM D2850)
Triaxial Shear tests are used to determine the shear strength of soil samples under various loading conditions. The test is performed on a relatively undisturbed sample extruded from a Shelby tube. In this test method, fluid flow is not permitted into or out of the soil specimen as the load is applied (undrained condition), therefore pore pressure builds up in the sample. The compressive strength of a soil is determined in terms of the total stress. The various confining pressures help determining the shear strength of the soil at different depths.

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL COMPRESSION TEST (ASTM D4767)
The shear characteristics of cohesive samples (collected from relatively undisturbed sample extruded from a Shelby tube) are measured in this test under undrained conditions. This test represents field conditions where fully consolidated soils under one set of stresses are subjected to a sudden change in stress without sufficient time for further consolidation (undrained condition). The data from this test is used to analyze the shear strength parameters of the soil at different depths. The compressive strength of a soil is reported in terms of the effective stress.

WATER SOLUBLE SULFATE, RESISTIVITY AND PH
To evaluate the corrosion potential of the site, MSG performs sulfates (Ohio DOT Supplement 1122), resistivity (ASTM G187), and pH tests (ASTM D4972) on select soil samples.

SPECIFIC GRAVITY (ASTM D854)
Specific gravity is defined as the ratio of the unit weight of soil solids only to unit weight of water at a specific temperature. MSG performs specific gravity tests for soils according to ASTM D854 test procedure.

PERMEABILITY (ASTM D2434 and ASTM D5084)
This test method covers laboratory measurements of the hydraulic conductivity (the coefficient of permeability) of water-saturated granular and cohesive materials. MSG performs multiple methods for permeability tests according to ASTM D2434 and ASTM D5084.

DIRECT SHEAR TEST (ASTM D3080)
The direct shear tests are performed to determine the maximum and residual shear strength. A horizontal load is applied at a constant rate of strain. The soil sample is placed in a box where the lower half of the box is mounted on rollers and is pushed forward at a uniform rate by a motorized apparatus. The upper half of the box bears against a steel proving ring, the deformation of which is shown on a dial gauge indicating the shear force. The various information that can be obtained from the results includes the maximum (peak) shear strength and the ultimate (residual) shear strength.

SUMMARY OF LABORATORY RESULTS

The Mannik & Smith Group, Inc.
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AASHTO R18

CLIENT Trilogy Health Services, LLC

PROJECT NAME Trilogy - Holly Towhship

PROJECT NUMBER T1730071

PROJECT LOCATION Holly Township, Michigan

Boring No. / Sample No.	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Bulk Density (pcf)	Satur-ation (%)	Specific Gravity
SB-01 / SS-2	3.5							20.0			
SB-02 / SS-2	8.5				9.525	70		18.5			
SB-03 / SS-3	6.0							10.2			
SB-04 / SS-3	6.0				9.525	35		10.7			
SB-04 / SS-5	13.5							14.5			
SB-04 / SS-7	23.5							12.8			
SB-06 / SS-2	3.5							14.3			
SB-07 / SS-1	3.5							14.4			
SB-07 / SS-2	8.5							13.2			
SB-08 / SS-3	6.0							10.4			
SB-08 / SS-5	13.5							12.2			
SB-09 / SS-1	1.0							21.8			
SB-09 / ST-1	5.5	30	15	15	9.525	63	CL	14.5	137.9		
SB-09 / SS-5	18.5							14.7			
SB-10 / SS-2	3.5							12.2			
SB-10 / SS-4	8.5							11.0			
SB-11 / SS-2	3.5							11.2			
SB-12 / SS-3	6.0							13.8			
SB-13 / SS-3	6.0	18	12	6				10.6	142.0		
SB-13 / SS-5	13.5							10.9			
SB-14 / SS-2	3.5							17.7			
SB-15 / SS-2	3.5							18.5			
SB-15 / SS-4	8.5							19.1			
SB-15 / ST-2	18.0	27	15	12	4.75	72	CL	14.6	138.5		
SB-16 / SS-2	3.5							6.8			
SB-17 / SS-3	6.0							13.3			
SB-18 / SS-2	3.5							20.2			
SB-19 / SS-2	3.5							13.5			
SB-19 / SS-4	13.5							20.9			
SB-20 / SS-2	3.5							13.2			
SB-20 / SS-6	18.5							12.7			
SB-21 / SS-2	3.5							12.5			
SB-22 / SS-3	6.0							13.0			
SB-22 / SS-6	18.5							11.9			
SB-23 / SS-3	6.0							12.7			
SB-24 / SS-1	3.5	29	15	14				15.2			
SB-25 / SS-2	3.5							14.2			

LAB SUMMARY - GINT STD US LAB.GDT - 4/28/23 14:44 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

ATTERBERG LIMITS' RESULTS

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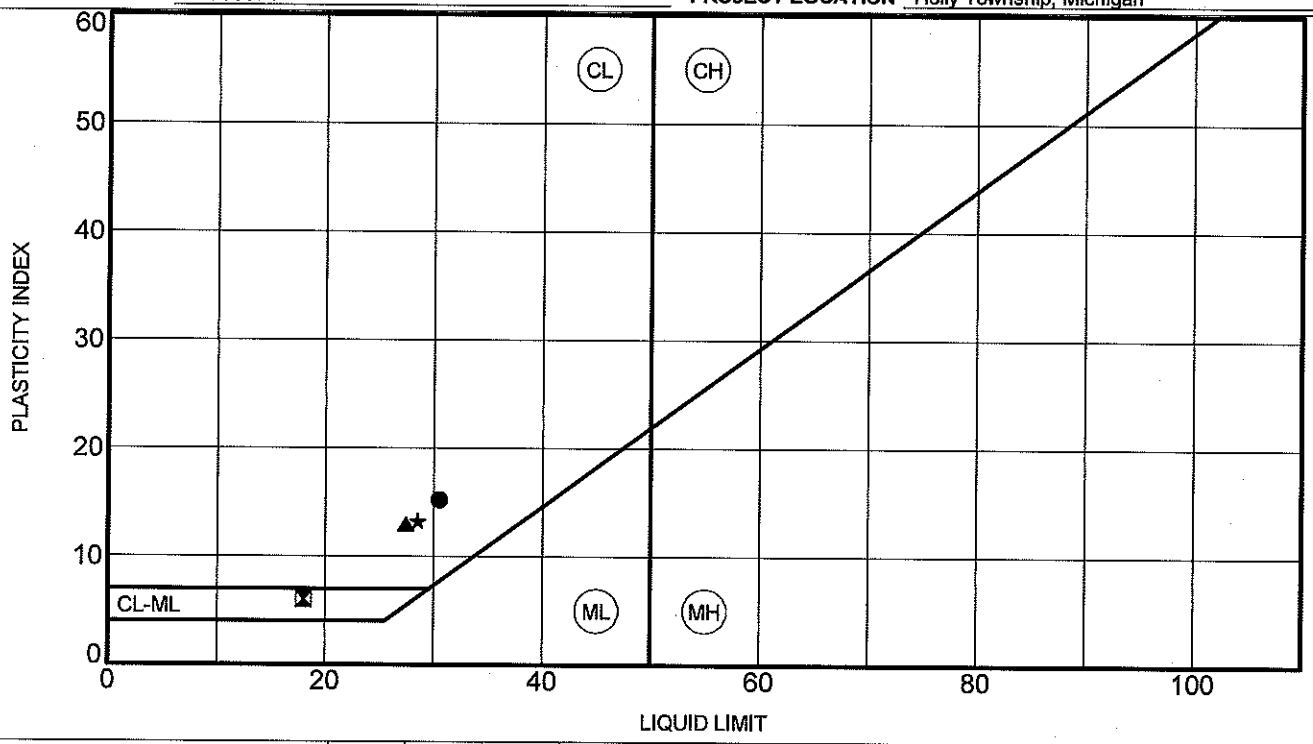
CLIENT Trilogy Health Services, LLC **PROJECT NAME** Trilogy - Holly Towhship

PROJECT NUMBER T1730071 **PROJECT LOCATION** Holly Township, Michigan



	Specimen Identification		LL	PL	PI	Fines	Classification
●	SB-09 / ST-1	5.5	30	15	15	63	SANDY LEAN CLAY (CL)
⊠	SB-13 / SS-3	6.0	18	12	6		SANDY LEAN CLAY (CL)
▲	SB-15 / ST-2	18.0	27	15	12	72	LEAN CLAY with SAND (CL)
★	SB-24 / SS-1	3.5	29	15	14		LEAN CLAY (CL)

ATTERBERG LIMITS - GINT MSG STD BBH 2020.07.21 LIB.GDT - 4/28/23 14:37 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

GRAIN SIZE DISTRIBUTION

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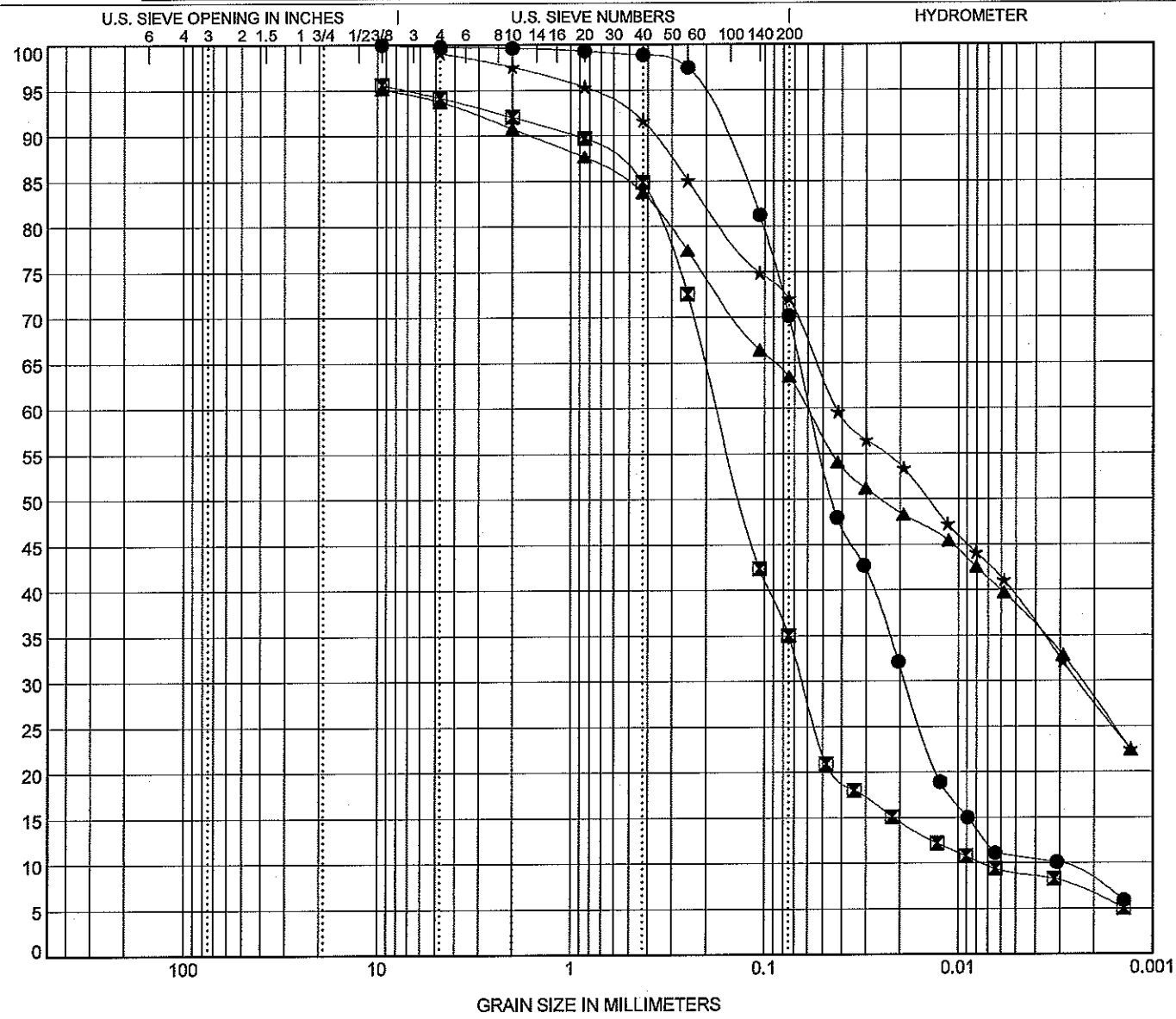
AASHTO R18

CLIENT Trilogy Health Services, LLC **PROJECT NAME** Trilogy - Holly Towhship

PROJECT NUMBER T1730071 **PROJECT LOCATION** Holly Township, Michigan



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB-02 / SS-2	8.5	LEAN CLAY (CL)				2.02	19.04
⊠	SB-04 / SS-3	6.0	LEAN CLAY WITH SAND (CL)				3.14	23.45
▲	SB-09 / ST-1	5.5	SANDY LEAN CLAY (CL)	30	15	15		
★	SB-15 / ST-2	18.0	LEAN CLAY with SAND (CL)	27	15	12		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB-02 / SS-2	8.5	9.525	0.058	0.019	0.003	0.2	29.6	62.4	7.8
⊠	SB-04 / SS-3	6.0	9.525	0.175	0.064	0.007	1.4	59.1	28.6	6.5
▲	SB-09 / ST-1	5.5	9.525	0.061	0.002		1.4	30.3	35.5	28.0
★	SB-15 / ST-2	18.0	4.75	0.043	0.002			27.1	44.4	27.7

GRAIN SIZE - GINT MSG STD BBH 2020.07.21 LIB.GDT - 4/28/23 14:46 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

UNCONFINED COMPRESSION TEST

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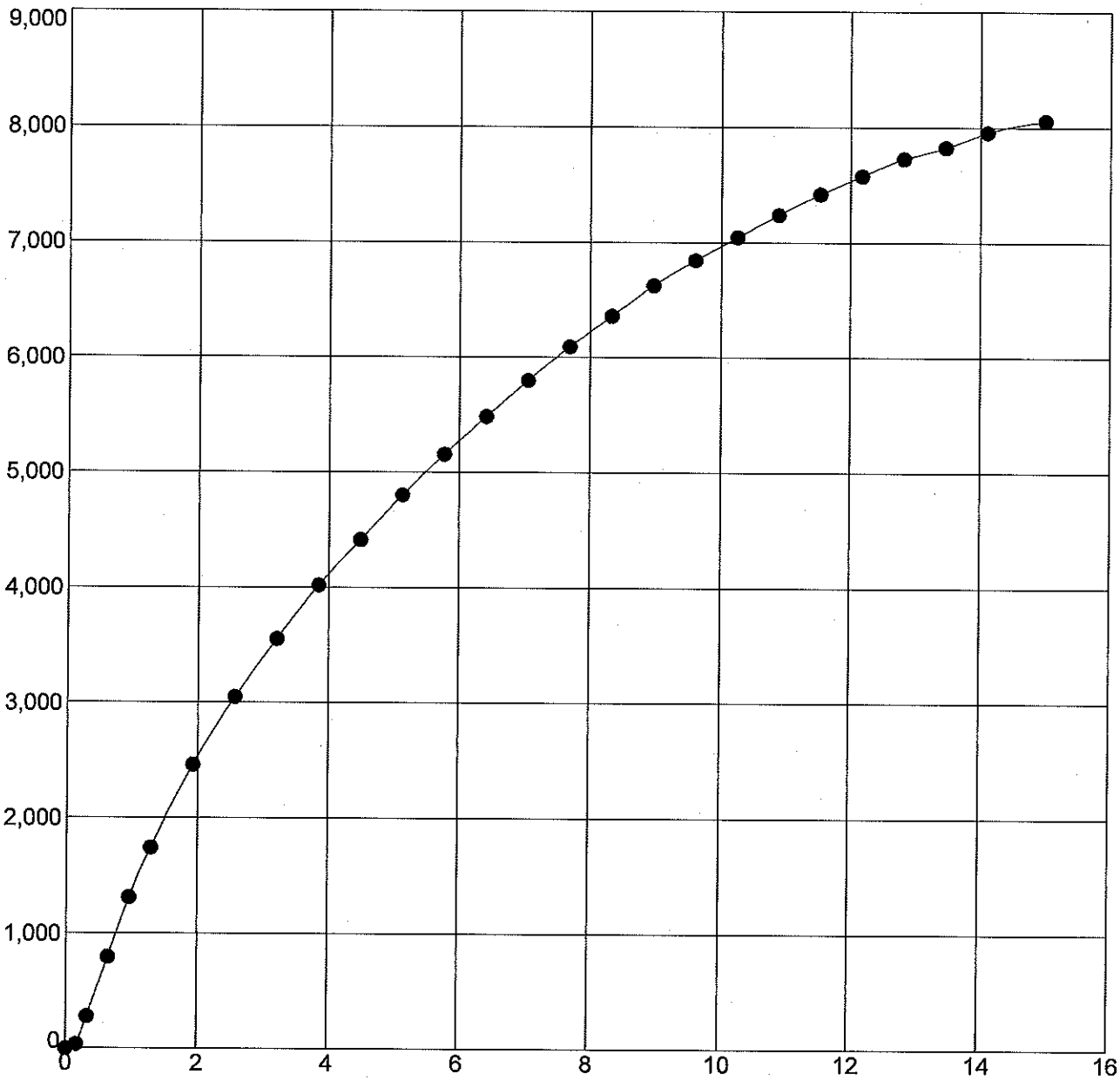
CLIENT Trilogy Health Services, LLC **PROJECT NAME** Trilogy - Holly Towhship

PROJECT NUMBER T1730071 **PROJECT LOCATION** Holly Township, Michigan



	Specimen Identification		Classification	γ_d	MC%
●	SB-09 / ST-1	5.5	SANDY LEAN CLAY (CL)	120	15

UNCONFINED - GINT STD US LAB.GDT - 4/28/23 14:52 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

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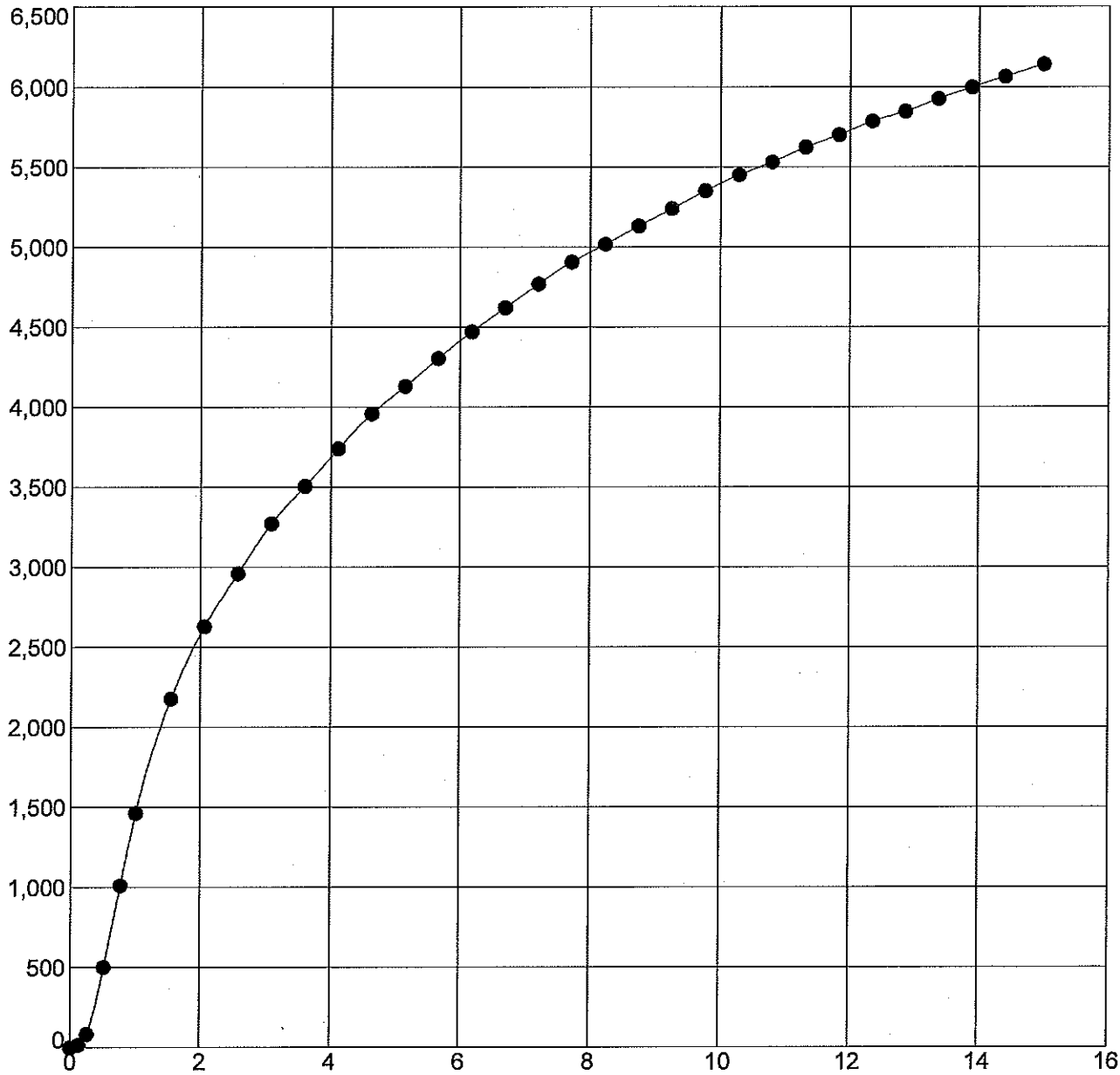
AASHTO R18

CLIENT Trilogy Health Services, LLC **PROJECT NAME** Trilogy - Holly Towhship

PROJECT NUMBER T1730071 **PROJECT LOCATION** Holly Township, Michigan



Specimen Identification		Classification	γ_d	MC%
● SB-15 / ST-2	18.0	**LEAN CLAY with SAND (CL)**	**121**	**15**

UNCONFINED - GINT STD US LAB.GDT - 4/28/23 14:53 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

UNCONFINED COMPRESSION TEST

The Mannik & Smith Group, Inc.
20600 Chagrin Boulevard, Suite 500, Shaker Heights, OH 44122
ph: (216) 378-1490 fax: (216) 378-1497
www.manniksmithgroup.com

AASHTO R18

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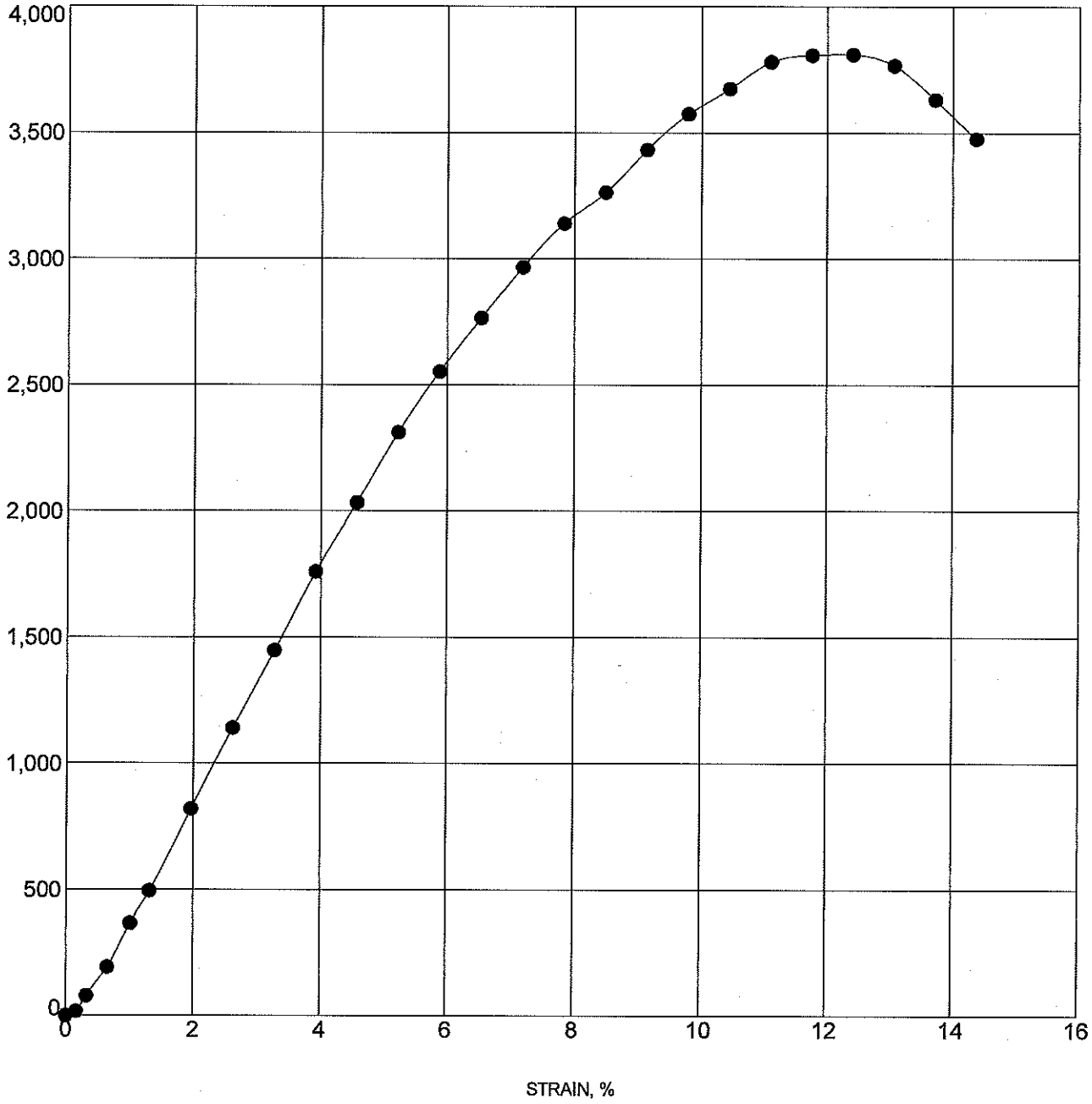
PROJECT NUMBER T1730071 **PROJECT LOCATION** Holly Township, Michigan



Specimen Identification		Classification	γ_d	MC%
●	SB-13 / SS-3 6.0		128	11

UNCONFINED - GINT STD US LAB.GDT - 4/28/23 14:54 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

MOISTURE-DENSITY RELATIONSHIP

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CLIENT Trilogy Health Services, LLC
PROJECT NAME Trilogy - Holly Towhship
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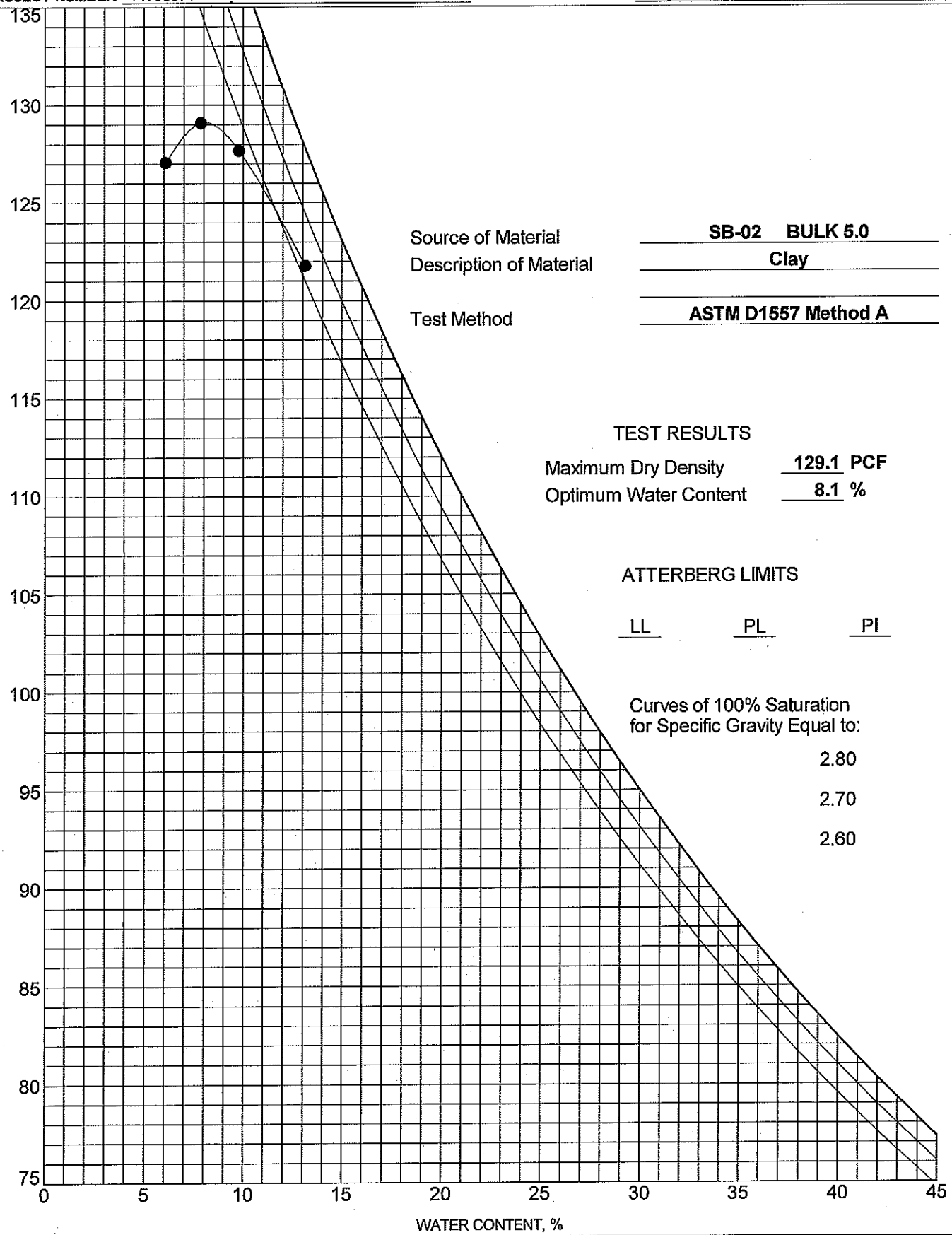

Source of Material: **SB-02 BULK 5.0**
Description of Material: **Clay**

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**129.1** PCF
Optimum Water Content	**8.1** %

ATTERBERG LIMITS

LL	PL	PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

COMPACTION - GINT STD US LAB.GDT - 4/29/23 09:41 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

MOISTURE-DENSITY RELATIONSHIP

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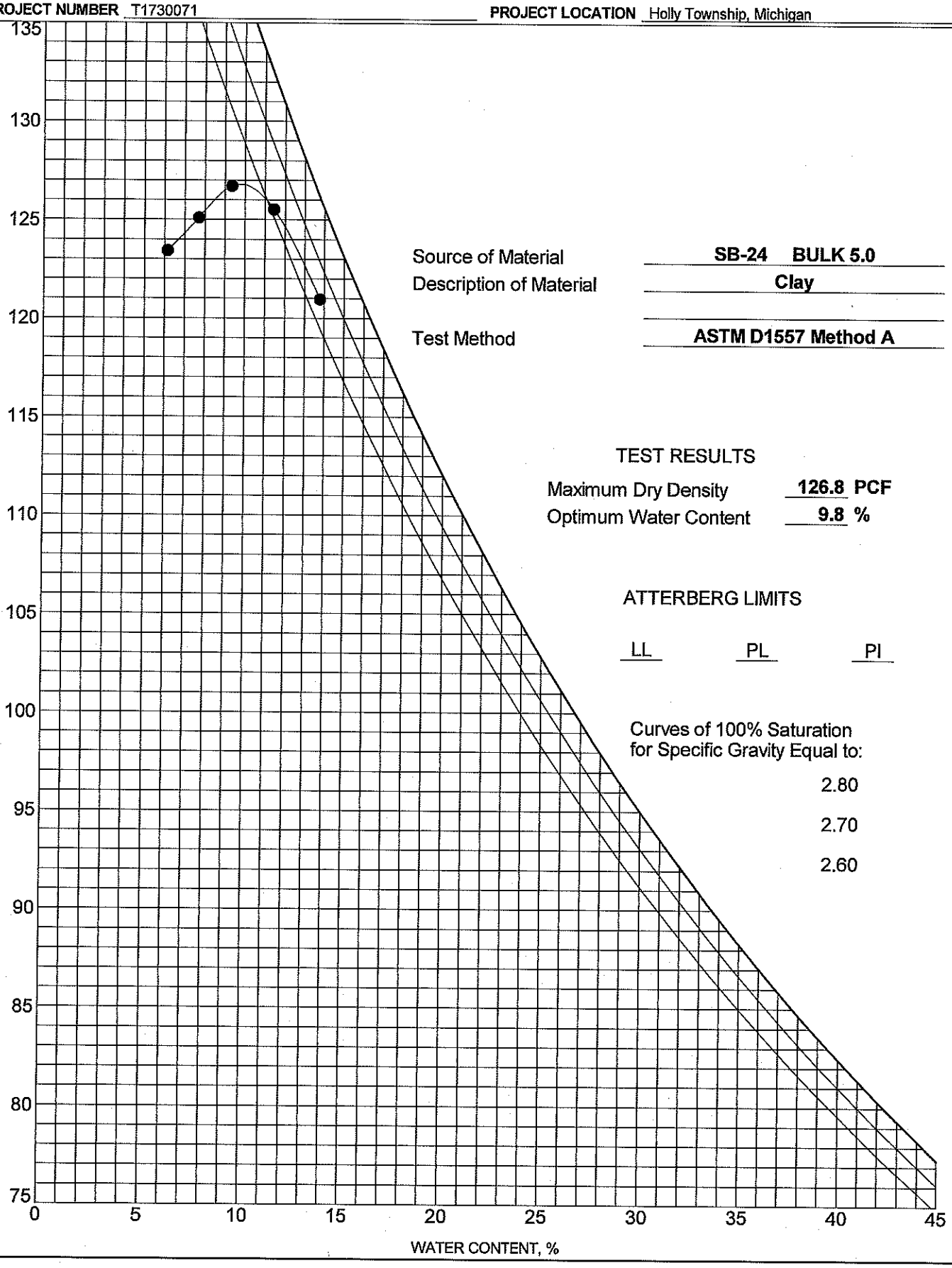
CLIENT Trilogy Health Services, LLC

PROJECT NAME Trilogy - Holly Towhship

PROJECT NUMBER T1730071

PROJECT LOCATION Holly Township, Michigan



Source of Material: **SB-24 BULK 5.0**

Description of Material: **Clay**

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density: **126.8 PCF**

Optimum Water Content: **9.8 %**

ATTERBERG LIMITS

LL PL PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

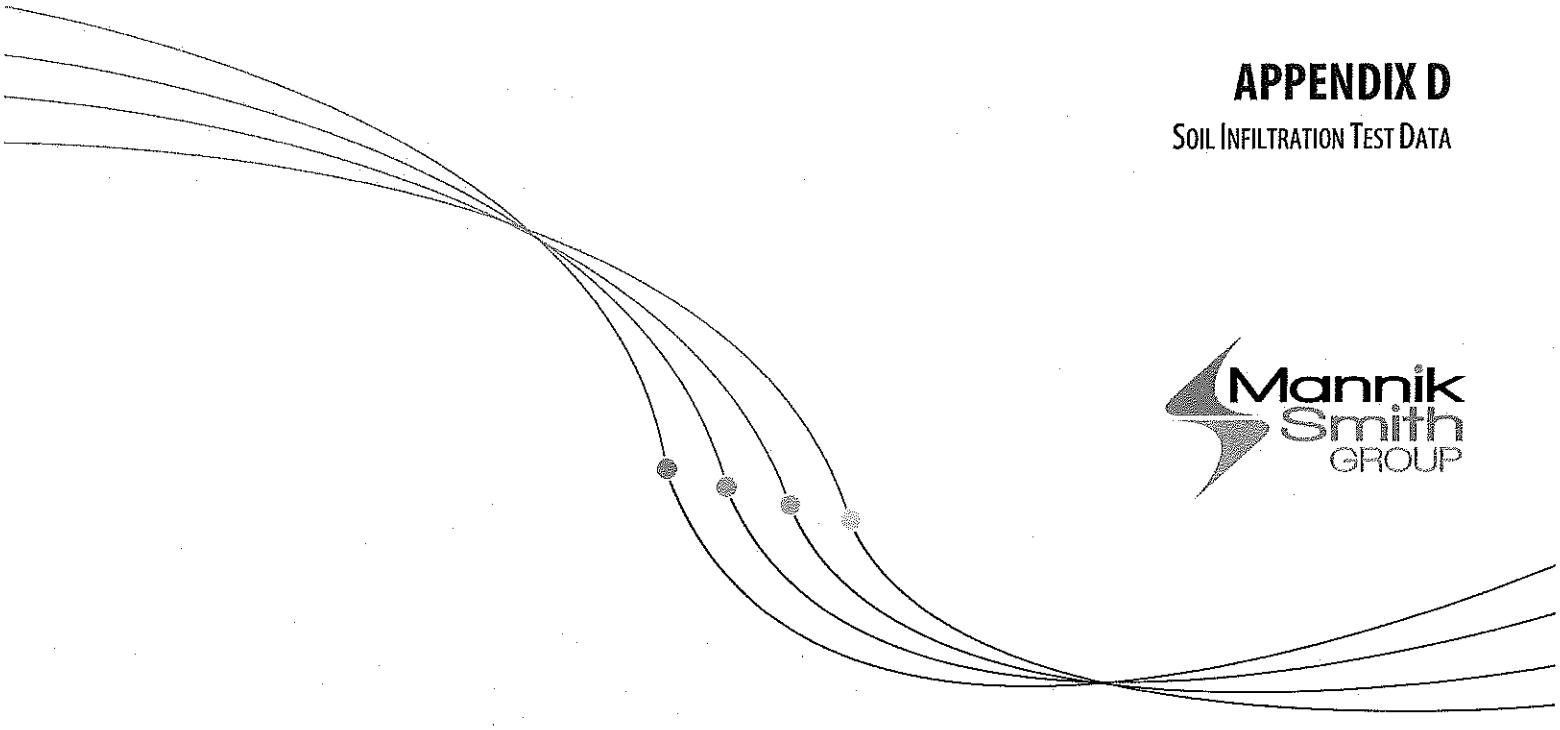
2.70

2.60

COMPACTION - GINT STD US LAB.GDT - 4/29/23 09:42 - W:\PROJECTS\PROJECTS P-T\T1730071\ADMIN\GEOTECH\LAB\T1730071 BORINGS.GPJ

APPENDIX D

SOIL INFILTRATION TEST DATA



INFILTRATION TESTING
FALLING HEAD TEST USING BOREHOLE

Project Name:	Trilogy Health Facility - Holly Twp	Project No.	T1730071
Client:	Trilogy Health Services, LLC	Date:	4/4/2023
Project Location:	Holly Township, MI	Test ID:	SB-02
Test Location:	477543.7 N; 13316529.4 E	Test Depth:	10 feet

Casing Dimensions				Initial Water Starting Depth	
Diameter		Area			
(in)	(cm)	(in^2)	(cm^2)	(in)	(cm)
3.25	8.255	8.30	53.52	0.00	0.00

			Flow Readings			Incremental Infiltration Rate				
Interval	Interval Time (min)	Elapsed Time (min)	Height Change (in)	Height Change (cm)	Flow (cm^3)	(in/s)	(cm/s)	(in/hr)	(cm/hr)	Notes
1	20	20	2.100	5.334	285.5	0.002	0.004	6.300	16.00	
2	20	40	2.100	5.334	285.5	0.002	0.004	6.300	16.00	Casing refilled after interval 1
3	20	60	2.100	5.334	285.5	0.002	0.004	6.300	16.00	Casing refilled after interval 2

Infiltration Rate: 16.00 cm/hr 6.30 in/hr

Visual Classification of Material Tested: Sandy Silt

Test Performed By:	AP	Checked By:	KDB

INFILTRATION TESTING
FALLING HEAD TEST USING BOREHOLE

Project Name:	Trilogy Health Facility - Holly Twp	Project No.	T1730071
Client:	Trilogy Health Services, LLC	Date:	4/4/2023
Project Location:	Holly Township, MI	Test ID:	SB-07
Test Location:	477413.2 N; 13316306.3 E	Test Depth:	10 feet

Casing Dimensions				Initial Water Starting Depth	
Diameter		Area			
(in)	(cm)	(in^2)	(cm^2)	(in)	(cm)
3.25	8.255	8.30	53.52	0.00	0.00

			Flow Readings			Incremental Infiltration Rate				
Interval	Interval Time (min)	Elapsed Time (min)	Height Change (in)	Height Change (cm)	Flow (cm^3)	(in/s)	(cm/s)	(in/hr)	(cm/hr)	Notes
1	20	20	0.000	0.000	0.0	0.000	0.000	0.000	0.00	
2	20	40	0.016	0.040	2.1	0.000	0.000	0.023	0.06	
3	20	60	0.031	0.079	4.2	0.000	0.000	0.031	0.08	

Infiltration Rate: 0.08 cm/hr 0.03 in/hr

Visual Classification of Material Tested: Lean Clay, little sand, trace gravel

Test Performed By:	AP	Checked By:	KDB

INFILTRATION TESTING
FALLING HEAD TEST USING BOREHOLE

Project Name:	Trilogy Health Facility - Holly Twp	Project No.	T1730071
Client:	Trilogy Health Services, LLC	Date:	4/4/2023
Project Location:	Holly Township, MI	Test ID:	SB-24
Test Location:	477048.2 N; 13316586.5 E	Test Depth:	10 feet

Casing Dimensions				Initial Water Starting Depth	
Diameter		Area			
(in)	(cm)	(in^2)	(cm^2)	(in)	(cm)
3.25	8.255	8.30	53.52	0.00	0.00

			Flow Readings			Incremental Infiltration Rate				
Interval	Interval Time (min)	Elapsed Time (min)	Height Change (in)	Height Change (cm)	Flow (cm^3)	(in/s)	(cm/s)	(in/hr)	(cm/hr)	Notes
1	20	20	0.000	0.000	0.0	0.000	0.000	0.000	0.00	
2	20	40	0.016	0.040	2.1	0.000	0.000	0.023	0.06	
3	20	60	0.031	0.079	4.2	0.000	0.000	0.031	0.08	

Infiltration Rate: 0.08 cm/hr 0.03 in/hr

Visual Classification of Material Tested: Lean Clay, little sand, trace gravel

Test Performed By:	AP	Checked By:	KDB