Attachment VIII.C.17.c.-2

EPT Concord Resort

Town of Thompson, Sullivan County

SANITARY ENGINEERING REPORT

AKRF Project Number: 80286

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1.0 INTRODUCTION

The project purpose is to redevelop and revitalize the site of the former Concord Resort in the Town of Thompson, Sullivan County, as envisioned and authorized by State, regional, and local economic development plans, into a thriving destination resort that serves to revitalize the economy and culture of the region, see Figure 1.

The project sponsor, EPR Concord II, LP (referred to as "EPR" or the "Owner") proposes to develop a master planned destination resort community (referred to as "EPT Concord Resort" on approximately 1,688 acres of land located on the site of the former Concord Resort in the Town of Thompson, Sullivan County, New York, see Figure 2.

When complete, the EPT Concord Resort will include an 18-hole golf course, Casino Resort, harness horse racetrack, grandstand/showroom, simulcast facility, hotels, waterpark, a recreational vehicle (RV) park, and an entertainment village with cinemas and supporting retail (the "Casino Resort"). In addition, there will be a residential village with a mix of unit types including condominiums, apartments, townhouses and detached single family homes, a civic center, and an active adult residential community. This mix of uses will be connected via a multi-use trail system with abundant open space. In total, the Resort is planned to have 897 housing units, 1,800 hotel rooms, a 405,000 square foot Casino, 903,000 square feet of commercial space, and a 35,000 square foot Civic Center. See Figure 3 for Parcel Map.

The EPT Concord Resort components will be phased over an approximately 10-year horizon. The initial development program of the EPT Concord Resort will include the Monticello Raceway Management, Inc. (MRMI) parcel which will require infrastructure improvements including electric, telecommunications, water supply, storm water, sanitary services, and site access. Although these improvements will specifically support the proposed development on the MRMI site, they will also be designed to support future development phases of the EPT Concord Resort.

The initial development of the Proposed Project will consist of the construction of the Casino Resort near the intersection of Thompsonville Road and Resort Entry Road. The wastewater generated from this portion of the Proposed Project is expected to be approximately 122,800 gallons per day (gpd).

This Engineering Report covers the following development:

- Casino Resort – The initial development is approximately 117 acres of a roughly 186 acre parcel to be leased to MRMI for the casino, harness horse racetrack, hotel and entertainment complex. The initial development area is located in the south central portion of the project site with access from Resort Entry Road and Thompsonville Road. The site is bordered on the north and west by Thompsonville Road, on the east by Resort Entry Road, and on the south by wetlands.
- Roadway - The Applicant has elected to develop a proposed gateway to the EPT Concord Resort Access through the development of "Resort Entry Road" which will be constructed west of Joyland Road (see Figure 3). Resort Entry Road will connect to the Route 17 Exit 106 off-ramp at its intersection with Towner Road and County Route (CR) 173/Cimarron Road. From here, the road will convey traffic north before turning east to meet with a newly improved Joyland CR 173/Cimarron Road intersection. At this point, Resort Entry Road will travel west for a short distance before curving to the north, passing to the west of a lake and then turning to the northeast after which it fronts the MRMI site before rejoining Joyland Road. In order to facilitate the construction of Resort Entry Road, the Owner has acquired several parcels to the west of Joyland Road and to the south of the MRMI site.
- Infrastructure - Water service will be constructed under Route 17, west of the Exit 106 interchange overpass and will follow the alignment of Resort Entry Road, a portion of Chalet

Road and then enter the Monster Golf Course. From there the main will traverse a portion of the golf course and go through a forested area onto Concord Road. Once on Concord Road it will be installed westerly to New York State Highway Route (SR) 42. Water service will connect to existing Village of Monticello infrastructure located within East Broadway. Sanitary sewer service will be provided within Resort Entry Road and Thompsonville Road and will connect to the Town of Thompson Sewage Treatment Plant (STP) via an existing maintenance path and under Kiamesha Creek to the STP. Electrical conduits and utility poles will also be constructed along the roadway to provide power and telecommunications to the MRMI facility.

This report provides the design basis for the first phase of the development which consists of the construction of the Casino, hotel, the horse racing track with paddock and maintenance building, and the roadway and utility infrastructure to support the Project. The development of the Proposed Project will require the design and construction of a sanitary sewer network. The applicant will construct portions of the sanitary sewer network within the new or redeveloped roadway to support the Project. Full build-out of the Project will be constructed in five phases. Additional sewerage piping will be constructed in the new roadway (Resort Entry Road) and redeveloped portions of Thompsonville Road, Chalet Road, and Joyland Road; however, flow will not enter the pipe network until such time that the adjacent lease parcels are constructed.

2.0 SITE INFORMATION

2.1 Soils and Geotechnical Investigation

2.1.1 Geology

The initial development area is within the Lower Walton formation of the West Falls Group, consisting of shale, sandstones, and conglomerate in higher elevation areas. Surficial geology within this development area includes kame and till deposits. Kame occurs in a northeast to southwest direction through the initial development area, underlying parts of the golf course and mixed coniferous-deciduous forest. Till underlies the southeastern portion of this development area, surrounding the freshwater pond beyond the parcel's southern boundary, and underlies the areas of the golf course on the parcel's far western side.

2.1.2 Geotechnical Investigation

A geotechnical investigation was performed in April 2012 to characterize subsurface conditions. Soil borings were taken at 32 locations within the development site. Detailed results of the survey are reported in full in Appendix C. In general, the first stratum consisted of topsoil ranging in depth from 6 to 12 inches. The second stratum usually consisted of "red-brown fine to coarse sand, and silt, little fine gravel (moist) (loose to dense)" and extended 1 to 3 feet below surface grade in most locations, but in some locations extended as far as 10 feet below surface grade. The third stratum and beyond was also usually "red-brown fine to coarse sand" but more dense and containing varying amounts of silt, gravel, cobbles, and boulders. Depth to bedrock exceeded completion depth (approximately 50 feet) in 19 of the 32 borings, and was 19 feet or greater in the other 13 boring locations. In most locations, groundwater was encountered at depths ranging from 7 to 21 feet. At locations C-1, C-7, and C-12, where piezometers were installed and groundwater levels were measured multiple times, stabilized groundwater levels were observed at depths of 24 to 30 feet. The variable groundwater depths are likely due to seepage through less pervious materials, and percolation of surface water through loose surficial soils place some restrictions on construction.

In addition, test pit explorations were performed within the proposed building, parking, and harness horse racetrack locations. Groundwater was found at 1 to 21 feet below grade in most locations indicative of seasonally saturated conditions and seepage from groundwater perching. Prior to reuse, some dewatering, aeration, and drying of the shallower surficial materials may be necessary. Controlling groundwater through diversion trenches or similar measures during construction may be required. See Appendix C for the complete Subsurface Investigation Report (Melick-Tully and Associates, P.C., May 1, 2012 and March 5, 2013).

2.1.3 Topography and Slopes

Elevation within the Site increases from west to east, with a low point of 1,340 feet above sea level on the golf course on the site's western side to a high point of 1,456 feet above sea level in the mixed coniferous-deciduous forest on the site's eastern side. With the exception of a very small area adjacent to Thompsonville Road, slopes are less than 20 percent throughout the initial development area.

2.1.4 Soils

The Natural Resources Conservation Service (NRCS) identifies major classifications of soils that have similar characteristics (such as texture and drainage) into a series. Within each series, soils differ in slope and other characteristics that affect their use. On the basis of these differences, soil series are further divided into phases (soil map units). Different soil phases exhibit variable water storage, erosion potential, and other characteristics that are important from a development perspective. Soil mapping units that are found on the Project Site and initial development area are listed below.

Table 2-1
NRCS Soil Classification

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
AoC	Arnot-Oquage complex, 0-15% slopes, very rocky	10-20 inches	Drainage class: shallow and somewhat excessively drained to moderately well drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.17-0.24 Permeability: 0.6-2.0 in/hr Hydrologic group: C/D
AoE	Arnot-Oquage complex, 15-35% slopes, very rocky	10-20 inches	Drainage class: shallow and somewhat excessively drained to moderately well drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.17-0.24 Permeability: 0.6-2.0 in/hr Hydrologic group: C/D
Fu	Fluvaquents-Udifluvents complex, frequently flooded	Not listed	Drainage class: excessively drained to very poorly drained. Depth to water table: Not listed. Soil erodibility "K" factor: not listed. Permeability not listed. Subject to frequent flooding and stream scour, stream bank erosion, and shifting of soil deposits. Hydrologic group not listed; capability subclass Vw.
MrA	Morris loam, 0-3% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on till plains or broad, flat hilltop on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C

Table 2-1
NRCS Soil Classification

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
MrB	Morris loam, 3-8% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on the lower parts of concave hillsides on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C
MrC	Morris loam, 8-15% slopes	More than 60 inches	Drainage class: Somewhat poorly drained soil on the lower parts of hillsides on uplands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.24-0.32 Permeability: <0.2-2.0 in/hr Hydrologic group: C
Ne	Neversink loam	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Dec-Apr. Permeability is moderate in surface and subsurface layers and slow in subsoil and substratum. Surface runoff is slow or very slow. Erosion is a slight hazard. Soil erodibility "K" factor: 0.20-0.28. Hydrologic group D and capability subclass IVw.
Nf	Neversink and Alden soils, very stony	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Dec-Apr. Permeability not listed. Surface runoff is very slow or intermittently ponded. Erosion hazard not listed. Soil erodibility "K" factor: 0.20-0.24. Hydrologic group D and capability subclass VIIs.
OeB	Oquaga very channery silt loam, 3-8% slopes	20-40 inches	Drainage class: Well drained to excessively well drained soil on hilltops on bedrock-controlled uplands. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.20 Permeability: 0.6-2.0 in/hr Hydrologic group: C
OgC	Oquaga Oquaga-Arnot complex, 8-15% slopes	20-40 inches	Drainage class: Moderately deep and well drained to excessively drained. Depth to water table: greater than 6 feet. Soil erodibility "K" factor: 0.20 Permeability: 0.6-2.0 in/hr Hydrologic group: C
Ra	Raynham silt loam	More than 60 inches	Drainage class: Somewhat poorly drained soil that formed in water-laid deposits of coarse silt and sands. Depth to water table: 0.5-1.5 feet Soil erodibility "K" factor: 0.49-0.64 Permeability: 0.06-2.0 in/hr Hydrologic group: C
ScB	Scriba loam, 3-8% slopes, stony	More than 60 inches	Drainage class: somewhat poorly drained. Depth to water table: 6 to 18 inches, Feb-Mar. Permeability is moderate or slow above the fragipan and slow in the fragipan. Surface runoff is slow. Erosion hazard is not listed. Soil erodibility "K" factor: 0.20-0.28. Hydrologic group C and capability subclass IIIw.
SeB	Scriba and Morris loams, gently sloping, extremely stony	More than 60 inches	Drainage class: somewhat poorly drained. Depth to water table: 6 to 18 inches, Feb-Apr. Permeability is slow to moderate above the fragipan and very slow to slow in the fragipan. Surface runoff is slow or medium. Erosion hazard is not listed. Soil erodibility "K" factor: 0.20. Hydrologic group C and capability subclass VIIs.

Table 2-1
NRCS Soil Classification

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
SrC	Raynham silt loam, 8-15% slopes, stony	More than 60 inches	Drainage class: Very deep, strongly sloping, well-drained soil on the sides and tops of hills. Depth to water table: 2.5-6.0 Soil erodibility "K" factor: 0.20 Permeability: 0.06-2.0 in/hr Hydrologic group: C
Wd	Wayland silt loam	More than 60 inches	Drainage class: poorly drained to very poorly drained. Depth to water table: 0 to 6 inches, Nov-Jun. Permeability is moderate in the surface layer and slow in the subsoil and substratum. Surface runoff is slow. Erosion hazard is not listed. Soil erodibility "K" factor: 0.43. Hydrologic group C/D and capability subclass Vw.
WeA	Wellsboro gravelly loam, 0-3% slopes	More than 60 inches	Drainage class: Very deep, nearly level, moderately well drained soil on till plains. Depth to water table: 1.5-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WeB	Wellsboro gravelly loam, 3-8% slopes	More than 60 inches	Drainage class: moderately well-drained Depth to water table: 18 to 36 inches, Nov-Mar. Permeability is moderate above the fragipan and slow in the fragipan. Surface runoff is slow to rapid. Erosion is a hazard on long slopes. Soil erodibility "K" factor: 0.28. Hydrologic group C and capability subclasses IIw (0-3% and 3-8% slopes) and IIIe (8-15% slopes).
WeC	Wellsboro gravelly loam, 8-15% slopes	More than 60 inches	Drainage class: Very deep, sloping, moderately well drained soil on hillsides. Depth to water table: 1.5-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WlC	Wellsboro and Wurtsboro soils, strongly sloping, extremely stony	More than 60 inches	Drainage class: moderately well-drained. Depth to water table: 18-36 inches, Nov-Mar. Permeability is moderate above the fragipan and slow in the fragipan. Surface runoff is medium or rapid. Erosion hazard is not listed. Soil erodibility "K" factor: 0.24-0.28. Hydrologic group C and capability subclass VIIs.
WuA	Wurtsboro loam, 0-3% slopes, stony	More than 60 inches	Drainage class: Very deep, gently sloping, moderately well drained soil on hillsides and hilltops. Depth to water table: 1.0-3.0 feet Soil erodibility "K" factor: 0.28 Permeability: 0.06-2.0 in/hr Hydrologic group: C
WuB	Wurtsboro loam, 3-8% slopes	More than 60 inches	Drainage class: moderately well-drained. Depth to water table: 1 to 3 feet, Nov-Mar. Permeability is moderate to a depth of 26 inches and slow beyond. Surface runoff is medium (3-8% slopes). Erosion is a hazard at 3-8% slopes. Soil erodibility "K" factor: 0.28. Hydrologic group C and capability subclasses IIw (3-5% slopes).

Table 2-1
NRCS Soil Classification

Symbol	Soil Series Name	Depth to Bedrock	Drainage Characteristics
WuC	Wurtsboro loam, 8-15% slopes, stony	More than 60 inches	Drainage class: moderately well-drained. Depth to water table: 1 to 3 feet, Nov-Mar. Permeability is moderate to a depth of 26 inches and slow beyond. Surface runoff is medium to rapid. Soil erodibility "K" factor: 0.28. Hydrologic group C and capability subclass IIIe

2.1.5 Floodplain and Floodway Evaluation

The 100-year Federal Emergency Management Agency (FEMA) floodplain on the Project Site is shown on the full size drawing set submitted as part of the Site Plan Application submission. A portion of the sanitary sewer system is located within the floodplain; however, the pump stations are located outside of the floodplain.

3.0 DESCRIPTION OF EXISTING SEWER SYSTEM

3.1 Existing Conditions

All existing uses on the Project Site, with the exception of the Chalet/pro-shop and temporary modular clubhouse, utilize subsurface septic systems for disposal of sanitary waste. The Chalet/pro-shop and temporary modular clubhouse are currently connected to a temporary holding tank, which is pumped out by a hauler. Other than this very small portion of the Monster Golf Course, the initial site is unimproved. As such, there is no wastewater generated on the site, nor is there any sanitary sewer infrastructure on the site.

3.2 Kiamesha Lake Sewer District (KLSD) and Existing Sewage Treatment Plant

Sewage of the Proposed Project will be tributary to the Kiamesha Lake Sewer District (KLSD) Sewage Treatment Plant. The sewage treatment plant (STP), located on Rock Ridge Drive, is operated by the Town of Thompson. KLSD's STP is designed and permitted to treat 2,000,000 gallons per day (gpd) of wastewater flow, as confirmed by the New York State Department of Environmental Conservation's (NYSDEC) State Pollutant Discharge Elimination System (SPDES) permit. Based on the current information, the STP has available capacity to treat an additional 500,000 - 700,000 gpd ("excess capacity"). For additional needed capacity in excess of the current STP limits in the future, there is the ability to expand the plant.

4.0 FLOW AND ORGANIC LOAD

4.1 Wastewater Flow Characteristics

The projected wastewater flows have been estimated based on the hydraulic loading rates listed in Table 3 of the NYSDEC 'Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities' (NYSDEC '88).

At full build-out of the Proposed Project, it is anticipated that it will generate approximately 881,000 gpd of wastewater. Table 4-1 and Table 4-2 break down this amount by each anticipated project phase and sewer connection location.

Table 4-1
Daily Sanitary Sewer Flow Tributary to Thompsonville Road Sewer Connection

Project Phase	Incremental Sewer Flow (gpd)
Casino Resort 'A'	122,800
Golf	17,500
Casino Resort 'B' and Entertainment Village	122,200
Recreation	285,000
Total	**547,500**

Table 4-2
Daily Sanitary Sewer Flow Tributary to Rock Ridge Drive Sewer Connection

Project Phase	Incremental Sewer Flow (gpd)
Residential Village and Hospitality	106,700
Hospitality, Commercial and Residential	226,800
Total	**333,500**

Casino Resort 'A' – The Proposed Project will consist of the construction of the Casino Resort (Casino, Hotel, Harness Horse Racetrack, Paddock and Maintenance Building) near the intersection of Thompsonville Road and Resort Entry Road. The wastewater generated from this portion of the Proposed Project is expected to be approximately 122,800 gpd.

Golf – This future phase will focus on improvements to the existing Monster Golf Course with the construction of a 20,000-square-foot Golf Clubhouse, 12 golf cottages, and a 9,000-square-foot golf course maintenance building. This construction is expected to generate a minimal amount of wastewater, approximately 17,500 gpd.

Casino Resort 'B' and Entertainment Village – This future phase will include a second hotel, to be constructed adjacent to Casino Resort 'A', and the addition of the Entertainment Village at the intersection of Thompsonville Road and Joyland Road. The Entertainment Village will include a movie theater, bowling alley, arcade, comedy club, and various restaurants and retail facilities. The sewage expected to be generated by this phase is approximately 122,200 gpd.

Residential Village, Hospitality & Recreation – This future phase of the Project consists of the development of further varied land uses such as an RV park, a waterpark, a spa, an innovative medical facility, a civic center, 20,000 square feet of retail space, and an 183,000 square-foot hotel and conference center. The construction of this phase is expected to generate a wastewater flow of almost 391,700 gpd.

Hospitality, Commercial & Residential – This future phase consists of 170 residential units, as well as the sporting club hotel. It will also include a 175,000-square-foot movie studio/soundstage and 290,000 square feet of commercial space which will combine to generate approximately 226,800 gpd of flow.

See Appendix A for Sanitary Sewer Flow Calculations.

4.2 Waste Stream Characteristics

The initial development proposed to be constructed is generally comprised of resort and entertainment uses which produce a waste stream that can be characterized as mostly commercial wastewater associated with the employees and patrons of the Casino, Hotel and Maintenance Building. As restaurants may contribute high grease levels in the wastewater, grease traps are necessary to prevent grease and oils from entering the sanitary system. In accordance with the requirements of NYSDEC, kitchen facilities of the restaurants and the Casino will be served by a separate sewer line in which a grease trap is installed upstream from the treatment system.

The proposed harness horse racetrack use constructed in the Project will generate an irregular type waste from the drains installed in each horse stall within the Paddock. These drains, which will collect flow from stall wash-down, may result in higher biological concentrations of the wastewater due to the organic waste associated with the animals. To lessen the impact to the KLSD STP, a solids interceptor will be constructed on the waste line just after it exits the Paddock, and a hauling service will be contracted to provide removal at regular intervals.

5.0 EXISTING WASTEWATER TREATMENT PLANT FACILITY

5.1 Kiamesha Lake Sewage District Sewage Treatment Plant (KLSD STP)

The Project Site is located entirely within the KLSD. KLSD has one STP, located on Rock Ridge Drive in the Town of Thompson, which is operated by the Town of Thompson. KLSD's STP is designed and permitted to treat 2 million gallons per day (mgd) of wastewater flow, as confirmed by the NYSDEC SPDES permit. According to the Superintendent of the STP, the plant currently treats between 300,000 and 500,000 gpd of wastewater. Wastewater capacity of 1 mgd at the STP has been allocated to Concord Associates, LP (CALP) pursuant to a certain Settlement Stipulation and Agreement, dated January 21, 2012. Therefore, the plant currently has available capacity to treat an additional 500,000 to 700,000 gpd ("excess capacity"). In addition, the KLSD STP can be expanded to accommodate additional future demand.

6.0 PROPOSED SANITARY SEWER SYSTEM

6.1 General Design Parameters

Although the full build-out of the Project will be constructed in phases, the proposed sanitary sewer system that will be constructed within the infrastructure scope for the initial phase is designed to convey and dispose of the wastewater estimated to be generated by the tributary development.

This report discusses the design parameters and details for the construction of the sanitary sewer system. In general, there will be new sanitary infrastructure in the following areas:

- Resort Entry Road beginning near the proposed bridge and proceeding north to Joyland Road;
- The northern portion of Resort Entry Road (north of intersection with Joyland Road),
- Thompsonville Road between Tannery Brook and the intersection of Chalet Road and Resort Entry Road.

The proposed sanitary system will ultimately convey the flow to the KLSD STP. This sanitary sewer system would include gravity and/or force main piping as well as associated pump stations, manholes, and lateral connections to proposed buildings. A sanitary sewer network of gravity sanitary sewer piping has been designed on the Casino site.

6.2 Proposed Wastewater Infrastructure

The development of the Proposed Project will require a sanitary sewer system and formation of a new sewer district. The Owner will construct this sanitary sewer system as part of the Proposed Project, and the system, within the public right-of-way, will subsequently be owned and maintained by the Town of Thompson. This sanitary sewer system would include gravity and/or force main piping as well as associated pump stations, manholes, and lateral connections to proposed buildings. The sanitary system will be divided into two systems:

6.2.1 Thompsonville Road Connection

This proposed sanitary sewer system would extend into Resort Entry Road and Chalet Road via gravity mains, or force mains in areas where the grades prohibit gravity flow. These mains would converge in a manhole in the vicinity of the intersection of Thompsonville Road and Resort Entry Road and convey the sewage along Thompsonville Road to Pump Station #1 located near the low point in Thompsonville Road west of the proposed Casino employee parking area. The sewage would then be pumped along Thompsonville Road to a sanitary manhole which is upstream of the connection point for the Casino and Hotel on-site system. From this manhole, the sewage would be conveyed via gravity main in Thompsonville Road to a manhole near the maintenance building driveway, in which it would converge with additional wastewater flows from the Paddock and Maintenance Building adjacent to the harness horse racetrack. From there, the sewage will enter Pump Station #2, constructed on the northern side of Thompsonville Road, and be pumped to a proposed manhole located at the northwest corner of the existing KLSD STP site. The sewage will then flow by gravity pipe connection to the existing manhole at the STP headworks. This portion of the collection system will be designed to convey flows from the Lake Club, Casino Resort complex, the Resort Core, the 18-hole Monster Golf Course and Golf Clubhouse, and the Family Resort Hotel areas. (See Appendix E for Sanitary Sewer Flow Map.)

6.2.2 Rock Ridge Drive Connection

This sanitary system is proposed to extend into Chalet Road and new private roads via gravity mains, and force mains in areas where the grades prohibit gravity flow. These mains will ultimately convey the sewage via gravity towards an existing sanitary line in Rock Ridge Drive. Wastewater will be conveyed to the KLSD STP through the existing sanitary lines. This portion of the collection system will be designed to convey flows from the Village, the Sporting Club, and the future residential development site along Rock Ridge Drive. Note the Rock Ridge Drive Connection is not part of the system required for the Casino Resort ‘A’, Golf, Casino Resort ‘B’, Entertainment Village and Recreation phases and is beyond the scope of this design report.

Although the Proposed Project would be constructed in phases, the sanitary infrastructure has been designed to accommodate the flows from the maximum build-out of the Proposed Project. For example, the sanitary main proposed to be constructed in the vicinity of Thompsonville Road to convey the wastewater flow from the initial phase to the existing KLSD STP, would be sized to handle not only the initial flows, but the additional flows from future phases as they are constructed.

As previously discussed, the KLSD STP has approximately 500,000 to 700,000 gpd of excess capacity. As subsequent phases of the Project are developed, the projected flows generated could eventually exceed the existing capacity of the STP, thereby potentially requiring modifications to the KLSD STP.

6.3 Sanitary Sewer Piping System

The sanitary sewer system has been designed in accordance with the requirements of the NYSDEC ‘88, and the Ten States Recommended Standards for Wastewater Facilities 2004 Edition. The gravity pipe

sizes throughout the system range from a minimum of 10-inches in diameter (exiting the Casino building) to 18-inches in diameter. At the Paddock and Maintenance buildings, 6-inch and 8-inch gravity sanitary pipes convey the small flows from these buildings to the system in Thompsonville Road. The pipes were designed with minimum slopes to ensure that under flowing full conditions, the minimum and maximum velocity parameters of 2 feet per second (ft/s) and 15 ft/s, respectively, are maintained. The piping material chosen for gravity flow condition is PVC SDR (Polyvinyl Chloride Standard Dimension Ration) 35 in accordance with the standards of the Town of Thompson.

As described above, the daily sanitary flow through the sanitary system has been calculated from the hydraulic loading rates provided in Table 3 of NYSDEC ’88. A detailed breakdown of the specific uses within each proposed development phase, specific to the Thompsonville Road connection, was prepared and sanitary unit flows were attributed to each use (see Sanitary Sewer Flow Calculations in Appendix A). The sanitary piping was sized to convey the cumulative flows from the different development areas of the Project, with a peaking factor of 4 applied to the average daily sanitary flow. Consistent with the NYSDEC ’88 requirements for design flow to sewage pumping stations, the peaking factor of 4 was chosen to provide the most conservative design of the network. The Specifications relevant to the sanitary sewer infrastructure can be found in Appendix B.

Sanitary manholes of a minimum 48-inch diameter are provided at all points of change of grade, size and alignment of sanitary gravity pipe, and at the terminus of all lines. The maximum spacing of the manholes is 400 feet. Drop pipe manholes have been specified at locations where the entering sewer is 2 feet above the invert of the exiting sewer. Further, in compliance with the requirements of the Town of Thompson, at all points of change in the force main alignment, chambers have been provided containing a two-way cleanout with gate valve and air release valve.

In accordance with NYSDEC requirements, grease interceptors will be provided on laterals emanating from all kitchen facilities within the Casino development to prevent grease and oil from entering the sanitary sewer system. Backflow prevention devices will be installed on the lateral ahead of the grease trap to ensure the kitchen waste does not re-enter the building system.

The force mains conveying the flow from the pumping stations to the gravity sewer structures are designed in accordance with the NYSDEC ’88 standards. The minimum force main diameter shall be 4-inches and the pipe material shall be PVC SDR 35. At maximum design flow, a minimum sewage velocity of 2 ft/s will be maintained in the force main. The force mains which will convey the flow from the pump stations are 10-inch and 12-inch; designed for the total flow at full build-out.

6.4 Pump Stations

Due to the topography of the area, it is necessary to construct pumping stations and force mains to convey the wastewater from low points in the system. The proposed pumping stations will be located adjacent to the northern side of Thompsonville Road, in an area outside the 100-year floodplain and adjacent wetland buffers. The NYSDEC’ 88 requires that an intermediate sized sewage treatment system that uses electrically operated pumps must contain either a backup pump or a backup storage tank capable of holding two days flow. The pump chamber will contain a set of dual alternating pumps and be equipped with associated NEMA (National Electrical Manufacturers Association) 4 electrical panel and controls, a high level float switch, and audible and visual alarms alerting the operator of malfunctions, allowing for the implementation of emergency procedures to prevent discharges of sanitary wastewater to the surface. The alarm shall be activated in cases of power failure, wet well high water levels, pump failure, unauthorized entry, or any other cause of pump station malfunction. A portable generator will provide backup power to the sanitary system pump stations. In addition, each of the sanitary pumping stations will be designed and constructed with flow meters recording the daily flows.

Wet well mounted pump stations manufactured by Smith & Loveless (S & L) have been chosen for this application. The pump stations are compact with a portion of the system above-grade. All station equipment mounts above the wet well for safe inspection and access at ground level. The wet wells are set below-grade. Further, these pump stations come complete with an easy-lift fiberglass enclosure (fitted with S & L gas shocks) which provides convenient access to all station equipment and protection from the elements.

While the sanitary piping system has been designed to convey the flow from the full build-out of the Project, the sanitary pump stations required a more flexible design that could accommodate the initial lower flows generated by the first phase of construction, and also the larger flows that would be produced as more phases were connected to the system. The solution was achieved by designing the pumps to handle the initial flows. In subsequent years, as additional phases commence construction and come on-line, rather than replacing the entire pump assembly, the pump impellers will be upgraded to handle the larger full build-out flows.

6.5 Design Calculations

Although the Project will be constructed in phases, in order to support the total wastewater conveyance requirements of the Project, the sanitary infrastructure is designed to accommodate the flows from the maximum build-out of the Project. Sanitary gravity pipe sizing was calculated by totaling estimated daily sanitary flows by construction phase for specific areas of development (refer to Sanitary Sewer Flow Calculations in Appendix A and Sanitary Sewer Flow Map in Appendix E). The detailed analysis follows:

6.5.1 Resort Entry Road

The sanitary network in Resort Entry Road (including the northern portion of Joyland Road) will accept the flow from the Resort Village, the Entertainment Village (movie theater and event field), an RV Park (to the south of the Casino parcel), and a Resort Hotel and Conference Center. The total daily sanitary flow from these uses is estimated to be 107,120 gpd, or a peak flow of 0.66 cubic feet per second (cfs). To design the piping system, a peak multiplier of 4 was applied to the total daily sanitary flow and the resulting flow rate converted to units of cfs. Using Manning's equation, it was calculated that a 12-inch sewer main running at a minimum slope of 1.25% provides a capacity of 3.98 cfs which is sufficient to convey the total flow from this portion of the development.

6.5.2 Chalet Road

A sanitary network is proposed within Chalet Road. Flow would be collected and conveyed from the Golf Course Clubhouse, Cottages, Waterpark, and a Resort Hotel, Spa Adventure and Tennis Center south along Chalet Road connecting to the sewer system located at the intersection of Thompsonville and Resort Entry Road. This system within Chalet Road will be designed in future phases of development. The total daily sanitary flow from this portion of the development is 241,724 gpd, or a peak flow of 1.50 cfs. This flow combines with the flow from the Resort Entry Road system to total 348,844 gpd, or a peak flow of 2.16 cfs, and will flow in a westerly direction from the Thompsonville Road / Resort Entry Road / Chalet Road intersection.

6.5.3 Thompsonville Road

The sanitary flow generated by the Entertainment Village located in the parcel at the southwest corner of the Chalet Road/Resort Entry Road/Thompsonville Road intersection will tie into the Thompsonville Road system. The full build out flow from the Entertainment Village uses, which consist of restaurants, retail space, a music venue, a billiards hall, a comedy club, a children's

activity center, and a bowling alley, totals 49,670 gpd, or a peak flow of 0.31 cfs. This flow, combined with the flow from the Chalet Road system and the Resort Entry Road system, totals 398,514 gpd, or a peak flow of 2.47 cfs. Since there may be several connection points, the locations of which are unknown at this time, the main in Thompsonville has been designed to accommodate this cumulative flow from the intersection at Resort Entry Road. A 12-inch main at a minimum slope of 4.90%, with a capacity of 7.89 cfs has been designed to efficiently convey the flow from the contributing adjacent areas based on the Comprehensive Development Plan (CDP), while preventing unnecessarily deep manholes and utility mains.

6.5.3.1. Pump Station No. 1

Where Thompsonville Road crosses United States Army Corps of Engineers (USACE) wetlands 33B and 34, there is a low point in the road. Near this low point, the sanitary flow is brought to Pump Station #1 which is located on the northern side of Thompsonville Road. From Pump Station #1, the flow is pumped via a 10-inch PVC force main to sanitary Manhole #107, where it becomes a gravity system. At this point, the gravity sanitary system also collects the wastewater flow from the Casino building, grandstand, and hotel, which amounts to 144,914 gpd or a peak flow of 1.79 cfs. Note due to the nature of these uses, it is anticipated that this flow will occur over a 12-hour period. The on-site flow is conveyed through a gravity sanitary system consisting of 10-inch, 12-inch and 15-inch PVC piping with varying slopes.

In the 2014 Build Year of the Project, 266,704 gpd of sanitary flow will be discharged through Pump Station #1 located on the northern side of Thompsonville Road. Pump Station #1 will consist of a duplex pumping system in accordance with the requirements of NYSDEC – ’88. This pump station was designed for conditions of 1,180 gallons per minute (gpm) at 36 feet total dynamic head (TDH). The pumps are 8 inch pumps with 20 horse power (HP) motors. The pump pit is 12 feet diameter to accommodate the minimum requirement for the pump operating capacity. The 12 feet diameter pit provides 846 gallons per foot storage. The operating distance between the start and stop floats is 1.5 feet; this provides a storage capacity of 1,269 gallons. The suction pipes will be 10 inches in diameter. These pumps are designed with a larger motor than necessary for this phase. When the sanitary flow from the future phases comes on-line in full build-out, equating to a total flow of 398,514 gpd, instead of replacing the entire pump and motor assemblies, the 12-inch impeller will be replaced with a 14-inch impeller. Note that although the motor is larger than needed during the early phases of construction, the pump station will only draw the horsepower needed for the 12-inch impeller. This provides a cost effective and timely method for upgrading the pumps to accept the maximum design flow.

During the initial phase, an 8-inch force main could be adequate to deliver the flow from Pump Station #1 to gravity sanitary Manhole #107; however, due to the velocity and friction losses in the pipe, the 8-inch force main would not meet future conditions without full replacement of the pump station. Therefore, we have determined a 10-inch force main will effectively handle both the initial and full build-out conditions, while allowing the full build-out flow at the Pump Station to be transferred with the change out of the impeller from 12-inch to 14-inch.

6.5.3.2. Pump Station No. 2

Between Pump Station #1 and Pump Station #2, the flow from the Casino Resort parcel and the second phase of the Hotel are conveyed from the Casino site to manholes in Thompsonville Road. Prior to reaching Pump Station #2, the sanitary flow generated from the Paddock and Maintenance Building for the horse racetrack, which equates to 4,014 gpd or a peak flow of 0.02 cfs, ties into the Thompsonville system at sanitary Manhole #103, located at the Paddock entrance driveway. The total combined full build-out flow of 547,442 gpd, or a peak flow of 4.28 cfs, is

conveyed via an 18-inch PVC sanitary gravity main, with a minimum slope of 0.50% (capacity of 7.43 cfs), and a maximum slope of 1.50% (capacity of 12.87 cfs), to Pump Station #2.

From Pump Station #2, sewage is pumped via a 12-inch PVC force main along an existing maintenance access path to proposed sanitary Manhole #114. Ten linear feet of 18-inch PVC gravity line connects the proposed manhole into the existing sanitary manhole at the headworks of the KLSD STP.

The design of Pump Station #2 was prepared using the same methodology as Pump Station #1. During 2014 Build Year of the Project, Pump Station #2 will accept 389,432 gpd from the Casino development. This pump station was designed for conditions of 1,500 gpm at 59 feet TDH. The pump pit is 10 feet by 12 feet to accommodate the minimum requirements for the pump operating capacity. The 10 feet by 12 feet pit provides 897 gallons per foot storage. The operating distance between the start and stop floats is 1.7 feet; this provides a storage capacity of 1,587 gallons. The suction pipes will be 10 inches in diameter. When the sanitary flow from full build-out is incorporated into the system, a total of 547, 442 gpd will pass through the pump station. To accommodate this flow, the pump impellers will be changed out from 12-inch to 14-inch impellers. An 8-inch, 10-inch and 12-inch force main were analyzed for velocity and friction losses, and the 12-inch force main was determined to be the best selection to convey the initial flow as well as the future full build-out flow to the sewage treatment plant.

See Appendix D for Pump Calculations.

6.5.4 Applicable Permits

The following permits are anticipated for the proposed project.

Table 6-1
Required Permits, Approvals and Involved Agencies

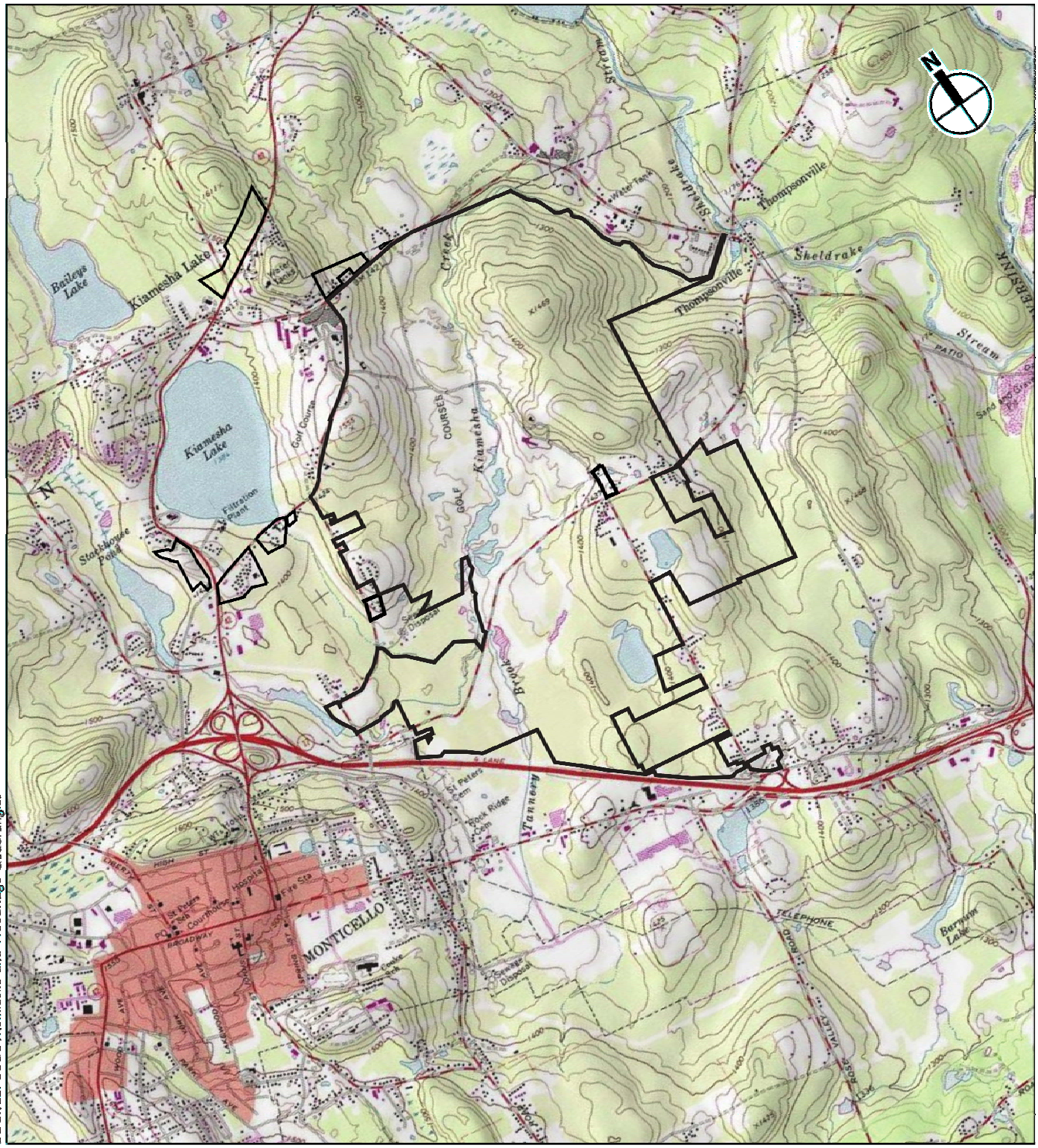
Approval/Permit/Review	Involved/Interested Agency
New York State Department of Environmental Conservation (NYSDEC)	
Article 15 Protection of Waters	NYSDEC
Article 24 Freshwater Wetland	NYSDEC
Water Quality Certification (Section 401)	NYSDEC
Threatened and Endangered Species (TES)	NYSDEC
CAFOS	NYSDEC
SPDES General Permit (GP-0-10-001) - SWPPP	NYSDEC
Sullivan County Planning and Environmental Management (SCPEM)	
Project Review (GML 239)	SCPEM
Swimming Pool Approval	SCPEM
Roadway Improvement Plans and Traffic Signal	SCDPW
Town of Thompson	
Approval of Planned Resort Development (PRD) and Comprehensive Development Plan (CDP)	Town Board - COMPLETED

Table 6-1
Required Permits, Approvals and Involved Agencies

Approval/Permit/Review	Involved/Interested Agency
Sewer Extension Approval	Planning Board
Site Plan Approval	Planning Board
Stripping of Land Approval	Planning Board
Subdivision Approval (as needed)	Planning Board
Water Service Connection	Department of Public Works (DPW)
Roadway Improvement Plant	Superintendent of Highways
New York State Department of Health (NYSDOH)	
Public Water Supply	NYSDOH
New York State Department of Transportation (NYSDOT)	
State Road Improvement	NYSDOT
Traffic Signal at Route 17 Exit 106 Interchange	NYSDOT
United States Army Corps of Engineers (USACE)	
Wetlands Permit	United States Army Corps of Engineers (USACE)
New York State Historic Preservation Office (SHPO)	
Section 106 and Section 14.09 Cultural Resources Coordination	SHPO
New York State Racing and Wagering Board	
Section 322 Approval	New York State Racing and Wagering Board
New York State Lottery	
Section 1617A Approval	New York State Lottery

The KLSD STP is also subject to state and regional regulation. As described above, the KLSD STP is currently permitted by New York State to treat 2 MGD of wastewater flow and is located within the Delaware River Basin. Therefore, the KLSD STP is also required to comply with the requirements of the Delaware River Basin Commission (DRBC) and is currently permitted under Docket No. D-89-11 CP. Any expansion of the plant to treat additional flows will require the approval of both NYSDEC and the DRBC. It is expected that if additional capacity is required at the STP, the KLSD and Town of Thompson will apply for, and secure, the necessary approvals.

FIGURES



APPLICANT

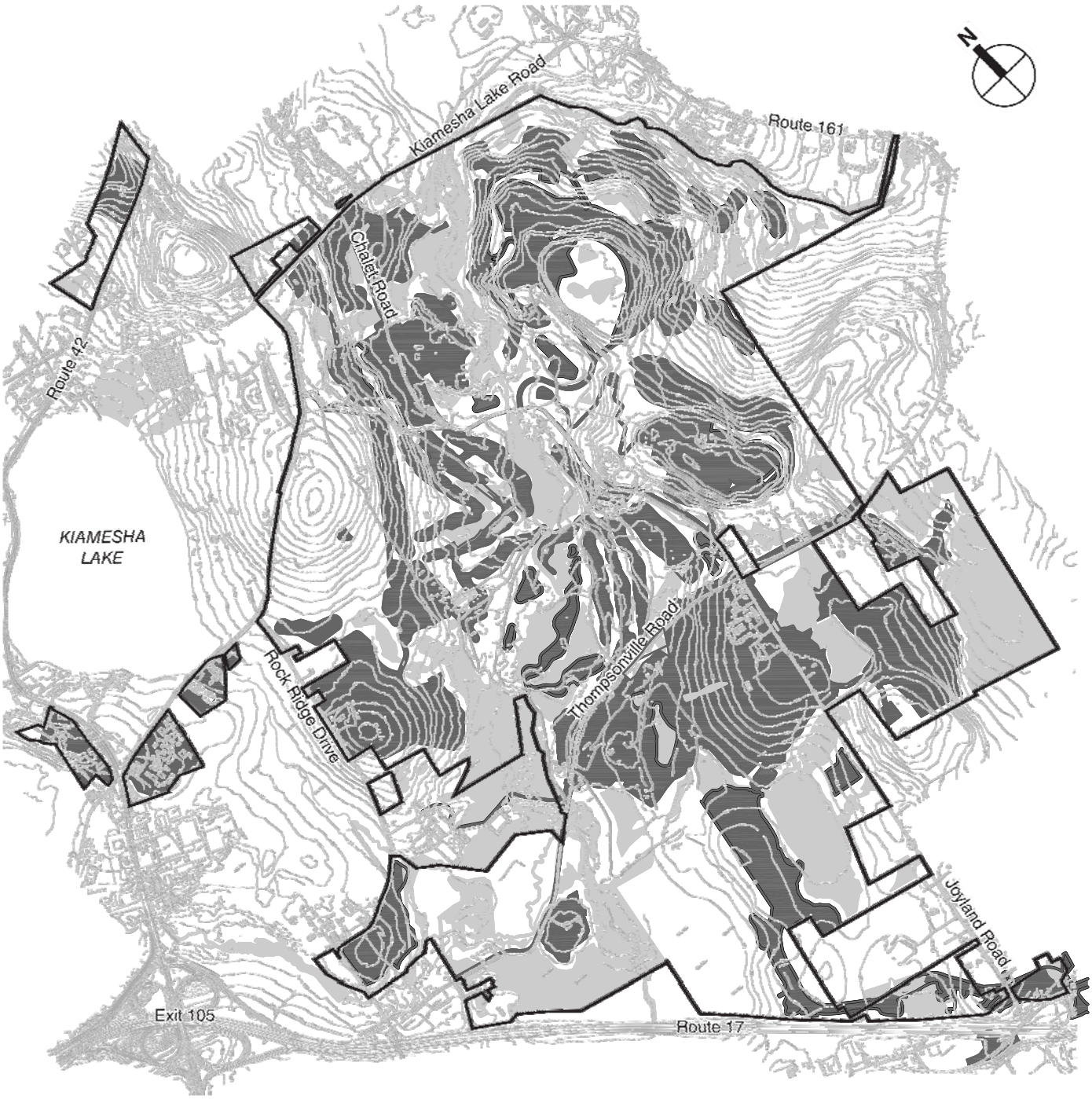
EPR CONCORD II, LP
909 WALNUT, SUITE 700
KANSAS CITY, MO 64106
(816) 472-1700 (PHONE)
(816) 472-5794 (FAX)

SITE / CIVIL ENGINEER

AKRF

AKRF ENGINEERING, P.C.
34 SOUTH BROADWAY, SUITE 401
WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)
(914) 949-7559 (FAX)

PROJECT		SHEET TITLE
EPT CONCORD RESORT SULLIVAN COUNTY THOMPSON, NEW YORK		VICINITY MAP
DRAWN BY MG	CHECKED BY JC	FIGURE 1
SCALE AS SHOWN	DATE 02/26/2014	



PROJECT SITE BOUNDARY
FEDERAL WETLAND AREAS
PROPOSED AREA OF DISTURBANCE

0 1000 2000 FEET
SCALE

APPLICANT
EPR CONCORD II, LP
909 WALNUT, SUITE 700
KANSAS CITY, MO 64106
(816) 472-1700 (PHONE)
(816) 472-5794 (FAX)

SITE / CIVIL ENGINEER
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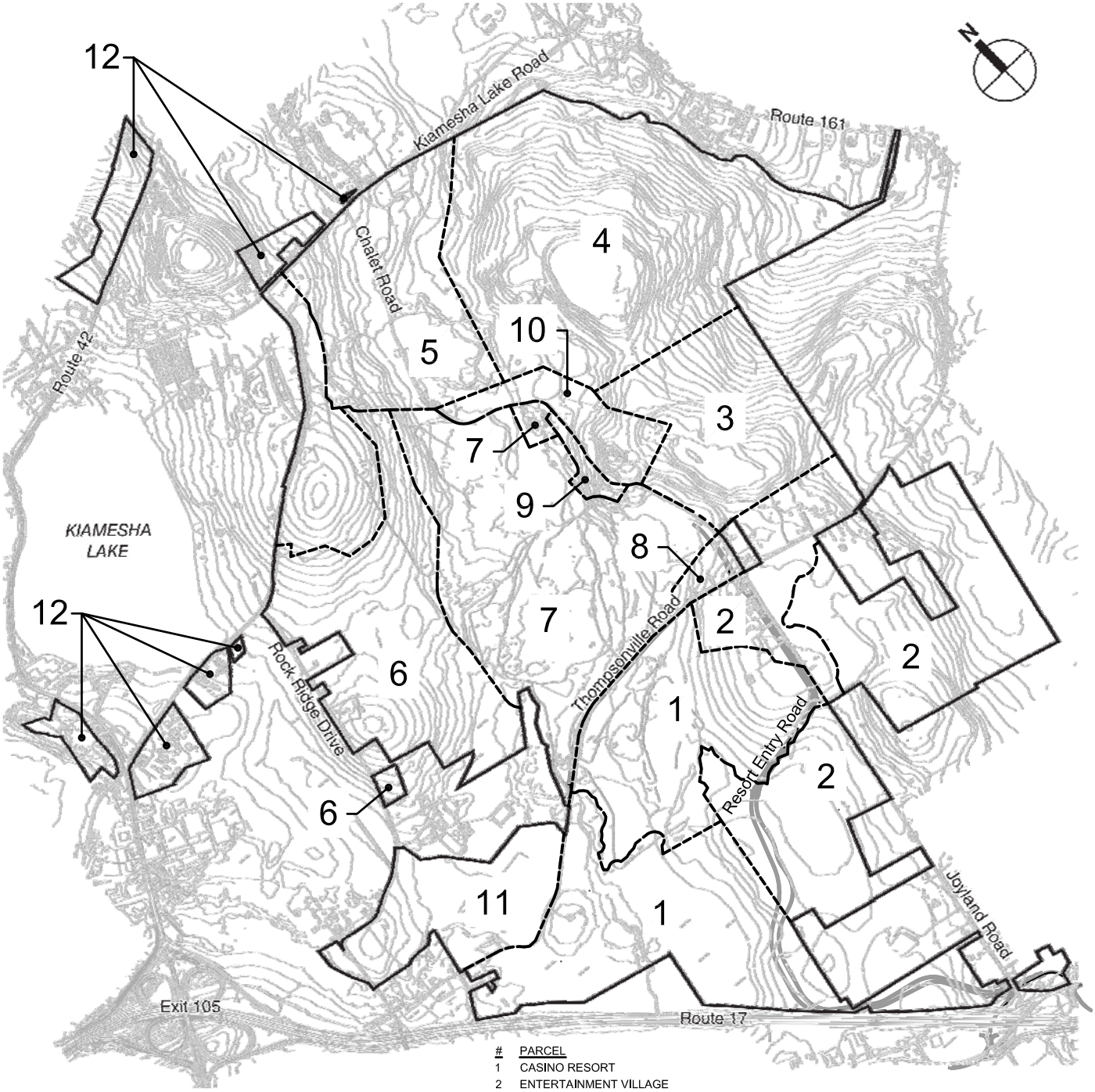
(914) 949-7336 (PHONE)
(914) 949-7559 (FAX)

PROJECT		SHEET TITLE
EPT CONCORD RESORT SULLIVAN COUNTY THOMPSON, NEW YORK		OVERALL DEVELOPMENT MAP
DRAWN BY MG	CHECKED BY JC	FIGURE 2
SCALE AS SHOWN	DATE 02/26/2014	



#	PARCEL
1	CASINO RESORT
2	ENTERTAINMENT VILLAGE
3	RESORT HOTEL
4	SPORTING CLUB / RESIDENTIAL
5	RESIDENTIAL VILLAGE
6	FUTURE DEVELOPMENT PARCEL
7	GOLF COURSE
8	GOLF MAINTENANCE
9	GOLF CLUBHOUSE & COTTAGES
10	RECREATION CORE
11	SOUTHWEST COMMERCIAL PARCEL
12	COMMERCIAL PARCELS

PROJECT SITE BOUNDARY
PARCEL BOUNDARY LINE

0 1000 2000 FEET
SCALE

APPLICANT
EPR CONCORD II, LP
909 WALNUT, SUITE 700
KANSAS CITY, MO 64106
(816) 472-1700 (PHONE)
(816) 472-5794 (FAX)

SITE / CIVIL ENGINEER
AKRF
AKRF ENGINEERING, P.C.
34 SOUTH BROADWAY, SUITE 401
WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)
(914) 949-7559 (FAX)

PROJECT		SHEET TITLE
EPT CONCORD RESORT SULLIVAN COUNTY THOMPSON, NEW YORK		PARCEL MAP
DRAWN BY MG	CHECKED BY JC	FIGURE 3
SCALE AS SHOWN	DATE 02/26/2014	

APPENDIX A

SANITARY SEWER FLOW CALCULATIONS

APPENDIX A - 1

EPT Concord Resort
Sanitary Sewer Flow Calculations

Land Use	Units		SANITARY UNIT FLOW (GPD)	Description	WATER DAILY DEMAND (GPD)	DAILY WATER DEMAND WITH WATER SAVING FIXTURES (20% REDUCTION WHEN APPLICABLE, GPD)	DAILY SANITARY FLOW (GPD)
Parcel 1 - Casino Resort 'A'							
- Casino	2,150	slots	5.0	per slot machine[1]	10,750	8,600	8,600
- Grandstand (53,409 sf)	500	seats	5	Sports Stadium (per seat)	2,500	2,000	2,000
- Employee Dining	250	seats	50	24-hour Restaurant (per seat)	12,500	10,000	10,000
- Restaurants	520	seats	50	24-hour Restaurant (per seat)	26,000	20,800	20,800
- Back of House	183,572	sf	0.1	Office (per sf)	18,357	14,686	14,686
Hotel Phase I	248	rooms	120	Hotel (per room)	29,760	23,808	23,808
- Hotel Amenities (Spa/Fitness 8,103 sf)	100	members	75	Country Club (per member)	7,500	7,500	7,500
- Hotel Pool (6,765 sf)	100	swimmers	10	Swimming Pools (per swimmer)	1,000	1,000	1,000
- Events Center (17,563 sf)	700	seats	50	24-hour Restaurant (per seat)	35,000	28,000	28,000
- Washing Machines	4	washing machines	580	Per washing machine	2,320	2,320	2,320
						Subtotal A:	**118,714**
Paddock (33,743 sf)	35,700	sf	0.1	Office (per sf)	3,374	3,374	3,374
Maintenance Building (11,612 sf)	2	toilets	400	Per toilet	800	640	640
						Subtotal B:	**4,014**
Window Washing				Window Washing [2]	4,800	4,800	0
Track Wetting				Track Wetting [3]	75,000	75,000	0

Sanitary Totals (A-1)	229,662	202,528	122,728
	WATER DAILY DEMAND (GPD)	DAILY WATER DEMAND WITH WATER SAVING FIXTURES WHEN APPLICABLE (20% REDUCTION, GPD)	DAILY SANITARY FLOW (GPD)

Restaurant Assumption

- Dining Space = 35% of the overall restaurant SF
- Number of seats = One (1) seat per every 15 SF of dining space

Sources:
1 - Rate from M/E Engineering per conference call on April 23, 2012.
2- Rate based on actual antipated demand by M/E Engineering per e-mail dated April 5, 2012 using 40 gpm for 2 hours.
3-Rate based on actual anticipated demand by JCJ Architectural per conference call on April 10, 2012.
All other rates from NYSDEC Design Standards for Wastewater Treatment Works

APPENDIX A - 2

EPT Concord Resort
Sanitary Sewer Flow Calculations

Land Use	Units		SANITARY UNIT FLOW (GPD)	Description	WATER DAILY DEMAND (GPD)	DAILY WATER DEMAND WITH WATER SAVING FIXTURES (20% REDUCTION WHEN APPLICABLE, GPD)	DAILY SANITARY FLOW (GPD)
Parcels 7, 8 , 9 - Golf							
Golf Course Clubhouse (20,000 sf)	200	Members	75	Country Club (per member)	15,000	12,000	12,000
Golf Cottages (6 cottages)	12	units	300	per 2 bedroom unit	3,600	2,880	2,880
Golf Course Maintenance Bldg (9,000 sf)	8	toilets	400	Per toilet	3,200	2,560	2,560
						Subtotal C:	**17,440**

Sanitary Totals (A-2)	**21,800**	**17,440**	**17,440**
	WATER DAILY DEMAND (GPD)	**DAILY WATER DEMAND WITH WATER SAVING FIXTURES WHEN APPLICABLE (20% REDUCTION, GPD)**	**DAILY SANITARY FLOW (GPD)**

APPENDIX A - 3

EPT Concord Resort
Sanitary Sewer Flow Calculations

Land Use	Units		SANITARY UNIT FLOW (GPD)	Description	WATER DAILY DEMAND (GPD)	DAILY WATER DEMAND WITH WATER SAVING FIXTURES (20% REDUCTION WHEN APPLICABLE, GPD)	DAILY SANITARY FLOW (GPD)
Parcel 1 - Casino Resort 'B'							
Hotel Phase II	250	rooms	120	Hotel (per room)	30,000	24,000	24,000
Casino Addition	100	slots	5	Slots (per machine)	500	400	400
Employees	150	employees	15	Per employee	2,250	1,800	1,800
						Subtotal D:	**26,200**
Parcel 2 - Entertainment Village							
Movie Theater	2,400	seats	3	40,000 sf - 12 screens	7,200	5,760	5,760
Event Field	400	people	10	Campground (Toilets Only)	4,000	4,000	4,000
						Subtotal E:	**4,000**
NY Wine & Market Components (20,000 sf)	467	seats	20	Tavern (100 seats)	9,333	7,467	7,467
Restaurant 1 (7,000 sf)	163	seats	35	Ordinary Restaurant (per seat)	5,717	4,573	4,573
Restaurant 2 (5,500 sf)	128	seats	35	Ordinary Restaurant (per seat)	4,492	3,593	3,593
Restaurant 3 (5,500 sf)	128	seats	35	Ordinary Restaurant (per seat)	4,492	3,593	3,593
Restaurant 4 (4,000 sf)	93	seats	35	Ordinary Restaurant (per seat)	3,267	2,613	2,613
Restaurant 5 (3,000 sf)	70	seats	35	Ordinary Restaurant (per seat)	2,450	1,960	1,960
Pub (3,500 sf)	82	seats	20	Tavern (per seat)	1,633	1,307	1,307
Music Venue (3,500 sf)	82	seats	5	Sports Stadium (per seat)	408	327	327
Billiards (3,000 sf)	70	seats	20	Tavern (per seat)	1,400	1,120	1,120
Gallery (5,000 sf)	117	seats	20	Tavern (per seat)	2,333	1,867	1,867
Kids Quest (10,000 sf)	100	people	15	Daycare w/Lunch	1,500	1,200	1,200
Comedy Club/Museum (10,000 sf)	233	sf	20	Tavern	4,667	3,733	3,733
Bowling Alley (35,000 sf)	28	lanes (18,000 sf)	75	Per lane	2,100	1,680	1,680
- Up-Scale Restaurant (3,000 sf)	70	seats	35	Ordinary Restaurant (per seat)	2,450	1,960	1,960
- Tavern (4,000 sf)	93	seats	20	Tavern (per seat)	1,867	1,493	1,493
- Retail/Rental Area	2,000	sf	0.1	Shopping Centers (per sf)	200	160	160
- Arcade/Fun Zone (Families) (5,000 sf)	117	seats	20	Tavern (per seat)	2,333	1,867	1,867
- Full Service Kitchen/Storage (3,000 sf)	70	seats	35	Ordinary Restaurant (per seat)	2,450	1,960	1,960
-Exterior Patio Dining Area (2,200 sf)	51	seats	35	Ordinary Restaurant (per seat)	1,797	1,437	1,437
						Subtotal F:	**49,671**
Resort Hotel	250	rooms	120	Hotel (per room)	30,000	24,000	24,000
- Washing Machines	4	washing machines	580	Per washing machine	2,320	2,320	2,320
Conference Center (50,000 sf)	1,000	seats	20	Banquet Facilities (per seat)	20,000	16,000	16,000
						Subtotal G:	**42,320**

Sanitary Totals (A-3)	**151,158**	**122,191**	**122,191**
	WATER DAILY DEMAND (GPD)	**DAILY WATER DEMAND WITH WATER SAVING FIXTURES WHEN APPLICABLE (20% REDUCTION, GPD)**	**DAILY SANITARY FLOW (GPD)**

Restaurant Assumption

- Dining Space = 35% of the overall restaurant SF
- Number of seats = One (1) seat per every 15 SF of dining space

APPENDIX A - 4

EPT Concord Resort
Sanitary Sewer Flow Calculations

Land Use	Units		SANITARY UNIT FLOW (GPD)	Description	WATER DAILY DEMAND (GPD)	DAILY WATER DEMAND WITH WATER SAVING FIXTURES (20% REDUCTION WHEN APPLICABLE, GPD)	DAILY SANITARY FLOW (GPD)
Parcels 2, 3, 5, 10 - Recreation							
RV Park							
- RV Lots/Spaces	180	units	300	Per Trailer	54,000	54,000	54,000
- Clubhouse, General Store, Mini Golf	60,000	sf	0.1	Shopping Centers	6,000	4,800	4,800
- Pools	200	people	10	Swimming Pool (per swimmer)	2,000	2,000	2,000
						Subtotal H:	**60,800**
Resort Hotel (183,000 sf)	550	rooms	120	Hotel (per room)	66,000	52,800	52,800
Waterpark (Indoor + Outdoor)	115,000	sf	0.0	Waterpark 4	160,000	160,000	160,000
Spa Adventure (7,500 sf)	100	members	75	Country Club (per member)	7,500	7,500	7,500
Tennis Center (13,728 sf)	56	court for 8 hours	80	Racquet (per court per hour) assume	4,480	3,584	3,584
Existing Chalet	5,000	sf	0.1	Office (per sf)	500	400	500
						Subtotal I:	**224,284**

Sanitary Totals (A-4)	**300,480**	**285,084**	**285,084**
	WATER DAILY DEMAND (GPD)	**DAILY WATER DEMAND WITH WATER SAVING FIXTURES WHEN APPLICABLE (20% REDUCTION, GPD)**	**DAILY SANITARY FLOW (GPD)**

Source:
4-Waterpark usage based on April 2008 article by Hotel and Leisure Advisors.

APPENDIX A - 5

EPT Concord Resort
Sanitary Sewer Flow Calculations

Land Use	Subtotal	DAILY SANITARY FLOW (GPD)
Sanitary Totals (A-1)		
	Subtotal A:	**118,714**
	Subtotal B:	**4,014**
Sanitary Totals (A-2)		
	Subtotal C:	**17,440**
Sanitary Totals (A-3)		
	Subtotal D:	**26,200**
	Subtotal E:	**4,000**
	Subtotal F:	**49,671**
	Subtotal G:	**42,320**
Sanitary Totals (A-4)		
	Subtotal H:	**60,800**
	Subtotal I:	**224,284**

Sanitary Totals (A-5)		**547,443**
		DAILY SANITARY FLOW (GPD)

APPENDIX B
SPECIFICATIONS

SECTION 312000 EARTH MOVING (Walks, Pavements, Utilities)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 01 Specification Sections, apply to this Section.

B. Subsurface Investigation Report prepared by Melick-Tully and Associates, P.C.

C. Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sediment Controls and Sequence of Construction.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks, pavements, utility structures, stormwater management and bioretention basins, turf and grasses and plants.
2. Subbase course for concrete walks and pavements.
3. Excavating and backfilling for utility trenches.
4. Soil restoration.
5. Fill material for underdrains.
6. Fill material for bioretention soils.
7. Rock removal.

B. Related Sections:

1. Section 311000 “Site Clearing”.
2. Section 312513 “Erosion Controls”.
3. Section 321216 “Asphalt Paving”.
4. Section 321313 “Concrete Paving”.
5. Section 329219 “Seeding”.
6. Section 329223 “Sodding”.
7. Section 329300 “Plants”.
8. Section 331116 “Site Water Utility Distribution Piping”.
9. Section 333100 “Sanitary Utility Sewerage Piping”.
10. Section 333216 "Packaged Utility Wastewater Pumping Stations”.
11. Section 333400 "Sanitary Utility Sewerage Force Mains”.
12. Section 334100 “Storm Utility Drainage Piping”.
13. Section 337119 "Electrical Underground Ducts and Manholes”.

1.3 REFERENCES

A. New York State Department of Transportation (NYSDOT) 2008 Standard Specifications.

B. New York State Department of Environmental Conservation (NYSDEC), New York State Standards and Specifications for Erosion and Sediment Control, 2005 or latest edition ("Blue Book").

C. Town of Thompson Town Code.

D. Occupational Safety and Health Administration (OSHA) Excavation Regulations, latest edition.

1.4 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

C. Bioretention Soil Media: Engineered soil blend for use in stormwater treatment system.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Crushed Stone: Natural, non-friable crushed material used for drainage and granular backfill.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

G. Engineered Fill: Soil materials used to raise existing grades and placed under controlled conditions.

H. Pea Gravel: Natural non-friable rounded material to be used as filter blanket for porous pavement.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cubic yard for bulk excavation or ¾ cubic yard for footing trench, and pit excavation that cannot be removed by rock excavating equipment without systematic drilling, ram hammering, ripping, or blasting, when permitted.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within structures.

1.5 SUBMITTALS

A. Materials Source: Submit name of imported materials source.

B. Material Test Reports: For each soil material proposed for fill and backfill.

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.

C. Product Data: Submit gradation, maximum wash loss, minimum durability index, maximum abrasion loss, air voids.

1.6 QUALITY ASSURANCE

A. Pre-excavation Conference: Conduct conference at Project site.

B. Field quality-control test reports.

1.7 PROJECT CONDITIONS

A. Do not commence earth moving operations until temporary erosion and sedimentation control measures, specified in Section 312513 “Erosion Controls” are in place.

B. Rock removal may be required for deeper excavations. Contractor to refer to and comply with Town of Thompson Town Code for rock removal.

C. Provide groundwater and runoff controls consisting of drains and diversions or additional measures, as necessary, so as to maintain dry excavations. Implement in accordance with the SWPPP and regulations of the New York State Department of Environmental Conservation (NYSDEC).

D. Provide erosion and sediment controls and construction sequencing in accordance with the SWPPP and regulations of the New York State Department of Environmental Conservation.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940. Meet NYSDOT 2008 Standard Specifications Type 4 gradation.

B. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve, not more than 15 percent (by weight) passing a No. 200 sieve, and a maximum particle size of 6 inches.

C. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and no fines (no material passing a No. 200 sieve).

D. Drainage Course, Choker Course and Reservoir Course for bioretention basins, asphalt porous pavement. All stone must be clean washed stone from the quarry or material producer as identified below.

US Standard Sieve Size (inches)	Drainage Course/Choker Course (AASHTO No. 57) Percent Passing	Reservoir Course (AASHTO No. 3) Percent Passing
2.5		100
2		90-100
1.5	100	35-70
1	95-100	0-15
¾		
½	25-60	0-5
3/8		
No.4	0-10	
No.8	0-5	
% Compaction (ASTM D698/AASHTO T99)	**95%**	**95%**

E. Filter Blanket for Porous Pavement: uniformly graded, clean washed, 3/8-inch Pea Gravel.

F. Bioretention Areas:

1. 12-inch Drainage Course
2. Bioretention Soil Media Characteristics:
   a. pH Range: 5.2 to 7.0.
   b. Organic Matter: 1.5 to 4.0%
   c. Magnesium: minimum 35 pounds per acre.
   d. Phosphorous (P205): minimum 75 pounds per acre.
   e. Potassium (K20): minimum 85 pounds per acre.
   f. Soluble Salts: 500 ppm.
   g. Clay: 10 to 25%.
   h. Silt: 30 to 55%.
   i. Sand: 35 to 60%.

G. Subsurface Drain – Drainage Course specified in the above table to be used as the stone fill within these drains.

H. Granular Backfill – ¾ inch clean, crushed stone.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored to comply with local practice or requirements of authorities having jurisdiction.

B. Filter Fabric: 140N by Mirafi, or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection and all frost damaged soils before placing subsequent materials.

D. Perform all excavations in accordance with current OSHA safety requirements. Excavation side slope support shall be provided using soldier piles and lagging, where necessary.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Any excavations resulting from demolition and utility removal to be backfilled with compacted engineered fill.

C. Contractor shall provide all equipment, labor and acceptable means necessary to maintain dry excavations at all times. No changes in the Contract Sum or the Contract Time will be authorized for dewatering, treatment, or disposal of water.

3.3 ROCK REMOVAL

A. Refer to and comply with Town of Thompson Town Code for any rock removal.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR STORMWATER MANAGEMENT AND BIORETENTION BASINS

A. Excavate surfaces to indicated lines, cross sections, elevations, and subgrades.

B. Sequence Work so as to avoid densifying the soil subgrade within areas where porous pavement and bioretention areas will be constructed.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

   1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

   1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

   1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
   2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.7 SUBGRADE INSPECTION

A. Proof-roll subgrade below the pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Place and compact final backfill of satisfactory soil to final subgrade elevation.

E. Install detectable warning tape directly above utilities, 12 inches below finished grade.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks, pavements, and utility structures, use engineered fill.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials below to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 98 percent.

D. Compact drainage course, choker course, reservoir course soil materials to not less than 95 percent according to ASTM D 698.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from structures and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1/2 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Protect prepared areas from damage.

3.14 SUBBASE COURSE UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Shape subbase course to required crown elevations and cross-slope grades.
2. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

3. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 1557.

3.15 SOIL RESTORATION

A. The Contractor will be required to complete soil restoration in the areas of the proposed pervious surfaces once final grade has been achieved in these areas. The type of soil restoration will depend on the type of soil disturbance and the type of hydrologic soil group. The Contractor will be required to complete soil restoration in conformance with the various methods outlined in the following table:

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not permitted		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A &B	HSG C&D	Protect area from any ongoing construction activities.
	Apply 6 inches of topsoil	Aerate and apply 6 inches of topsoil	
Areas of cut or fill	HSG A &B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 330513 MANHOLES AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Modular precast concrete manhole and structures with tongue-and-groove joints, covers, anchorage, and accessories.
2. Catch basins.
3. Stormwater inlets.
4. Outlet control structures.
5. Flared end sections.
6. Flow diversion structures.

B. Related Sections include the following:

1. Section 333100 “Sanitary Utility Sewerage Piping”.
2. Section 333400 “Sanitary Utility Sewerage Force Mains”.
3. Section 334100 “Storm Utility Drainage Piping”.

1.3 REFERENCES

A. American Concrete Institute:

1. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:

1. ASTM C55 - Standard Specification for Concrete Brick.
2. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).
3. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
4. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
5. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
6. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals.

1.4 SUBMITTALS

A. Shop Drawings: Indicate manhole and structure locations, elevations, piping, and sizes and elevations of penetrations.

B. Product Data: Submit cover and frame construction, features, configuration, and dimensions.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with New York State Department of Environmental Conservation and Town of Thompson standards.

B. Section 014000 "Quality Requirements" and Section 017000 "Execution and Closeout Requirements": Field inspecting, testing, adjusting, and balancing.

C. Test concrete manhole and structure sections in accordance with ASTM C497.

D. Precast Unit Manufacturer: Company specializing in the production of precast concrete site structures shall have a minimum of five years experience.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Cement - Shall conform to ASTM C150, Type II, and shall be of the non air-entrained types:

1. Admixtures: The use of admixtures shall comply with the requirements of the Building Code. The final soluble chloride content in concrete, percent by weight of cement, due to the addition of admixtures and other ingredients shall not exceed .05 at 28 days.

B. Air-entraining admixtures shall conform to ASTM C260.

C. Chemical admixtures shall conform to ASTM C494.

D. Slag cement: ASTM C989, Grade 100 or 120. Shall be GranCem slag cement as manufactured by the St. Lawrence Cement Company. The amount of cement required by the Building Code may be reduced by 8% as per the code with the use of slag cement that has been reviewed and approved by the Engineer.

E. Water - Shall be clean potable water free of injurious foreign matter conforming to the requirements for water specified in ASTM C94.

F. Aggregates

1. Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as the combination of sizes when two or more are used,

shall conform to the appropriate grading requirements of the applicable ASTM specifications. Maximum size of coarse aggregate shall conform to paragraph 3.3.3 of ACI 318. Aggregates shall conform to ASTM C33 and be of Size No.67 or No.8.

G. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

H. Concrete Reinforcement

1. Reinforcing Bars: All reinforcing bars shall be of deformed type of new billet steel conforming to current requirements of ASTM A615/A 615M, grade 60. No rail or re-rolled steel will be permitted.
2. Welded Steel Wire Fabric: Wire Fabric shall conform to the requirements of ASTM A185/ A 185M, steel, welded wire fabric, plain.

2.2 TRAPS

A. Neenah Foundry Co. # R-3701 trap, cast iron or equal product manufactured by Campbell Foundry or McKinley Iron Works, Inc.

2.3 PRECAST UNIT STEPS/RUNGS

A. Campbell Foundry Co. Pattern #2592 (cast iron, diamond non-skid design) or equal product manufactured by Neenah Foundry or McKinley Iron Works, Inc. with stainless bolts and washers with Ackerman-Johnson Expansive Screw Anchors (Cat. No. 762-62, with non-corrosive brass cones) and 1/4-inch thick neoprene gaskets.

1. M.A. Industries Inc. Model PS-4-B copolymer polypropylene plastic surrounding 1/2-inch diameter grade 60 reinforcement.

2.4 SELF-SEALING BUTYL GASKET

A. 7/8" x 7/8" or 1" diameter conforming to Federal Specifications SS-S-00210.

B. Expansion Screw Anchors with malleable lead shields in accordance with Federal Specifications FF-S-325C, Group 1, Type 1, Class 1.

2.5 INTERIOR COATING

A. Two component high solids epoxy polyamide coating in accordance with ANSI/NSF Standard 61 meeting the performance characteristics of Tnemec Series 66 Hi-Build Epoxoline or Carboline Carboguard 888.

2.6 EXTERIOR COATING

A. Two component coal tar-epoxy coating meeting the performance characteristics of Tnemec 46-413 Tneme-Tar or Carboline Bitumastic 300M.

2.7 MANHOLES

A. Standard Precast Concrete Manholes

1. Description: ASTM C 478 precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: FRP ladder wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch-diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SEWER."
2. Material: ASTM A 536 ductile iron unless otherwise indicated.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

   a. Invert Slope: 2 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

2.8 DRAINAGE SPECIALTIES: PRECAST, POLYMER-CONCRETE UNITS

A. Catch Basins:

1. 24-by-12-inch polymer-concrete body, with outlets in quantities and sizes indicated.
2. Gray-iron slotted grate.
3. Frame: Include gray-iron or steel frame for grate.

B. Oil Interceptors:

1. Polymer-concrete body with interior baffle and four steel support channels and two 1/4-inch-thick, steel-plate covers.
2. Steel-plate covers.

2.9 CATCH BASINS

A. Standard Precast Concrete Catch Basins

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
4. Top Section: As indicated on the Drawings.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
8. Steps: FRP ladder wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: As shown on the Drawings.

2.10 OUTLET CONTROL STRUCTURE

A. Pre-cast concrete structure with rectangular grate opening and orifices as specified on the Drawings and associated schedule.

2.11 FLOW DIVERSION STRUCTURE

A. Pre-cast concrete structure with interior weir and inlet grate and/or manhole frame and cover as specified on the Drawings and associated schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 “Administrative Requirements”: Verification of existing conditions before starting work.

B. Verify items provided by other sections of Work are properly sized and located.

C. Verify built-in items are in proper location, and ready for roughing into Work.

D. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.3 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.4 STRUCTURE INSTALLATION

A. Install precast units at locations shown on the Drawings; place level and plumb, and to proper depths. Catch basins are to be placed to ensure that the long direction of the slot of the grating will be perpendicular to the flow of pedestrian traffic. Coordinate with pipe connection locations. Install butyl gaskets at joints on both horizontal surfaces of keyed

joint, in such manner to seal each joint completely, providing adequate lap. One 9" or less diameter opening per unit is permitted to be core drilled in the field due to fabrication errors. Any other unit requiring greater diameter or greater opening shall be rejected.

B. Install precast collars and manhole brick set in Type M mortar to allow for placement of the covers at the correct rim invert elevation.

C. Install cast iron frames and covers, and traps, as detailed on the Drawings and as recommended by the manufacturer. Grates are to be placed with the long direction of the slot perpendicular to the flow of pedestrian traffic when placed in walkways.

D. Units with large spalls (greater than 2" in depth and 2 SF in area) and openings greater than 9" in diameter placed in the wrong location are rejected and shall be replaced. Minor spalls and openings 9" or less placed in the wrong location are to be patched as follows:

1. Roughen surface or perimeter of opening to a fractured aggregate surface.
2. In openings, drill and install a minimum of four 1/2" diameter stainless steel expansion anchors with 4" extension.
3. At openings, install butyl sealant around perimeter.
4. Apply slurry coat of hydraulic repair mortar of type approved by the A/E of Record to all surfaces to receive repair mortar.
5. Install hydraulic repair mortar to match existing contours and thicknesses of members.

E. After installation of the precast units and before backfilling, provide protective coatings as follows:

1. Interior: If the first coat was applied in the shop, lightly clean and roughen the surface and touch up areas of damage with the same coating. Apply a second coat at 4.0 mils DFT. If both coats are to be applied in the field, apply each coat at 4.0 mils DFT per coat, allowing the manufacturer's recommended cure time between coats. If second coat is not installed within manufacturer's specified time parameters, lightly roughen prior to second coat.
2. Exterior, for those surfaces and units designated to receive it: If the first coat was applied in the shop, lightly clean and roughen the surface and touch up areas of damage with the same coating. Apply a second coat at 8.0 mils DFT. IF both coats are to be applied in the field, apply each coat at 8.0 mils DFT per coat, allowing the manufacturer's recommended cure time between coats. If second coat is not installed within manufacturer's specified parameters, lightly roughen prior to second coat.

F. Make pipe-to-precast unit connections using non-shrink grout.

3.5 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipaters at outlets, as indicated.

3.6 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

END OF SECTION 330513

SECTION 333100 SANITARY UTILITY SEWERAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Sanitary sewage pipe.
2. Underground pipe markers.
3. Bedding and cover materials.

B. Related Sections include the following:

1. Section 312000 “Earth Moving”.
2. Section 330513 “Manholes and Structures”.
3. Section 333216 “Packaged Utility Wastewater Pumping Stations”.

1.3 REFERENCES

A. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft3).
2. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
3. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
4. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
7. ASTM D3034 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, SDR 35.

B. New York State Department of Environmental Conservation Design Standards for Wastewater Treatment Works – 1988

C. Recommended Standards for Wastewater Facilities (Ten State Standards) 2004 Edition

1.4 SUBMITTALS

A. Section 013000 “Administrative Requirements”.

B. Product Data: Submit data indicating pipe material used, and pipe accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify piping and connections meet or exceed specified standards.

E. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the standards of the Town of Thompson, New York State Health Department, and the Ten State Standards, including installation and testing. Sewer pipes shall not exceed the infiltration or exfiltration test rate of one hundred gallons per day/mile/inch diameter using a minimum positive head of 2 feet, or any other requirement set forth by the Town of Thompson.

B. Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities. All costs related to re-inspection, or additional work, shall be paid for by the Contractor at no additional expense to the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 “Product Requirements”: Requirements for transporting, handling, storing, and protecting products.

B. Do not place materials on private property without written permission of property owner.

C. During loading, transporting and unloading, exercise care to prevent damage to materials.

D. Do not drop pipe or fittings.

E. Avoid shock or damage to pipe.

F. Take measures to prevent damage to exterior surface or internal lining of pipe.

G. Do not stack pipe higher than recommended by pipe manufacturer.

H. Store gaskets for mechanical and push-on joints in cool, dry location out of direct sunlight and not in contact with petroleum products.

1.7 COORDINATION

A. Section 013000 “Administrative Requirements”: Coordination and project conditions.

B. Coordinate the Work with sanitary sewer connections to the pump stations, and trenching and backfilling.

PART 2 - PRODUCTS

2.1 SANITARY SEWAGE PIPE

A. Plastic Pipe (for diameters 4 inches to 18 inches): ASTM D3034, SDR 40, Poly Vinyl Chloride (PVC) material; bell and spigot style rubber ring sealed gasket joint.

1. Fittings: ASTM D3034, PVC with bell ends.
2. Joints: ASTM F477, elastomeric gaskets.

2.2 UNDERGROUND PIPE MARKERS

A. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sewer Service" in large letters.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type as specified in Section 312000 “Earth Moving”.

B. Cover: Fill Type as specified in Section 312000 “Earth Moving”.

C. Soil Backfill from Above Pipe to Finish Grade: Soil Type as specified in Section 312000 “Earth Moving”. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Correct over excavation with fine aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Lay pipe to slope gradients noted on Composite Utility Drawings, with maximum variation from indicated slope of 1/8 inch in 10 feet.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches.

D. Refer to Section 312000 “Earth Moving” for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Install trace wire continuous over top of pipe.

F. When installing pipe under streams or other obstructions that cannot be disturbed, use pipe-jacking process, microtunneling, or horizontal directional drilling.

G. Flushing Sewers: Flush all sanitary sewers with water in sufficient volume to obtain free flow through each line. Remove any obstructions and correct any defects discovered.

3.4 CLOSEOUT SUBMITTALS

A. Section 017000 “Execution and Closeout Requirements”.

B. Project Record Documents: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

END OF SECTION 333100

SECTION 333216 PACKAGED UTILITY WASTEWATER PUMPING STATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Packaged pumping stations.
2. Initial operation of packaged pumping stations.

B. Related Sections:

1. Section 312000 “Earth Moving”.
2. Section 330513 “Manholes and Structures”.
3. Section 333100 “Sanitary Utility Sewerage Piping”.
4. Section 333400 “Sanitary Utility Sewerage Force Mains”.
5. Section 335000 “Engine Generator for Pumping Stations”.
6. Section 337119 “Electrical Underground Ducts and Manholes”.

1.2 REFERENCES

A. ASTM International:

1. ASTM A-36 – Standard Specification for Carbon Structural Steel
2. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
3. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
4. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

1.3 SYSTEM DESCRIPTION

A. The Contractor shall furnish and install two (2) factory built, automatic pumping stations as manufactured by Smith & Loveless, Inc., Lenexa, Kansas. The stations shall be complete with all needed equipment, factory installed in a rectangular, dual compartment welded steel chamber consisting of a separate entrance to the wet well and an equipment chamber. The equipment chamber shall have two separate fiberglass covers.

B. The principal items of equipment shall include two vertical, close coupled, motor driven, vacuum primed, non-clog pumps; valves; internal piping; central control panel with circuit breakers; motor starters and automatic pumping level controls; lighting; ventilating blower; priming pumps with SONIC START® pump prime detection system and appurtenances; and all internal wiring.

C. Pumping Station #1: The station shall be constructed in one complete factory-built assembly. It shall be sized to rest on top of the wet well as detailed in the Drawings.

1. Pumping Station RWWMPS as manufactured by Smith & Loveless, Inc.
2. Wet Well: Concrete, 12'-0" diameter circular opening, depth as shown on Drawings.
3. Duplex Pumping System as meet the pump curves shown on the Drawings.
4. Supporting floor: Minimum 1/2" thick steel to prevent deflection.
5. Shell: 1/4" minimum thickness steel plate formed and welded to create a minimum 6'-3" by 8'-0" equipment chamber with a minimum inside height of 6'-7".
6. Manway: 3'-0" x 3'-0" for access to wet well.

D. Pumping Station #2: The station shall be constructed in one complete factory-built assembly. It shall be sized to rest on top of the wet well as detailed in the Drawings.

1. Pumping Station RWWMPS as manufactured by Smith & Loveless, Inc.
2. Wet Well: Concrete, 10'-0"x 12'-0" rectangular opening, depth as shown on Drawings.
3. Duplex Pumping System as meet the pump curves shown on the Drawings.
4. Supporting floor: Minimum 1/2" thick steel to prevent deflection.
5. Shell: 1/4" minimum thickness steel plate formed and welded to create a minimum 6'-3" by 8'-0" equipment chamber with a minimum inside height of 6'-7".
6. Manway: 3'-0" x 3'-0" for access to wet well.

E. All internal clearances shall meet or exceed N.E.C. requirements.

F. Steel plate shall meet or exceed ASTM A-36 specifications.

G. The pump casings and discharge piping shall be mounted in relation to the station floor as detailed in the construction drawings. All pump components and station piping, including the suction pipe connections, shall be removable without having to enter the wet well. The suction and discharge connections, where they pass through the floor, shall be sealed gas-tight by gaskets, rather than being welded, to allow adjustment, replacement and prevent pipe strain.

H. The equipment chamber shall be physically separated from the wet well. Wet well access shall be completely separate from the equipment chamber and shall be provided with the access manway exposed only to the atmosphere.

I. The equipment chamber shall be provided with two (2) separate fiberglass covers, one over the pumps and piping and the other over the control section, hinged at the center support channel. The fiberglass covers shall be formed with a drip lip around the edges. Lockable pneumatic shocks shall be provided to assist in opening the covers, support them in the open position and to restrain them under load. An aluminum ladder with a 3' safety extension bar shall be located in the station to provide easy access. The safety extension shall be of telescoping aluminum construction, and shall lock securely in the "Up" position. Only one segment of the fiberglass cover need be opened for personnel access into the equipment chamber, but either or both may be opened for equipment access. A single cover will not be acceptable due to weight. The fiberglass two-piece cover shall be made of molded reinforced orthophthalic polyester resins with a minimum of 30% glass fibers with a minimum average length of 1-1/4". The outside of the enclosure shall be coated with a polyester protective in-mold coating for superior resistance to weathering, ultraviolet radiation,

yellowing and chalking. The completed fiberglass enclosure shall be resistant to mold, mildew, fungus and corrosive liquids and gasses normally found in pump station environments.

J. A 1/4" hinged aluminum manway cover located exterior to the pump chamber shall be provided. The manway shall be 36" x 36" minimum for pumping station #1 and 36" x 36" minimum for pumping station #2 and be an integral part of the station head plate and shall provide access into the wet well. Both equipment chamber and wet well access covers shall be provided with arrangements for padlocking. The manway cover shall have a three-color 7" x 10" (minimum size) corrosion-resistant sign permanently affixed to it, reading "DANGER – Before Entering, Test for Explosive Atmosphere. Test for Oxygen Deficiency. Supply Fresh Air to Work Area".

K. A lifting socket shall be welded to the wall for each pump. A stanchion with lifting arm shall be provided to support a hoist (provided by others) for removal of the motors, impellers and pumps.

L. Two (2) adjustable 10" by 36" aluminum shelves shall be mounted on 6' long slotted aluminum struts on the wall opposite the control panel, for the operator's use or for auxiliary equipment mounting.

1.4 DESIGN REQUIREMENTS

A. Design operating conditions of the pumping stations are as follows:

1. Pumping Station #1:

   a. Maximum flow: 1,180 gpm.
   b. Total dynamic head: 40 feet.
   c. Maximum allowable speed: 900 RPM.
   d. Operating point: 1,180 gpm at 36 ft TDH.
   e. Maximum rated horsepower of each pump motor: 20 Hp.
   f. The minimum pump efficiency at the design point shall be 70%. Due to energy conservation requirements, the specified minimum efficiency shall be enforced.
   g. Provide 8D4D Pumps by Smith & Loveless, Inc.

2. Pumping Station #2:

   a. Maximum flow: 1,550 gpm.
   b. Total dynamic head: 110 feet.
   c. Maximum allowable speed: 1,170 RPM.
   d. Operating point: 1,500 gpm at 59 ft TDH.
   e. Maximum rated horsepower of each pump motor: 40 Hp.
   f. The minimum pump efficiency at the design point shall be 70%. Due to energy conservation requirements, the specified minimum efficiency shall be enforced.
   g. Provide 8D4D Pumps by Smith & Loveless, Inc.

B. All openings and passages, in the pumps, piping, fittings, check valves and plug valve, shall be large enough to permit the passage of a sphere 3" in diameter.

C. The pump motors shall not be overloaded beyond their nameplate rating, at the design conditions, nor at any head in the operating range.

1.5 PERFORMANCE REQUIREMENTS

A. Locate four floats consisting of "common stop", "start lead", "start lag", and "high level" in basin. Start one pump automatically when "start lead" float is activated. Start second pump automatically when "start lag" float is activated. Signal alarm condition automatically when "high level" float is activated. Stop both pumps automatically when "common stop" float is activated. Set float elevations in accordance with Drawings. Set pumps to automatically switch operation from one pump to another after shut off of each pumping cycle.

B. Sound, Vibration, and Thermal Control: Dampen or suppress noise, absorb vibration, accommodate thermal expansion and stresses, and adjust or correct for misalignment in piping systems.

1.6 SUBMITTALS

A. Section 013000 “Administrative Requirements”: Requirements for submittals.

B. Shop Drawings: Indicate station layout designed by station manufacturer. Show size, materials, and components of system. Indicate basin size, inlet and discharge location, cover dimensions, vent location, lifting loop location, check valve location, union ball valve location, pump location, discharge piping location, junction box location, guide rail assembly location, level control locations, and ballast support flange dimensions.

C. Product Data: Submit for each type of packaged pumping station.

1. Include catalog data for basin, cover, hinged doors, slide rail assembly, discharge piping, valves, junction box, level controls, and control panel.
2. Include pump catalog data, performance curve, breakaway fittings data, and access frame data.
3. Include control panel data and panel wiring schematic.

D. Test Reports:

1. Submit written report showing factory pump inspections and tests have been successfully performed.

E. Manufacturer's Installation Instructions: Submit manufacturer’s published installation instructions.

F. Manufacturer's Certificate: Certify products meet or exceed requirements.

G. Manufacturer's Field Reports:

1. Submit report of each visit of manufacturer’s representative to provide technical assistance during installation.

2. Submit start-up report before final acceptance of pumps to document pumping station operation meets performance requirements.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 “Execution and Closeout Requirements”: Requirements for submittals.

B. Record actual locations of packaged pumping stations including basins and control panel.

C. Submit executed certification of pumping stations after performance testing.

D. Submit spare parts list and rebuild kits.

E. Provide Operations and Maintenance Manual containing operating and maintenance requirements for pumping station and schedule of recommended maintenance.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing work of this section with minimum ten years documented experience approved by manufacturer.

C. Design pumping station under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of New York.

1.9 PRE-INSTALLATION MEETINGS

A. Section 013000 “Administrative Requirements”: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 “Product Requirements”: Requirements for transporting, handling, storing, and protecting products.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials and water by temporary covers, completing sections of work, and isolating parts of completed system.

D. Accept system components on site in manufacturer’s original containers or configuration. Inspect for damage.

E. Store sensitive materials for field assembly in dry area in original shipping containers.

F. Support basin with nylon slings to structural lift points during handling.

G. Repair damage to basin according to manufacturer's instructions.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 "Product Requirements": Environmental conditions affecting products on site.

B. Do not install basin when bedding is wet or frozen.

1.12 WARRANTY

A. Section 017000 "Execution and Closeout Requirements": Requirements for warranties.

B. Furnish five year prorated manufacturer's warranty on pump seals.

1.13 EXTRA MATERIALS

A. Section 017000 "Execution and Closeout Requirements": Requirements for extra materials.

B. A complete replacement pump shaft seal assembly shall be furnished with each pump station. The spare seal shall be packed in a suitable container and shall include complete installation instructions. A spare volute gasket and seal gasket shall be provided.

C. A spare 24V DC control power supply unit shall be provided to be available as an emergency replacement.

D. An instructional video presentation on the pump mechanical seal system in DVD format shall be included. The DVD shall contain a presentation on the following subjects: purpose and location of the mechanical seal, signs of a defective mechanical seal, how to remove the mechanical seal, troubleshooting seal failure causes, seal components, required tools, how to reinstall the seal and how to place the pump back into service. The video shall include footage of an actual seal replacement.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bedding, Ballast, and Backfill.

1. Bedding: Aggregate Type as specified in Section 312000 "Earth Moving".

2.2 BASIN SYSTEM

A. Contractor to provide precast concrete basin structures as shown on the Drawings.

1. Pumping Station #1: 12'-0" diameter opening, depth as shown on Drawings.
2. Pumping Station #2: 10'-0"x 12'-0" rectangular opening, depth as shown on Drawings.

B. Furnish materials in accordance with New York State standards.

2.3 PUMPS

A. The pumps shall be 4-inch vertical, centrifugal non-clog type of heavy cast-iron construction, especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by linear movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that end play is limited to the clearance within the bearing. To minimize seal wear resulting from shaft deflection caused by the radial thrust of the pump, the shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 1-7/8" for motor frame sizes 213 through 286; 2-1/8" for motor frame sizes 324 and 326; and 3" for frame 364 and larger. The dimension from the lowest bearing to the top of the impeller shall not exceed 6".

B. The oversized shaft incorporating oversized bearings and heavier bearing frame construction provides for extended mechanical seal, bearing and overall pump/motor life. Since the larger shaft with the specified minimum overhang is the key to heavier, more rigid construction throughout, no deviation from the specified shaft diameter or tolerances will be allowed.

C. The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move in a linear direction with the thermal expansion of the shaft and shall carry only radial loads.

D. The shaft shall be solid stainless steel through the mechanical seal to eliminate corrosion and abrasive rust particles. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified minimum diameter.

E. The pump shall have an adapter providing a large water reservoir above the impeller to provide for positive exclusion of air from the impeller. The seal shall be inside this area to assure lubrication. Pumps which do not use hollow priming adapters for positive lubrication of the seal will not be acceptable.

F. The pump shall be constructed so as to permit priming from the lower pressure area behind the impeller. Priming from high-pressure connections, which tends to cause solids to enter and clog the priming system, will not be acceptable. The priming bowl shall be transparent, enabling the operator to monitor the priming level.

G. The pump shall be arranged so that the rotating element can easily be removed from the casing without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal, so that any foreign object may be removed from the pump or suction line.

H. The pump shaft shall be sealed against leakage by a single mechanical seal constructed so as to be automatically drained and primed each time the pump is drained and primed. Water which lubricates the mechanical seal shall be automatically drained from around the seal if the pump loses prime in order to allow both the pump and the seal to be drained, thereby preventing freezing and breakage of the seal during power outages in sub-freezing temperatures.

I. The seal shall be of carbon and ceramic materials with the mating surfaces lapped to a flatness tolerance of one light band. The rotating ceramic shall be held in mating position with the stationary carbon by a stainless steel spring. The entire seal assembly shall be held in place by a bronze seal housing to prevent excessive heat buildup. Use of cast-iron or other ferrous material for the seal housing, which will rust and damage the seal, shortening its life, will not be acceptable.

J. The pump volute shall be furnished with mounting lugs and bolted to the station floor plate, forming a gas-tight seal.

K. Manufacturers:

1. Smith & Loveless, Inc.
2. Substitutions: Not Permitted.

2.4 MOTORS

A. The pump motors shall be vertical, solid shaft, NEMA P base, squirrel cage induction type, suitable for three phase, 60 Hertz, 230 Volt electric current. They shall have Class F insulation. Insulation temperature shall, however, be limited to Class B. The motors shall have normal starting torque and low starting current, as specified by NEMA Design B characteristics. They shall be open drip proof design with forced air circulation by integral fan. Openings for ventilation shall be uniformly spaced around the motor frame. Leads shall be terminated in a cast connection box and shall be clearly identified.

B. The motors shall have 1.15 service factor. The service factor shall be reserved for the Owner's protection. The motors shall not be overloaded beyond their nameplate rating, at the design conditions, nor at any head in the operating range as specified under Operating Conditions.

C. The motor pump shaft shall be centered, in relation to the motor base, within 0.005". The shaft runout shall not exceed 0.003".

D. The motor shaft shall equal or exceed the diameter specified under main pumps, at all points from immediately below the top bearing to the top of the impeller hub.

E. A bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fittings for lubrication as well as purging old lubricant.

F. The motor shall be fitted with heavy lifting eyes or lugs, each capable of supporting the entire weight of the pump and motor.

2.5 CONTROLS

A. The control equipment shall be mounted in a NEMA Type 4 steel enclosure with two hinged, lockable doors and a steel barrier partition down the middle. One side of the divider shall house the three-phase circuits (motor starters and circuit protectors, etc.), and the other shall house the single-phase control circuits and low voltage components. The low voltage controls shall be accessible without exposing the three-phase high voltage supply, and shall be operable without opening the enclosure door. The control panel shall be mounted to the station wall at a convenient height.

B. All components within the control panel shall be UL listed or recognized, and the complete station control panel itself shall be labeled as a UL 508A General Use Industrial Control Panel.

C. To facilitate wire tracing and servicing, the control wiring shall be run in enclosed wireways, with removable covers, rather than tied up in bundles.

D. Control relays up to 6-amp capacity shall be the modular, plug-in type, with integral LED indicating lights to show activation. Larger control relays, vacuum pump contactors and the SONIC START operating modules shall be enclosed to be “finger safe”.

E. A duplex GFI protected convenience outlet shall be provided in the station for operation of 120-volt AC devices.

F. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all auxiliary circuits, and motor circuit protectors with lockout capability shall be provided for each pump motor. Only instantaneous trip magnetic-type motor circuit protectors, matched to the motor inrush current, shall be used for the motor circuits, for added protection from low-level faults. Thermal magnetic circuit breakers will not be allowed for pump motor service.

G. Magnetic across-the-line starters with 24-volt coils and solid state overload protection for each phase shall be provided for each pump motor to give positive protection against phase unbalance, thermal overload, phase loss and ground fault. To provide the fastest trip speed and for ground fault protection, only solid-state overload protection will be used, and motor starters using heater coils will not be acceptable. Each single-phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.

H. Individual NEMA 4 oil-tight Hand-Off-Automatic selector switches shall be provided for each pump. The switches shall be 3-position rotary-type with spring return on the Hand position, and mounted on the top of the station control panel for easy access from either the front or the top.

I. A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture-proof molded plastic case. The flush mounted dial shall register in hours and tenths of hours up to 99,999.9 hours before repeating. The meter shall be suitable for operation from a 115-volt, 60 cycle supply.

2.6 FLOAT SWITCH LEVEL CONTROLS

A. To control the operation of the pumps with variations of liquid level in the wet well, a minimum of three (3) displacement switches shall be provided. A 30' cord shall be provided with each switch. The cord shall have a corrosion-resistant vinyl jacket and be multi-stranded in order to prevent fatigue.

B. An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps at the end of each pumping cycle.

C. Provisions shall also be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level for the low level pump.

D. An adjustable displacement switch shall be provided to sense a high water level condition. The switch shall hang into the wet well and shall activate a contact to indicate the high water condition.

2.7 RUNNING TIME METER

A. A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture-proof molded plastic case. The flush-mounted dial shall register in hours and tenths of hours up to 99,999.9 hours before repeating. The meter shall be suitable for operation from a 115-volt, 60-cycle supply.

2.8 PUMP FAILURE TO PRIME OR FAILURE TO PUMP ALARM (CHECK VALVE SWITCH TYPE)

A. To sense failure to deliver normal flow for any reason, including failure to prime, each pump shall be provided with a sealed sensor switch mounted in a protective ABS enclosure. The enclosure shall be mounted with an adjustable universal mounting bracket to the external arm of each discharge check valve. The mounting bracket shall allow the adjustment of the sensor switch with a single locking pivot adjustment. A red LED indicating light shall be provided on each switch unit to facilitate accurate setting of the switch for proper operation. The sensor switch shall monitor the movement of the check valve arm and thereby detect failure of the pump to deliver normal operating flow when called on to run. An auxiliary time delay relay shall be provided to prevent an alarm signal during the pump priming and startup period.

2.9 VACUUM-PRIMING SYSTEM

A. A vacuum priming system shall be furnished to prime the main pumps. The system shall be as shown on the vacuum priming schematic and shall include two vacuum pumps, providing 100 percent standby. Vacuum pumps shall have corrosion-resistant internal components. The vacuum priming system shall be complete with large port vacuum control solenoid valves, SONIC START® prime level sensor, float-operated check valves to protect the vacuum pumps, and all necessary shut-off valves as shown on the piping schematic. The float-operated check valves shall have a transparent body for visual inspection. All hoses and tubing used in the priming system

shall be at least 3/8" nominal diameter. The air discharged from the vacuum pumps shall be piped into the wet well.

B. The solenoid valves used in the vacuum priming system shall be of the high flow, direct acting brass body type, with threaded ports, NBR seals and 300 Series stainless steel plunger, rod, plate and springs. The minimum orifice diameter shall be 5/16". The solenoid valves shall be UL Listed, with Class F coil rating and of suitable voltage and thermal capacity for the application.

C. Liquid level in the pump priming chamber shall be monitored by a SONIC START® resonant frequency liquid level probe. The probe shall be equipped with a piezoelectric drive and sensitive circuits to detect frequency shifts when the probe is covered by liquid. The probe shall be completely sealed and have a 316L stainless steel housing for corrosion resistance. It shall be provided with a wiring connector molded of PolyPhenylSulfone, an amorphous high performance thermoplastic for impact and chemical resistance. The probe shall have a plug-in connector to facilitate easy removal.

D. The SONIC START® probe shall be provided with light emitting diodes. This diagnostic tool shall indicate connectivity, prime status or a fault condition. Systems utilizing an electrode, mechanical means such as a float, or that require any type of electrical or moving parts inside the priming chamber, which may accumulate debris, short out, bind or fail will not be acceptable.

E. The priming system shall automatically provide positive lubrication of the mechanical seal each time a main pump is primed. To prevent excessive stoppage due to grease accumulation, no passageway in the priming system through which the pumped liquid must pass shall be smaller than the equivalent of a 2-1/2" opening.

F. The vacuum priming system shall have two field selectable modes of operation. In the "On-Demand" mode, the priming system will operate only after a pump is called on to run, and if it is not primed. Once primed, the pump will be allowed to run. In the "Constant Prime" mode, both pumps are kept primed continuously, and ready to start immediately when called for.

2.10 LIGHTING

A. A low profile four tube fluorescent light fixture with diffuser cover shall be provided to give adequate illumination for all areas within the equipment chamber. The fixture shall be equipped with quick start bulbs and low temperature ballast. A manual switch located in the equipment chamber shall be provided to turn the lights and ventilating blower on when the cover is closed.

2.11 VENTILATING BLOWER

A. A ventilating blower shall be provided, capable of delivering a minimum of 30 air changes per hour of outside air into the equipment chamber. The blower shall be rigidly mounted to the chamber shell and shall discharge into the station as shown on the plans. It shall be controlled by a percentage timer to provide essentially continuous ventilation. The air intake and exhaust ports shall be 6" pipe with a gooseneck for weather protection and shall be screened to keep out debris and rodents.

2.12 SUMP PUMP

A. A submersible sump pump with close coupled motor shall be installed in the sump. It shall be rated 1000 GPH at design head. A mechanical seal on the shaft shall exclude water from the motor housing. The sump pump shall be controlled automatically by a float switch. It shall discharge into the wet well through steel piping with two check valves with a 90 degree axial offset between them, as shown on the plans.

2.13 MAIN PIPING

A. The pump suction shall be drilled and tapped for a 125-pound American Standard flange for ready connection of the suction riser. The discharge line from each pump shall be fitted with a clapper type check valve and eccentric plug valve. Size, location, and quantity of check valves and plug valves shall be as shown on the plans. All passageways through the pumps and piping shall be capable of passing a 3” sphere.

B. The check valve shall be of the spring loaded type with external lever arm and an easily replaced resilient seat for added assurance against vacuum leaks. Check valves shall have stainless steel shaft with replaceable bronze shaft bushings and shall be sealed with o-rings or an adjustable Teflon seal. Ball-type check valves without an external lever arm are not acceptable. An operating wrench shall be provided for the plug valve.

C. Protrusions through the station floor shall be sealed where necessary to effect sealing between the equipment chamber and the wet well. The suction and discharge connections, where they pass through the floor, shall be sealed by gaskets in order to prevent corrosive, noxious fumes from entering the station. Welded joints that do not allow adjustment or replacement will not be considered for this application. The pump station manufacturer shall extend the suction and discharge connections below the floor at the factory so that field connections can be made without disturbing the gas-tight seals. Once the station is installed, however, it shall be possible to remove the entire 4” or 6” suction pipes through the station floor without having to enter the wet well to unbolt them.

D. The manufacturer of the pump station shall provide a compression-type sleeve coupling for installation on the common discharge pipe. A minimum of two anchoring points shall be provided on the bottom of the station baseplate for attachment of coupling joint restraints, which shall be provided by the installing contractor.

2.14 ACCESSORIES

A. Sealant: Industrial silicon sealant for pipe penetrations in basin.

B. Anchor Bolts, Nuts, and Washers: ASTM A709/A709M, Grade 36, bent anchor bolts; ASTM A307, Grade A, nuts; ASTM A126, gray iron washers. Galvanize bolts, nuts and washers in accordance with ASTM A153/A153M.

C. An aluminum ladder shall be provided in the manway portion of the station, to facilitate access. A 36” extendable bar shall be fitted to the manway ladder, to provide easier entry, when raised.

D. Trash Basket: The B1B series trash basket system, as manufactured by Halliday Products, Inc. of Orlando, Florida, shall be of the bar screen style basket, having 2" (51mm) clear opening between 1/4" (7mm) thick bars and solid sides. The heavy duty ladder/guide rail system shall be of 3" (77mm) structural aluminum channel and incorporate 1 3/8" (35mm) diameter type "D" rungs with flat resistant surface, spaced 12" (305mm) on center. For ease of operation, the basket will have (4) 2 1/2" (64mm) solid aluminum wheels with 1/2" (13mm) stainless steel axles. An aluminum basket stop shall be supplied loose for field mounting to insure proper basket position.

E. Fencing: Provide fencing around the perimeter of each pumping station as shown on the Drawings. Fencing shall be chain link, with black polymer coating complying with ASTM F 934, 96 inches in height, and include two swing gate leafs of 36 inches each, for a total opening of 72 inches.

2.15 SOURCE QUALITY CONTROL

A. Section 014000 “Quality Requirements”: Testing, inspection and analysis requirements.

B. Perform the following factory inspections and tests:

1. Motor voltage and frequency check as shown on name plate.
2. Motor and cable insulation test for moisture content or insulation defects in accordance with UL criteria.
3. Submerged pump run test to determine pump meets hydraulic performance requirements.

C. Allow witnessing of factory inspections and test at manufacturer’s test facility. Notify Owner at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify inlet and discharge piping connections are size, location, and elevation on Drawings.

3.2 PREPARATION

A. Establish elevations of packaged pumping station as shown on Drawings.

B. Establish minimum separation of 10 feet between sanitary sewer piping and water utility piping in accordance with NYSDEC requirements.

3.3 EXCAVATION

A. Excavate direct burial cable trench in accordance with Section 312000 “Earth Moving”.

B. Excavate to required elevation to install basin on undisturbed subgrade in accordance with Section 312000 “Earth Moving” with minimum clearance of 4 inches between basin and surrounding earth.

C. Excavation support to be in compliance with OSHA standards.

3.4 BASIN INSTALLATION

A. Place, compact and level aggregate bedding to minimum 8 inches.

B. Install basin on aggregate base at proper grade and to alignment on Drawings.

C. Ballast basin with aggregate over ballast support flange and around entire basin perimeter to not less than weight of 63 pounds per cubic foot of basin volume.

D. Seal cover penetrations with industrial silicone sealant.

E. Install rubber gasket around circular wet well structure.

F. Set cover frames and covers level without tipping, to correct elevations.

G. Assemble basin components including inlet hub/fitting, discharge hub, cover, pump support rail system, level controls, and junction box.

H. Connect to inlet and discharge piping with flexible connector.

I. Seal joints water tight between inlet and discharge pipes and sump wall.

3.5 PUMP INSTALLATION

A. Wire pump to junction box.

3.6 CONTROL PANEL INSTALLATION

A. Mount and wire control panel for pumping station operation including duplex motor controls, circuit breaker, starter, control transformer, fuse box, terminal block, alternator, alarm and running lights.

B. Wire in accordance with requirements of National Electrical Code.

C. Use 16 AWG control wiring for control circuits and white for neutral grounded conductors.

D. Use minimum 14 AWG black power wiring.

E. Number each conductor.

F. Tin ends of wires with 60/40 lead tin alloy solder.

G. Locate and connect direct burial cable from control panel to basin junction box.

3.7 BACKFILL

A. Backfill basin and direct burial cable in accordance with Section 312000 “Earth Moving”.

B. Maintain optimum moisture content of fill material to attain required compaction density.

C. After hydraulic test, evenly backfill around entire periphery of basin by hand placing backfill material and hand tamping in 6 inches compacted layers to finish grade. Compact to 95 percent maximum density.

D. Do not use wheeled or tracked vehicles for tamping.

3.8 STATION STARTUP, INITIAL TESTING AND OPERATION

A. All components of the pump station shall be given an operational test at the pump station manufacturer's facility to check for excessive vibration, for leaks in the piping or seals and correct operation of the automatic control and vacuum priming systems and all auxiliary equipment. Installed pumps shall take suction from a deep wet well, simulating actual service conditions. Testing of uninstalled pumps and individual components shall not be an acceptable alternate to testing the complete, assembled system.

B. The control panel shall undergo both a dry logic test and a full operational test with all systems operating. Factory test instrumentation shall include flow measuring with indicator; compound suction gauge; Bourdon tube-type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator and a vibrometer capable of measuring both amplitude and frequency.

C. Installation of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

D. The manufacturer shall provide the services of a factory trained representative for a maximum period of one (1) day on site to perform initial startup of the pump station and to instruct the Owner’s operating personnel in the operation and maintenance of the equipment. Coordinate and operate pumps in conjunction with other construction of pumping stations, gravity interceptors, and connection to existing manhole at sewage treatment facility.

E. Operation and maintenance manuals shall be furnished, which cover service procedures for all of the pumping stations.

F. Correct failures during test by repairing or replacing malfunctioning parts or equipment or faulty workmanship, regardless of cause, within 48 hours after notification from Engineer.

G. After correcting failures caused by defective equipment, material, or faulty workmanship, retest until failures are eliminated.

H. Confirm general sequencing of pump and float operations at basin and control panel are in accordance with performance requirements.

I. Adjust basin, pump, and control panel systems so station operates to performance requirements and in accordance with specifications.

J. Document and certify startup results in startup report.

3.9 COMPACTION TESTS

A. Compaction Testing: As specified in Section 312000 “Earth Moving”.

3.10 MANUFACTURER'S FIELD SERVICE

A. Furnish factory trained representative and field technical assistance during the following periods of pumping station installation:

1. Unloading of station materials and components.
2. Start-up, testing, and demonstration of station systems-basin, pump, and control panel.

3.11 WARRANTY

A. The manufacturer of the station shall warranty for one (1) year from date of startup, not to exceed eighteen (18) months from date of shipment, that the structure and all equipment he provides will be free from defects in material and workmanship. Warranties and guarantees of the suppliers of various components in lieu of a single source responsibility by the Manufacturer will not be accepted. The Manufacturer shall assume primary responsibility for the warranty of the station and all components.

B. In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Manufacturer shall repair or replace, at his discretion, such defective part. He shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the steel structure, main pumps, main pump motors and main piping manifold. After startup service has been performed, the labor to replace accessory items, such as the blower, priming pumps, alternator, etc., shall be the responsibility of others.

C. The repair or replacement of those items normally consumed in service, such as seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.

D. It is not intended that the Manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

END OF SECTION 333216

SECTION 333400 SANITARY UTILITY SEWERAGE FORCE MAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Force mains.
2. Bedding and cover materials.

B. Related Requirements:

1. Section 312000 “Earth Moving”.
2. Section 333100 “Sanitary Utility Sewerage Piping”.
3. Section 333216 “Packaged Utility Wastewater Pumping Stations”.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
3. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
5. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
6. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
7. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 COORDINATION

A. Section 013000 “Administrative Requirements”: Coordination and project conditions.

B. Coordinate the Work with connection to existing Town of Thompson Sewage Treatment Plant, proposed pumping stations and backfilling and trenching.

1.4 PRE-INSTALLATION MEETINGS

A. Section 013000 “Administrative Requirements”: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.5 SUBMITTALS

A. Section 013000 “Administrative Requirements”: Requirements for submittals.

B. Product Data: Submit data indicating pipe material used, pipe accessories, and restrained joint details and materials.

C. Manufacturer's Instructions: Indicate special procedures required to install Products specified.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 “Execution and Closeout Requirements”: Requirements for submittals.

B. Project Record Documents: Record location of pipe runs, connections, and invert elevations.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with the standards of the Town of Thompson, New York State Health Department, and the Ten State Standards, including installation and testing.

B. Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities. All costs related to re-inspection, or additional work, shall be paid for by the Contractor at no additional expense to the Owner.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 “Product Requirements”: Requirements for transporting, handling, storing, and protecting products.

B. Do not place materials on private property without written permission of property owner.

C. During loading, transporting and unloading, exercise care to prevent damage to materials.

D. Do not drop pipe or fittings.

E. Avoid shock or damage to pipe.

F. Take measures to prevent damage to exterior surface or internal lining of pipe.

G. Do not stack pipe higher than recommended by pipe manufacturer.

H. Store gaskets for mechanical and push-on joints in cool, dry location out of direct sunlight and not in contact with petroleum products.

1.9 EXISTING CONDITIONS

A. Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

PART 2 - PRODUCTS

2.1 FORCE MAIN

A. Polyvinyl Chloride (PVC) Pressure Sewer Pipe and Fittings - 12" Nominal Pipe Size and Smaller:

1. ASTM D2241, PVC 1120 (12454) or PVC 1220 (12454) or PVC 2120 (14333); SDR 21.

2.2 UNDERGROUND PIPE MARKERS

A. Trace Wire: Electronic detection materials for non-conductive piping products.

1. Unshielded 10 gage THWN insulated copper wire.
2. Conductive tape.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 312000 “Earth Moving”.

B. Cover: Fill as specified in Section 312000 “Earth Moving”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 “Execution and Closeout Requirements”: Requirements for installation examination.

B. Verify excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Section 017000 “Execution and Closeout Requirements”: Requirements for installation preparation.

B. Correct over excavation with fine aggregate.

C. Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 312000 “Earth Moving”.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with Drawings.

B. Route piping in straight line.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches.

D. Refer to Section 312000 “Earth Moving” for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Connect to sanitary sewer manholes, pumping stations and existing manhole at Town of Thompson Sewage Treatment Plant as shown on Drawings.

F. Install Work in accordance with Quality Assurance standards described above.

3.5 INSTALLATION - THRUST RESTRAINT

A. Provide pressure pipeline with restrained joints or concrete thrust blocking at bends, tees, and changes in direction; construct concrete thrust blocking in accordance with Drawings.

3.6 INSTALLATION - CRADLES AND ENCASEMENT

A. Provide concrete cradles and encasement for pipeline where indicated on Drawings as specified in Section 033000 “Cast-in-Place Concrete”.

3.7 FIELD QUALITY CONTROL

A. Section 017000 “Execution and Closeout Requirements”: Requirements for testing, adjusting, and balancing.

B. Perform test of sanitary sewage system in accordance with the standards of the Town of Thompson, New York State Health Department, and the Ten State Standards.

C. When tests indicate Work does not meet specified requirements, remove work, replace and retest.

3.8 PROTECTION

A. Section 017000 "Execution and Closeout Requirements": Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 333400

SECTION 335000 ENGINE GENERATOR FOR PUMPING STATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Engine generator. This generator must be purchased and stored on site to be used in emergency cases for power backup for the pumping stations.

B. Related Sections include the following:

1. Section 333216 “Packaged Utility Wastewater Pumping Station”.

1.3 DESCRIPTION OF SYSTEM & SITE

A. Provide a 100 kW standby power system to supply electrical power at 240 Volts, 60 Hertz, three Phase. The generator shall consist of a liquid cooled diesel engine, a synchronous AC alternator, and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified hereinafter.

B. The site is an NEC ordinary location with no specific harsh environment requirements.

C. The genset shall be applied at the listed ambient and elevation. Bidders to submit the generators rated power output at 100 ambient (˚F) and 1000 elevation (Ft).

D. Bidders are to submit the genset’s sound level in dBA at 23 ft based on the configuration specified.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

A. An electric generating system, consisting of a prime mover, generator, governor, coupling and all controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.

B. The generator set must conform to applicable NFPA requirements.

C. The generator set must be available with the Underwriters Laboratories listing (UL2200) for a stationary engine generator assembly.

D. The generator set must meet EPA federal emission guidelines for stationary standby power generation.

1.5 MANUFACTURER QUALIFICATIONS

A. This system shall be supplied by an original equipment manufacturer (OEM) who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 25 years, thereby identifying one source of supply and responsibility. Approved suppliers are Generac Industrial Power or an approved equal.

B. The manufacturer shall have printed literature and brochures describing the standard series specified, not a one of a kind fabrication.

C. Manufacturer's authorized service representative shall meet the following criteria:
   1. Certified, factory trained, industrial generator technicians.
   2. Service support 24/7.
   3. Service location within 200 miles.
   4. Response time of 4 hours.
   5. Service & repair parts in-stock at performance level of 95%.
   6. Offer optional remote monitoring and diagnostic capabilities.

1.6 SUBMITTALS

A. Provide required information:
   1. Engine Generator specification sheet
   2. Controls specification sheet(s)
   3. Installation/Layout dimensional drawing
   4. Wiring schematic
   5. Sound data
   6. Emission certification
   7. Warranty statement

PART 2 - PRODUCTS

2.1 ENGINE RATING AND PERFORMANCE

A. Engine Rating and Performance:
   1. The prime mover shall be a liquid cooled, diesel fueled, turbocharged after-cooled engine of 4-cycle design. It will have adequate horsepower to achieve rated kW output with at an operating speed of 1800 RPM.
   2. The engine shall support a 100% load step.
   3. The generator system shall support generator start-up and load transfer within 10 seconds.

B. Engine Oil System:
   1. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s).
   2. The engine shall operate on mineral based oil. Synthetic oils shall not be required.
   3. The oil shall be cooled by an oil cooler which is integrated into the engine system.

C. Engine Cooling System:
   1. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system. The coolant system shall include a coolant fill box which will provide visual means to determine if the system has adequate coolant level. The radiator shall be designed for operation in 122 degrees F, (50 degrees C) ambient temperature.
   2. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer.
   3. Engine coolant and oil drain extensions, equipped with pipe plugs and shut-off valves, must be provided to the outside of the mounting base for cleaner and more convenient engine servicing.
   4. A radiator fan guard must be installed for personnel safety that meets UL and OSHA safety requirements.

D. Engine Starting System:
   1. Starting shall be by a solenoid shift, DC starting system.
   2. The engine's cranking batteries shall be lead acid. The batteries shall be sized per the manufacturer's recommendations. The batteries supplied shall meet NFPA 110 cranking requirements of 90 seconds of total crank time. Battery specifications (type, amp-hour rating, cold cranking amps) to be provided in the submittal.
   3. The genset shall have an engine driven, battery charging alternator with integrated voltage regulation.
   4. The genset shall have an automatic dual rate, float equalize, 10 amp battery charger. The charger must be protected against a reverse polarity connection. The chargers charging current shall be monitored within the generator controller to support remote monitoring and diagnostics. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

E. Engine Fuel System:
   1. The engine fuel system shall be designed for operation on #2 diesel fuel and cold weather diesel blends.
   2. The engine shall include a primary fuel filter, water separator, manual fuel priming pump, and engine flexible fuel lines must be installed at the point of manufacture. Element shall be replaceable paper type.
   3. The engines suction line shall be fitted with a check valve to secure prime for the engines injection pump.

F. Engine Controls:
   1. Engines that are equipped with an electronic engine control module (ECM), shall monitor and control engine functionality and seamlessly integrate with the genset controller through digital communications. ECM monitored parameters shall be integrated into the genset controllers NFPA 110 alarm and warning requirements. All ECM fault codes

shall be displayed at the genset controller in standard language – fault code numbers are not acceptable.

2. For engines without ECM functionality or for any additional genset controller monitoring, sensors are to be conditioned to a 4-20ma signal level to enhance noise immunity and all sensor connections shall be sealed to prevent corrosion.
3. Engine speed shall be controlled with an integrated isochronous governor function with no change in alternator frequency from no load to full load. Steady state regulation is to be 0.25%.

G. Engine Exhaust and Intake:
1. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.
2. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system. A rain cap will terminate the exhaust pipe after the silencer. All components must be properly sized to assure operation without excessive back pressure when installed.
3. The manufacturer shall supply a critical grade exhaust silencer as standard. For applications with site specific sound requirements (reference section 1.1), the silencer shall be selected to achieve site sound levels.
4. For gensets in a weather or sound attenuated enclosure, all exhaust piping from the turbo-charger discharge to the silencer shall be thermally wrapped to minimize heat dissipation inside the enclosure.
5. The engine intake air is to be filtered with engine mounted, replaceable, dry element filters.

2.2 ALTERNATOR

A. The alternator shall be the voltage and phase configuration as specified in section 1.3.A.

B. The alternator shall be a 4 pole, revolving field, stationary armature, synchronous machine. The excitation system shall utilize a brushless exciter with a three phase full wave rectifier assembly protected against abnormal transient conditions by a surge protector. Photo-sensitive components will not be permitted in the rotating exciter.

C. The alternator shall include a permanent magnet generator (PMG) for excitation support. The system shall supply a minimum short circuit support current of 300% of the rating (250% for 50Hz operation) for 10 seconds.

D. The alternator shall support 240 skVA with a maximum voltage dip of 20%.

E. Three phase alternators shall be 12 lead, broad range capable of supporting voltage reconnection. Single phase alternators shall be four lead and dedicated voltage designs (600v) shall be six lead. All leads must be extended into a NEMA 1 connection box for easy termination. A fully rated, isolated neutral connection must be included by the generator set manufacturer.

F. The alternator shall use a single, sealed bearing design. The rotor shall be connected to the engine flywheel using flexible drive disks. The stator shall be direct connected to the engine to ensure permanent alignment.

G. The alternator shall meet temperature rise standards of UL2200 (120 degrees C). The insulation system material shall be class "H" capable of withstanding 150 degrees C temperature rise.

H. The alternator shall be protected against overloads and short circuit conditions by advanced control panel protective functions. The control panel is to provide a time current algorithm that protects the alternator against short circuits. To ensure precision protection and repeatable trip characteristics, these functions must be implemented electronically in the generator control panel. Thermal magnetic breaker implementation is not acceptable.

I. An alternator strip heater shall be installed to prevent moisture condensation from forming on the alternator windings. A tropical coating shall also be applied to the alternator windings to provide additional protection against the entrance of moisture.

2.3 CONTROLS

A. The generator control system shall be a fully integrated microprocessor based control system for standby emergency engine generators meeting all requirements of NFPA 110 level 1.

B. The generator control system shall be a fully integrated control system enabling remote diagnostics and easy building management integration of all generator functions. The generator controller shall provide integrated and digital control over all generator functions including: engine protection, alternator protection, speed governing, voltage regulation and all related generator operations. The generator controller must also provide seamless digital integration with the engine's electronic engine control module (ECM) if so equipped. Generator controller's that utilize separate voltage regulators and speed governors or do not provide seamless integration with the engine management system are considered less desirable.

C. Communications shall be supported with building automation via the Modbus protocol without network cards. Optional internet and intranet connectivity shall be available.

D. The control system shall provide an environmentally sealed design including encapsulated circuit boards and sealed automotive style plugs for all sensors and circuit board connections. The use of non-encapsulated boards, edge cards, and pc ribbon cable connections are considered unacceptable.

E. Circuit boards shall utilize surface mount technology to provide vibration durability. Circuit boards that utilize large capacitors or heat sinks must utilize encapsulation methods to securely support these components.

F. A predictive maintenance algorithm that alarms when maintenance is required. The controller shall have the capability to call out to the local servicing dealer when maintenance is required.

G. Diagnostic capabilities should include time-stamped event and alarm logs, ability to capture operational parameters during events, simultaneous monitoring of all input or output parameters, callout capabilities, support for multi-channel digital strip chart functionality and .2 msec data logging capabilities.

H. In addition to standard NFPA 110 alarms, the application loads should also be protected through instantaneous and steady state protective settings on system voltage, frequency, and power levels.

I. The control system shall provide pre-wired customer use I/O: 4 relay outputs (user definable functions), communications support via RS232, RS485, or an optional modem. Additional I/O must be an available option.

J. Customer I/O shall be software configurable providing full access to all alarm, event, data logging, and shutdown functionality. In addition, custom ladder logic functionality inside the generator controller shall be supported to provide application support flexibility. The ladder logic function shall have access to all the controller inputs and customer assignable outputs.

K. The control panel will display all user pertinent unit parameters including: engine and alternator operating conditions; oil pressure and optional oil temperature; coolant temperature and level alarm; fuel level (where applicable); engine speed; DC battery voltage; run time hours; generator voltages, amps, frequency, kilowatts, and power factor; alarm status and current alarm(s) condition per NFPA 110 level 1.

2.4 ENGINE/ALTERNATOR PACKAGING

A. The engine/alternator shall be isolated from the generator frame with rubber isolators. The packaging shall not require the addition of external spring isolators.

B. A mainline, thermal magnetic circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated between 100 to 125% of the rated ampacity of the genset. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections.

C. A second mainline, thermal magnetic circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated based on manufacturer’s requirements. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections.

D. The generator shall include a unit mounted 120 volt convenience outlet.

2.5 ENCLOSURE

A. The genset shall be packaged with a sound attenuating enclosure.

B. The enclosure shall be completely lined with sound deadening material. This material must be of a self extinguishing design.

C. The enclosure shall be made of steel with a minimum thickness of 14 gauge. The enclosure is to have hinged, removable doors to allow access to the engine, alternator and control panel. The hinges shall allow for door fit adjustment. Hinges and all exposed fasteners will be stainless steel or JS5000. The use of pop-rivets weakens the paint system and not allowed on external painted surfaces. Each door will have lockable hardware with identical keys.

D. The enclosure shall be coated with electrostatic applied powder paint, baked and finished to manufacturer's specifications. The color will be manufacturer’s standard.

E. The enclosure shall utilize an upward discharging radiator hood. Due to concerns relative to radiator damage, circulating exhaust, and prevailing winds, equipment without a radiator discharge hood will not be acceptable.

F. The genset silencer shall be mounted on the discharge hood of the enclosure. Due to architectural concerns, silencers mounted on the top of the generator enclosure are not acceptable. Gensets with silencers mounted inside the main generator compartment are acceptable only if the silencer is thermally wrapped to minimize heat stress on the surrounding components.

2.6 SUB-BASE FUEL TANK

A. The packaging shall include a double wall, sub-base mounted, UL142 listed fuel tank. The tank shall be sized to provide 24 hours of run time.

B. The tank shall include fuel suction and return connections, normal and emergency vents, secondary containment emergency vent and rupture basin sensor, mechanical fuel level indication and a stub-up area convenient for electrical conduit entry.

C. The fuel tank shall use an electric fuel sensor to provide an analog indication of fuel level. The controller shall have a warning indication on low fuel level and provide optional shutdown functionality for low, low fuel level.

D. The fuel tank shall have a sloped top and bottom. The sloped top allows water to run off. The sloped bottom allows the water and other impurities in the fuel to collect near the back of the tank away from the fuel suction point.

E. The fuel tank must be supplied by the engine-generator set manufacturer and be installed before shipment.

2.7 LOOSE ITEMS

A. Supplier to itemize loose parts that require site mounting and installation. Preference will be shown for gensets that factory mount items like mufflers, battery chargers, etc.

B. Spare Parts:
   1. Fuses: One spare set
   2. Filters One spare set (air, fuel, oil)

PART 3 - EXECUTION

3.1 FACTORY TESTING

A. Before shipment of the equipment, the engine-generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:
   1. Verify voltage & frequency stability.
   2. Verify transient voltage & frequency dip response.

3. Load test the generator for 30 minutes.

3.2 OWNER'S MANUALS

A. Three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

3.3 INSTALLATION

A. CONTRACTOR shall install the complete electrical generating system including all external fuel connections in accordance with requirements of NEC, NFPA, and the manufacturer's recommendations as reviewed by the Engineer.

3.4 SERVICE

A. Supplier of the genset and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

3.5 WARRANTY

A. The standby electric generating system components, complete genset and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of five (5) years. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge for parts, labor and travel.

B. The warranty period shall commence when the standby power system is first placed into service. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

3.6 STARTUP AND CHECKOUT

A. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:
   1. Ensuring the engine starts (both hot and cold) within the specified time.
   2. Verification of engine parameters within specification.
   3. Verify no load frequency and voltage, adjusting if required.
   4. Test all automatic shutdowns of the engine-generator.

5. Perform a load test of the electric plant, ensuring full load frequency and voltage are within specification by using building load.

3.7 TRAINING

A. Training is to be supplied by the start-up technician for the end-user during commissioning. The training should cover basic generator operation and common generator issues that can be managed by the end-user.

END OF SECTION 335000

SECTION 337119 ELECTRICAL UNDERGROUND DUCTS AND MANHOLES

PART 1 - GENERAL

SUMMARY

A. Section Includes:

1. Rigid steel conduit.
2. Plastic conduit.
3. Plastic duct
4. Reinforced resin conduit.
5. Precast concrete manholes.
6. Underground duct markers.
7. Cast-in-place manhole accessories.

B. Related Sections:

1. Section 016010 “General Provisions for Electrical Work”.
2. Section 312000 "Earth Moving".
3. Section 337900 “Site Grounding”.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSIC80.1 – Rigid Steel Conduit, Zinc Coated.

ASTM International:

2. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
3. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
4. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
5. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
6. ASTM C1037 - Standard Practice for Inspection of Underground Precast Concrete Utility Structures.

Institute of Electrical and Electronics Engineers:

7. IEEE C2 – National Electrical Safety Code

B. Code of the Town of Thompson, New York.

C. NFPA 70, National Electrical Code (NEC).

D. National Electrical Safety Code (NESC).

National Electrical Manufacturers Association:

1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
2. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
3. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
4. NEMA TC 6 - PVC and ABS Plastic Utilities Duct for Underground Installation.
5. NEMATC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.
6. NEMA TC 10 - PVC and ABS Plastic Communications Duct for Underground Installation.
7. NEMA TC 14 - Filament Wound Reinforced Thermosetting Resin Conduit and Fittings.

Underwriters Laboratories Inc.:

8. UL 651A – Type EB and A Rigid PVC Conduit and HDPE Conduit.

SYSTEM DESCRIPTION

Interconnected system of encased conduits, ducts, and manholes and handholes to distribute medium-voltage power and low-voltage power.

Conduit and duct routing and manhole and handhole locations are shown in approximate locations unless dimensions are indicated. Route and locate to complete duct bank system.

Medium-voltage: Use rigid plastic underground conduit

Low-voltage: Use rigid plastic underground conduit.

SUBMITTALS

Section 013000 “Administrative Requirements”: Requirements for submittals.

Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes.

Product Data: Submit for nonmetallic conduit, ducts, manhole accessories and handhole accessories.

Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

CLOSEOUT SUBMITTALS

E. Section 017000 “Execution and Closeout Requirements”: Requirements for submittals.

F. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes and handholes.

QUALITY ASSURANCE

Perform Work in accordance with NFPA 70 National Electrical Code, National Electrical Safety Code (NESC), state codes, local codes and requirements of authority having jurisdiction.

Maintain one copy of each document on site.

QUALIFICATIONS

Manufacturer: Company specializing in manufacturing Products specified in this section with minimum ten years documented experience.

COORDINATION

Section 013000 “Administrative Requirements”: Requirements for coordination.

Coordinate Work with existing underground utilities and structures.

PART 2 - PRODUCTS

RIGID STEEL CONDUIT

Manufacturers:

1. Allied Tube & Conduit
2. Republic Conduit
3. Calconduit
4. Approved Equal

Furnish materials in accordance with Town of Thompson, and NFPA 70 National Electrical Code standards.

Rigid Steel Conduit: ANSI C80.1.

Fittings: NEMA FB 1, steel.

PLASTIC CONDUIT

Manufacturers:

5. Carlon
6. Heritage plastics

7. Cantex
8. Approved Equal

Furnish materials in accordance with Town of Thompson, and NFPA 70 National Electrical Code standards.

Rigid Plastic Conduit: NEMA TC 2, Schedule 40 PVC, with fittings and conduit bodies to NEMA TC 3.

Rigid Plastic Underground Conduit: UL 651A, Type A PVC

PRECAST CONCRETE MANHOLES

Manufacturers:

9. Oldcastle Precast.
10. Roman Stone
11. Lakelands Concrete
12. Approved Equal

Furnish materials in accordance with Town of Thompson, and NFPA 70 National Electrical Code standards.

Product Description: Precast manhole designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

Shape: Rectangular as indicated on Drawings.

Nominal Inside Dimensions: 6 x 10 feet.

Inside Depth: 7 feet

Wall Thickness: 6 inches .

Base Section: Include one 12 inch deep x 14 inch sump with cast sleeve, and one 3/4 inch ground rod opening.

Top Section: Include 36 inch diameter grooved opening for frame and cover.

Frames and Covers: ASTM A48/A48M; Class 30B gray cast iron, 36 inch size, machine finished with flat bearing surfaces. Furnish cover marked ELECTRIC.

Duct Entry Provisions: As indicated on Drawings.

Duct Entry Locations: As indicated on Drawings.

Duct Entry Size: 4 inch

Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Furnish watertight seal.

Cable Rack Inserts: Minimum load rating of 800 pounds Locate at 3 feet on center.

Cable Rack Mounting Channel: 1-1/2 x 3/4 inch length. Furnish cable rack arm mounting slots on 1-1/2 inch centers.

Cable Racks: Steel channel, 1-1/2 x 3/4 x 14 inches with fastener to match mounting channel.

Cable Supports: Porcelain clamps and saddles.

Manhole Steps: Polypropylene plastic manhole step with 1/2 inch steel reinforcement. Cast steps at 12 inches on center vertically.

Sump Covers: ASTM A48/A48M, Class 30B gray cast iron.

Source Quality Control: Inspect manholes in accordance with ASTM C1037.

HANDHOLES

Manufacturers:

13. Furnish materials in accordance with Town of Thompson, and NFPA 70 National Electrical Code standards.

Description: Molded composite handhole comprising modular, interlocking sections complete with accessories.

Shape: As indicated on Drawing.

Covers: Molded composite with tamperproof fasteners. Furnish cover marked ELECTRIC.

Duct Entry Provisions: Singe duct knockouts.

Duct Entry Locations: each end.

Duct Entry Size: 4 inch

UNDERGROUND DUCT MARKERS

Manufacturers:

14. Compliance signs
15. Berntsen
16. Seton
17. Approved Equal

Underground Warning Tape: 4 wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

CAST-IN-PLACE MANHOLE ACCESSORIES

Frames and Covers: ASTM A48/A48M; Class 30B gray cast iron, 30 inch size, machine-finished with flat bearing surfaces. Furnish cover marked ELECTRIC.

Cable Pulling Irons: Use galvanized rod and hardware.

Cable Rack Inserts: Minimum load rating of 800 pounds.

Cable Rack Mounting Channel: 1-1/2 x 3/4 inch steel channel, 48 inch length. Furnish cable rack arm mounting slots on 1-1/2 inch centers.

Cable Racks: Steel channel, 1-1/2 x 3/4 x 14 inches with fastener to match mounting channel.

Cable Supports: Porcelain clamps and saddles.

Manhole Steps: Polypropylene plastic manhole step with 1/2 inch steel reinforcement.

Sump Covers: ASTM A48/A48M; Class 30B gray cast iron.

PART 3 - EXECUTION

EXAMINATION

Section 013000 “Administrative Requirements”: Verification of existing conditions before starting work.

Verify routing and termination locations of duct bank prior to excavation for rough-in.

Verify locations of manholes prior to excavating for installation.

INSTALLATION

Install Work in accordance with Town of Thompson Code, NFPA 70 National Electrical Code, National Electrical Safety Code (NESC), state codes, and requirements of authority having jurisdiction.

INSTALLATION – DUCT BANK

Install duct to locate top of ducts at depths as indicated on Drawings.

Install power conduit and duct to locate top of duct bank minimum 30 inches below finished grade.

Install conduit and duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope conduit and duct toward manholes and away from building entrances.

Cut conduit and duct square using saw or pipe cutter; de-burr cut ends.

Insert conduit and duct to shoulder of fittings; fasten securely.

Join nonmetallic conduit and duct using adhesive as recommended by manufacturer.

Wipe nonmetallic conduit and duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

Install no more than equivalent of three 90-degree bends between pull points.

Install fittings to accommodate expansion and deflection.

Terminate conduit and duct at manhole entries using end bell.

Stagger conduit and duct joints vertically in concrete encasement 6 inches minimum.

Use suitable separators and chairs installed not greater than 4 feet on centers. Secure separators and chairs to trench bottom prior to concrete pour.

Band conduits and ducts together before backfilling or placing concrete.

Securely anchor conduit and duct to prevent movement during concrete placement.

Use mineral pigment to color concrete red.

Install ducts with minimum 3 inch concrete cover at bottom, top, and sides.

Install two No. 4 steel reinforcing bars in top of bank under paved areas.

Connect to existing concrete encasement using dowels.

Connect to manhole wall using dowels.

Provide suitable pull string in each empty duct except sleeves and nipples.

Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

Backfill trenches in accordance with Section 312000 “Earth Moving”.

Interface installation of underground duct markers with backfilling specified in Section 312000 “Earth Moving”. Install 6 inches below finished surface.

INSTALLATION – PRE-CAST MANHOLE

Excavate for manhole installation in accordance with Section 312000 “Earth Moving”.

Install and seal precast sections in accordance with ASTM C891.

Install manholes plumb.

Use precast neck and shaft sections to bring manhole cover to finished elevation.

Attach cable racks to inserts after manhole installation is complete.

Dampproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days.

Backfill manhole excavation in accordance with Section 312000 “Earth Moving”.

INSTALLATION – PRE-CAST HANDHOLE

Excavate for handhole installation in accordance with Section 312000 “Earth Moving”.

Install and seal precast sections in accordance with ASTM C891.

Install handholes plumb.

Backfill handhole excavation in accordance with Section 312000 “Earth Moving”.

INSTALLATION – CAST-IN-PLACE MANHOLE

Excavate for manhole installation in accordance with Section 31200 “Earth Moving” .

Concrete: Install air entrained, 3,000 psi compressive strength at 28 days in accordance with Town standards.

Shape:As indicated on Drawings.

Nominal Dimensions: 6 x 10 feet

Inside Depth: 7 feet .

Wall Thickness: 6 inches .

Base: Include 14 inch drain opening and one ¾ inch ground rod openings. Slope to drain at 0.25 inch per foot (2 percent).

Top: Include 36 inch diameter opening; cast 1/2 inch rod in opening to accept ladder hook.

Duct Entry: Cast duct openings in walls as indicated on Drawings.

Cable Pulling Irons: Locate opposite each duct entry.

Cable Rack Inserts: Locate at 1 feet on center.

Construct brick collar with 30 inch clear opening to bring cover to proper elevation.

Manhole Steps: Cast steps at 12 inches on center vertically.

Install ladder in each manhole.

Attach cable racks to inserts after manhole construction is complete.

Dampproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days.

Backfill manhole excavation in accordance with Section 312000 “Earth Moving”.

END OF SECTION 337119

APPENDIX C

SUBSURFACE INVESTIGATION REPORTS

REPORT
SUBSURFACE INVESTIGATION

PROPOSED CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, SULLIVAN COUNTY, NEW JERSEY
CONCORD RESORT DEVELOPMENT

May 1, 2012

Prepared By:
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MTA Project No.: 8979-001*1D

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CHRISTOPHER P. TANSEY, P.E.

May 1, 2012

Concord Resort Development
c/o AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016

Attention: Ms. Karen E. Franz, P.E., LEED, AP
Vice President

Report
Subsurface Investigation
Proposed Concord Resort Development
Town of Thompson, Sullivan County, New York
Concord Resort Development

Introduction

This report presents the results of a subsurface investigation performed by Melick-Tully and Associates, P.C. (MTA) for the proposed Concord Resort development to be constructed in the Town of Thompson, Sullivan County, New York. The portion of the resort currently slated for the first phase of development is primarily located south of and adjacent to Thompsonville Road, to the west of its intersection with Joyland Road, as shown on the Site Location Map, Plate 1. This report was prepared in general accordance with our proposal dated February 7, 2012.

Proposed Construction

We understand that the on-site Phase I portion of the proposed development would include the construction of approximately 4,500 linear feet of sanitary sewer line, a harness track, and paddock/maintenance buildings which will be located to the west of the harness track. The

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development would also include a nine-story hotel constructed as a part of a casino building with a total footprint of over 300,000 square feet in plan area, with up to three levels of below-grade parking and service facilities. A number of retail and commercial structures are proposed to be located north and east of the proposed casino structure. Automobile parking lots and access roadways would be situated to the north and east of the casino.

Structural loading information provided to us for the main casino structure indicates maximum interior column loads of up to 1,800 kips would be imposed where the parking levels will extend up to three levels below the main entry level, and column loads for the hotel tower would reportedly be up to approximately 1,200 kips. The entry level along the east side of the structure would be established at approximately Elevation +1,435 feet, requiring fills of up to 13 feet along the eastern edge of the structure to match the proposed exterior and slab-on-grade portion of the structure. Access to the lowest level parking area along the western side of the casino would be established at Elevation +1,399 feet, requiring fills of approximately 5 to 13 feet to reach the proposed lowest garage floor slab level. In addition, cuts of up to approximately 15 feet will be required to reach portions of the lowest floor slab levels. Although not provided to us at this time, we anticipate that the proposed paddock, maintenance building and retail structures would impose light to moderate column loads and light to moderate at-grade floor slab loads. At this time, grading plans for the surrounding parking, track and paddock areas were not provided to us.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil, rock and groundwater conditions along the proposed alignment of the new sanitary sewer and within the proposed track, building and parking areas at accessible locations;

2) estimate the relevant geotechnical engineering properties of the encountered materials;

3) evaluate the site foundation requirements considering the anticipated structural loads and encountered subsurface conditions;

4) recommend an appropriate type of foundation for support of the proposed structures, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by the Building Code of New York State, 2010 Edition, for seismic design purposes;

5) provide recommendations for the support and the need for subdrainage of the lowest level floor slabs;

6) estimate the post-construction settlements of the recommended floor and foundation systems;

7) provide estimated lateral earth pressure and drainage criteria for use in the design of below-grade building walls;

8) provide geotechnical-related parameters for use in pavement design;

9) collect tube samples from test pits performed in the areas proposed for automobile parking where the stormwater management system may be constructed and subject the samples to laboratory permeability testing; and

10) discuss appropriate earthwork considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, a subsurface exploration program consisting of 48 test borings and 41 test pit explorations was performed at the site. Thirty-two borings were performed in the casino/hotel area and 16 borings along the route of the proposed new sanitary sewer line. Seven test pit explorations were performed in the vicinity of the proposed track and paddock areas, 25 test pits in the proposed parking areas, and 9 test pits in the portion of the development where the retail structures are proposed. The borings were advanced utilizing all-terrain vehicle and truck-mounted drilling equipment and extended to depths varying from approximately 8-1/2 to 51 feet below the existing surface grades. Piezometers were installed in Borings C-1, C-7 and C-12 to depths of 34 to

50 feet to allow periodic measurement of the water levels. The test pits were advanced using a track-mounted excavator (Caterpillar Model 315) and extended to depths ranging from approximately 4 to 13 feet below the existing surface grades. The approximate locations of the explorations are shown on the Plot Plan, Plate 2.

All work was performed under the direct technical observation of engineers and geologists from MTA. Our representatives located the explorations in the field utilizing limited survey control provided by others and the topographic information and existing site features shown on plans provided to us. Our representatives maintained continuous logs of the explorations as the work proceeded, supervised the soil sampling operations during the drilling operations, and obtained bulk samples of the encountered materials from the test pits. Numerous closely spaced soil samples were obtained from the borings using the general procedures of the Standard Penetration Test. Rock core samples were obtained from the borings using an NQ size core barrel. Several bulk samples and numerous tube samples were collected from the test pits for laboratory Proctor and permeability testing.

All soil and rock samples obtained from the explorations were brought to our office where they were further examined in our soil mechanics laboratory. Detailed descriptions of the materials encountered in the borings are shown on the individual boring logs, Plates 3-C-1 through 3-C-32 (casino borings) and 3-S-1 through 3-S-16 (sanitary line borings). The results of the test pit explorations are shown on Plates 4-T-1 through 4-T-7 (track/paddock test pits), 4-P-1 through 4-P-25 (parking area test pits) and 4-R-1 through 4-R-9 (retail area test pits). The soils were visually classified in general accordance with the Unified Soil Classification System presented on Plate 5 and the Engineering Rock Classification and Core Description Chart, Plate 6.

Numerous soil samples were subjected to laboratory testing consisting of grain-size analyses, modified Proctor compaction testing, and moisture content determinations to aid in their engineering classification and evaluation. The results of the grain-size tests are presented on Plates 7A through 7K, Gradation Curves, and the results of the modified Proctor tests on Plates 7L through 7Q, Gradation Curves and Compaction Test Reports. The results of the moisture content tests are presented on the Gradation Curves and on the appropriate exploration logs. In addition, 18 tube samples collected from the test pits performed in the automobile parking areas where below-grade stormwater management facilities may be situated were subjected to falling head tube permeameter permeability tests. A summary of the results of the tube permeameter tests are presented on Plate 8. The construction details for the piezometers installed at Borings 3-C-1, 3-C-7 and 3-C-12 are shown on Plates 9A through 9C, Piezometer Construction Details.

The results of our subsurface exploration program, our visual examination of the soil and rock samples, and our review of the laboratory test results have provided the basis for our engineering analyses and design recommendations. The following discussions of our findings are subject to the limitations attached as an Appendix to this report.

Site Conditions

Published Geology: The proposed Concord Resort complex is located within the southern New York section of the Appalachian Plateau's Geomorphic Province. This province is characterized by a deeply dissected plateau underlain by Paleozoic Age clastic sedimentary rock.

According to the Geologic Map of New York, Map and Chart Series No. 15, published by the New York State Education Department, 1970, the site is underlain by rock of the Upper Walton Formation. This rock formation is Devonian in age and consists of greenish to reddish conglomerates, sandstones and shales.

The Soil Survey of Sullivan County, New York, USDA, 1989, maps the upper part of the site as containing Willsboro and Wurtsboro soils. The Willsboro and Wurtsboro Series are similar in nature, being gravelly loams to gravelly fine sand loams with a perched water table of approximately one and one-half to three feet. Bedrock is reported as being deeper than six feet. These soils consist of dense glacial till.

The lower portion of the site in the area of the track is mapped as containing Scriba loams, Navasink and Alden soils, Arnot-Oquaga Complex, Wayland silt loam and Wurtsboro loam. These materials are generally loamy soils and sandy loams formed from residual sandstone, shale or dense glacial till, with the exception of the Wayland soils which are silty loams formed from alluvial materials. These soils are mapped as having a perched water table of approximately 0.5 to 6 feet and bedrock deeper than 6 feet below grade.

Surface Features: The majority of the proposed casino/hotel and southern parking areas are currently moderately to heavily wooded with several areas identified as wetlands. The northeast portion of the property just west of Joyland Road is occupied by an abandoned summer camp with numerous one-story cottage structures and gravel access drives. The majority of the proposed track and paddock areas are currently occupied by portions of the Concord Golf Course with numerous fairways, water features, areas mapped as wetlands, and wooded areas scattered throughout.

Topographic information shown on plans provided to us indicates that the site generally slopes moderately to steeply downward from east to west from a high of approximately Elevation +1,456 feet in the eastern portion of the property adjacent to Joyland Road to a low of approximately Elevation +1,360 feet in the north central portion of the proposed track oval. Thompsonville Road slopes moderately to gently downward from its intersection with Joyland Road to the west from a high of approximately Elevation +1,434 feet at the intersection of Thompsville Road and Joyland

Road to a low of approximately Elevation +1,344 feet in the area of Boring S-16 where our study for the sanitary line terminated.

Subsurface Conditions: The following generalized strata were encountered in the explorations and are listed in order of increasing depth:

1) Topsoil: A surficial layer of topsoil was encountered in 84 of the 89 explorations performed for this study. In general, the topsoil was found to be approximately 4 to 12 inches thick in the majority of the explorations, but ranged up to approximately 18 to 24 inches in thickness in 16 of the test pits.

2) Pavement/Fill: A two-inch thick layer of asphalt pavement was encountered in Test Pit P-8 and gravel pavement and fill materials were encountered in nine of the explorations, primarily in the area of the abandoned camp and adjacent to Thompsonville Road. The borings performed for Thompsonville Road were advanced adjacent to the existing pavement surface in order to minimize disturbance to the existing roadway. However, our visual observations indicate that Thompsville Road and Joyland Roads are likely constructed by "chip seal" methods and do not consist of a true asphaltic concrete section. Although only shallow fill materials on the order of two feet or less were encountered in only about ten percent of the explorations, it should be anticipated that fill materials may be encountered once construction begins in previously developed areas such as the abandoned camp, along Thompsonville Road and in sections of the existing golf course.

3) Silty Sand: Below the surficial topsoil and fill materials, the natural soils typically consisted of sands and silty sands containing varying amounts of gravel, cobbles and boulders which were encountered in all of the explorations performed for this study. The sandy soils are believed to be glacial in nature and extended to the completion depths in the majority of the explorations performed. The upper one to two feet of the glacial sandy soils were found to be somewhat loose in relative density, probably the result of freeze-thaw cycles. Below the upper two feet, the glacial materials were observed to be dense to very dense in relative density for their full depth.

4) Silty/Gravelly Strata: The glacial sandy soils contained varying amounts of silts and gravels; however, in several samples subjected to laboratory grain-size testing, the silt and gravel percentages were high enough to classify the materials as silt and/or gravel, as indicated on the appropriate exploration logs.

5) Sandstone/Siltstone/Claystone Bedrock: In 11 of the 32 borings performed in the casino area, 4 of the 16 borings performed along the route of the proposed

> sanitary sewerline on Thompsonville Road, and in 13 of the 41 test pit explorations, sandstone /siltstone/claystone bedrock was encountered at depths varying from approximately 4 to 45 feet below grade. For discussion purposes, the sandstone/siltstone/claystone will be referred to as sedimentary rock for the remainder of this report. In several of the explorations, it could not be determined if refusal to further drilling or excavation was encountered atop sedimentary bedrock or relatively large boulders. In general, the sedimentary rock was found to grade sounder with depth, where encountered.

It should be noted that the soil classification from the borings are based on the materials recovered in a standard SPT sample spoon which is approximately two inches in outside diameter. Our logs note the presence of gravel, cobbles and boulders, but these larger particles are not reflected on the grain-size curves.

Groundwater seepage was encountered in 15 of the 41 test pits and 36 of the 48 test borings performed for this study upon their completion. Three piezometers were installed in Borings No. C-1, C-7 and C-12. The stabilized groundwater levels in the piezometers installed in the deeper borings were at levels of approximately 24 to 30 feet below grade. The groundwater levels observed in the remainder of the explorations were shallow, typically on the order of 1 to 21 feet at most locations and could represent true groundwater levels in the lower elevated portions of the site or perched groundwater levels atop less pervious zones of the in-place materials in the higher portions of the site. In addition, mottling which is indicative of seasonal groundwater conditions or seasonally saturated soils, was observed in a number of the test pit explorations. “True” groundwater levels could be present at depths of 24 feet or greater below grade; however, it is apparent due to the numerous ponds, lakes and wetlands present at varying elevations throughout the area, as well as the seepage observed at varying levels in the explorations, that groundwater seepage could be encountered at variable elevations and intensities throughout the site, at least on a seasonal basis.

Cross-sections showing the generalized subsurface conditions are presented on Plates 10A through 10E.

Findings and Recommendations

General: Based on the results of our study, it is our opinion that:

1) The proposed casino, paddock buildings and retail structures may derive their support from conventional shallow foundations established on the undisturbed natural soils, fractured or sound sedimentary bedrock, or controlled compacted fill placed to reach the desired levels. Pavements and floor slabs may also derive their support from these materials.

2) Relatively sound sedimentary bedrock was encountered at depths of approximately 20 to 46 feet below the existing surface grades in the casino, generally anticipated to be below the levels required to construct the planned lowest level of the casino structure. However, relatively large boulders were encountered in a number of the explorations and refusal to further excavation with the excavator atop sedimentary bedrock and/or large boulders was encountered at shallower levels throughout the site. Consequently, the use of relatively large excavation equipment and/or localized jackhammering with hydraulic hammers attached to large excavation equipment could be required for site excavations. Excavations which extend more than several feet below the surface of the refusal levels observed could require blasting.

3) The moisture levels observed in the majority of the materials subjected to laboratory testing indicate that the natural glacial soils appear to be at or close to moisture levels which would allow recompaction to 95 percent of their maximum dry density. Several samples contained high moisture contents. Due to the relatively high silt content of the materials, the soils are highly susceptible to disturbance due to slight changes in moisture content. Consequently, some aeration and drying of the shallower surficial materials and portions of the material which are wet or which are allowed to become wet should be anticipated to be required.

4) The relatively low permeability rates observed in the tube permeameter tests performed on the natural glacial soils, as well as the observation of perched groundwater at variable levels indicates that the existing site soils would provide very limited infiltration characteristics for stormwater recharge.

5) Stabilized groundwater levels in the three deep piezometers installed were observed at depths of approximately 24 to 30 feet below grade; however, slight to moderate groundwater seepage was encountered in a number of the explorations at variable levels across the site. Consequently, dewatering

during construction should be anticipated to be required, and drainage systems should be provided for below-grade portions of the structures.

Further discussion of these items and others considered relevant to the proposed development are presented in subsequent sections of this report.

Site Preparation and Earthwork: The development areas should be cleared and grubbed of all vegetation and any existing structures and existing subsurface elements such as foundations or utilities should be demolished and the resulting demolition rubble legally disposed of off-site. Any excavations resulting from demolition and utility removal should be backfilled with controlled compacted fill as described in subsequent sections of this report. After clearing, grubbing and demolition, the topsoil should be stripped for its full depth from within and at least 20 feet beyond the proposed casino building and track area. The topsoil should be stripped from within and up to ten feet beyond the limits of areas where minor cuts and fills may be required such as the limits of the proposed parking areas, paddock building and retail structures. We recommend that the site grades be identified and finalized prior to determining the limits of topsoil removal. The topsoil would not be suitable for reuse as controlled compacted fill or backfill in building or paved areas.

After clearing and stripping, any isolated pockets of fill and/or soft, wet soils should be located and removed. We believe that potentially compressible deposits could be encountered in wetland areas present where the new racetrack will be developed. However, due to the preliminary planning stages of the project, wetlands disturbance permits were not obtained at the time of our study and no explorations were completed in the wetlands. Consequently, pockets of soft, compressible organic soils and/or pockets of fill materials installed during the construction of the existing golf course would need to be located and removed prior to constructing the proposed track. Additional test pits should be performed when the site plans in this area are finalized.

After clearing and stripping and removal of any soft organic and/or uncontrolled fill materials, and prior to placement of controlled compacted fill in areas to be raised, the exposed subgrade materials should be proofrolled and compacted to a dense and unyielding consistency with several passes of a heavy, self-propelled, vibrating drum compactor with a minimum static drum weight of ten tons under the observation of a qualified geotechnical engineer. Any subgrade materials which appear to be soft or unstable should be further excavated to the surface of competent soils and backfilled with controlled compacted fill. We believe that the majority of the soils exposed after stripping of the topsoil will consist of glacial silty sand materials. For the most part, these materials are anticipated to be relatively dense; however, due to their high silt content and the relatively loose nature of the upper two feet of the materials encountered in the explorations and the presence of shallow perched groundwater, we anticipate that the surficial materials will be highly susceptible to softening and disturbance once subjected to construction equipment traffic.

In the lower elevated or poorly drained areas where the proposed racetrack will be constructed, it may be prudent to proofroll the exposed subgrade soils with the compactor in a "static" mode to help limit disturbance. This determination should be made at the time of construction by a qualified geotechnical engineer. Installation of an initial two foot thick lift of gravel, shot rock and/or similar free-draining material to bridge soft areas may help stabilize the subgrades prior to additional fill placement for the track.

The majority of the on-site soils in the cut areas of the casino building were observed to consist of silty sands with varying amounts of cobbles and boulders. Three bulk samples of the on-site soils which appear to be representative of materials anticipated to be generated from cut areas were subjected to laboratory modified Proctor (ASTM D-1557) compaction testing to estimate the moisture/density relationship of the soils. The moisture content tests performed on additional

samples obtained in the explorations indicated that the majority of the site materials were at moisture contents that would permit compaction to the required degree. However, several samples possibly impacted by freezing/thawing and inundation of surface water, were observed to be well above the levels required for compaction. Consequently, some aeration and drying should be anticipated. We recommend that the project be sequenced so that the majority of the earthwork operations are performed during periods of warm, dry weather in order to facilitate reuse of the on-site soils as structural fill. If the earthwork operations are performed during or following periods of wet or freezing weather, compaction of the on-site soils to the required degree may be difficult. We recommend that the earthwork contractor work in conjunction with a qualified geotechnical engineer familiar with the site conditions to selectively utilize the driest available materials from cut areas as fill in the building footprint and/or track area or other areas critical for completion of the project's construction schedule, and to utilize wetter soils over as large an area as possible in the parking areas where they could be allowed to dry prior to compaction, minimizing construction delays.

We recommend to the extent possible, that cobbles and boulders be utilized in areas requiring deeper fills where they would not interfere with future excavation for foundation and utility installation. Portions of the cobbles and boulders could be broken into smaller fragments where they may be reused to stabilize wetter areas prior to installation of granular controlled compacted fill. Care should be taken to provide sufficient soil to infill any voids between the cobbles and boulders to minimize the potential for migration of the upper fill soils into voids between the cobbles and boulders.

Any imported fill required to complete the site grading within the building and paved areas should consist of uncontaminated, relatively well-graded, granular soils containing less than 15 percent by weight of material passing a U.S. Standard No. 200 sieve and a maximum particle size of

six inches. The fill supplier should provide documentation of the environmental quality of all imported fill.

All materials placed in building or paved areas should be spread in layers on the order of twelve inches or less in loose thickness and uniformly compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure. Backfill placed in confined areas, such as foundation or utility trench excavations, should be spread in thinner layers and uniformly compacted to similar densities using manually operated compaction equipment.

All construction excavations should be performed in accordance with the most recent OSHA Excavation Guidelines and any state and local governing safety codes. Based on the results of our explorations, we believe that the existing site soils will be considered a Type "C" soil as defined by the latest OSHA Excavation Regulations. Excavation side slopes should be flattened as necessary to maintain safe excavations, or should be adequately braced.

Due to the high percentage of cobbles and boulders encountered in the glacial matrix soils, installation of driven sheeting for excavations which need sidewall support would be difficult or impossible. Consequently, excavation side slope support consisting of soldier piles and lagging could be required.

Bedrock consisting of fractured sedimentary bedrock was encountered in several of the borings at depths of approximately 19 to 45 feet below grade in the casino area, 15 to 20 feet in three of the borings performed along the route of the proposed sanitary line, and in a number of the test pits at depths as shallow as four feet below the existing surface grades. Rock cores utilizing an NQ size core barrel which extracts a rock core approximately two inches in diameter were advanced in nine of the casino borings and two of the borings performed along the route of the proposed sanitary line in Thompsonville Road. Approximately five to ten feet of rock was cored at each boring and

was observed to grade sounder with depth. We believe that excavations could extend a few feet below the surface of the highly weathered portions of the bedrock using rippers, or large excavators fitted with rock teeth. The transition between the highly weathered, fractured sedimentary rock and sounder, less jointed bedrock will vary across the site. Excavations below sounder portions of the bedrock could likely extend only a nominal depth below the sound rock using heavy construction equipment. In addition, large boulders could be encountered.

In confined areas such as foundation or utility trench excavations, it should be anticipated that some blasting or extensive hammering may be required to achieve the proposed construction subgrade levels. All we can really say is based on grades provided, we do not think rock will be encountered in the casino/hotel. No grades were provided in other areas.

Groundwater was encountered in the majority of the borings at depths of approximately 6 to 21 feet below grade upon their completion, and shallower perched water from runoff and snow melt was encountered in a number of the test pits at the time of our study. Groundwater levels were measured four to six times in Borings No. C-1, C-7 and C-12 where piezometers were installed to depths of 34 to 50 feet, and the stabilized groundwater levels were encountered at depths of approximately 24 to 30 feet below grade corresponding to elevations of +1,387 feet to 1,400 feet. The variable nature of the groundwater levels observed while the explorations were being performed indicates that groundwater seepage could be encountered in excavations at various levels due to seepage through more pervious zones of materials, and from surface water which percolates through the surficial soils. Surficial runoff through the topsoil into the test pit excavations was noted extensively at the time of our study, even when the lower strata in the test pits exhibited no infiltration. Consequently, controlling groundwater through drains and diversion trenches upgrade from the earthwork construction activities should be anticipated during construction. We believe

that perched water seepage will be variable in intensity, but that the majority of the site groundwater can be controlled by pumping from sumps and/or diversion and cutoff trenches. The contract documents should require the contractor to provide the equipment, labor and whatever means necessary to maintain relatively dry excavations at all times.

Groundwater seepage above the levels encountered in the explorations should be anticipated, at least on a seasonal basis. We recommend that the site stormwater utilities be installed as early as possible and be bedded in clean, three-quarter crushed stone in order to help intercept and divert groundwater seepage to the extent possible.

Foundation Design Criteria: Following the previously described site preparation procedures, the proposed casino, paddock area and retail structures could be supported by conventional shallow foundations which derive their support from the undisturbed, natural glacial soils, sedimentary bedrock, or controlled compacted fill installed to achieve the proposed floor slab subgrade levels. If the foundation excavations are allowed to remain open, it may be prudent to overexcavate the footings and place a four to six-inch thick layer of clean, three-quarter inch crushed stone, washed gravel, or flowable fill in the excavations to protect the exposed subgrade soils from the affects of moisture and/or foot traffic prior to the installation of concrete. We believe that foundations established a minimum of four feet below the existing surface grades on the dense glacial soils could be designed to impose allowable net bearing pressures of up to four tons per square foot. Foundations established on controlled compacted fill required to achieve the proposed lowest floor slab levels, which from our preliminary review of the existing topography appear to be required at the eastern upper entry level and along the west side of the casino structure for the proposed Level 3 entry to the below grade parking, could be designed to impose maximum allowable net bearing pressures of up to two tons per square foot. Bearing capacities of six tons per square foot or more

could be obtained from the fractured sedimentary bedrock. However, for ease of construction, it may be prudent to design all foundations for dense till or controlled compacted fill.

If higher bearing capacities are desired in the fill areas of the parking structure due to the relatively heavy column loads, the foundations could be constructed at deeper levels on the dense natural glacial till soils and the area backfilled to reach the proposed floor slab levels. Drilled piers or forms of ground improvement such as geopiers could also be considered to achieve higher bearing capacities. Further evaluation of these alternatives could be provided as the design progresses, if desired.

Although no structural loading or grading information was provided to us for the paddock area buildings or retail structures, we anticipate that relatively light to moderate foundation loads would be imposed. Consequently, for ease of construction, it may be prudent to design the paddock and retail buildings for maximum allowable bearing capacities of 4,000 pounds per square foot, which could be attained from the recompacted, in-place natural soils and/or controlled compacted fill required to achieve the proposed site grading.

Exterior foundations should be established at least four feet below the lowest adjacent exterior grades, or deeper if required by local building codes, to provide protection from frost penetration. Interior foundations located in permanently heated portions of the proposed buildings could be constructed at convenient depths below the ground floor slab, provided they reach the intended bearing stratum. Any foundations below unheated space should extend to four feet.

Foundation Settlement: Because of the wide variation in column loads and the footing sizes, as well as depths below existing grade, foundation settlements will be variable and additional analyses will be required when more detailed foundation plans and loading are available.

For preliminary purposes, we looked at a column load of 1,800 kips for a footing four feet below grade at a four ton per square foot bearing capacity which results in a footing size of 15 feet by 15 feet and total settlements estimated to be up to approximately one and one-half inches. Settlements will occur rapidly as the load is applied and post-construction settlements will be smaller.

Settlements for smaller size footings will be proportionally less, on the order of one-half of one inch, or less.

Seismic Design Criteria: Based on the subsurface conditions encountered in the explorations performed for this study, we estimate that the site would be a Site Class "C" as defined by the Building Code of the State of New York, 2010 Edition, for seismic design purposes. This estimate is based on the average Standard Penetration Test N-values obtained in the borings and the formula prescribed in the building code. To more accurately define the Site Class, shear wave velocity measurements could be made using geophysical methods.

Floor Slab Design Criteria: Following the previously described site preparation procedures, the ground floor slabs of the proposed structures may be supported at the indicated levels on the natural subgrade materials or properly placed controlled compacted fill. We recommend that the lowest level floor in the below-grade parking slab subgrades be underlain by a layer of coarse, free-draining material consisting of at least twelve inches of clean, three-quarter inch crushed stone or washed gravel. We recommend that subslab drains consisting of minimum four-inch diameter, perforated PVC pipes spaced 20 feet on center be installed below the proposed third level below grade parking area which would reportedly be established at Elevation +1,399 feet. The pipes should be surrounded by a minimum of four inches of clean, three-quarter inch crushed stone or

washed gravel and be connected to a manifold or header pipe where any water which accumulates in the stone may drain by gravity to daylight beyond the building limits or to the storm sewer system.

We recommend that floor slabs for the proposed paddock area and retail structures be underlain by a minimum of six inches of clean, three-quarter inch crushed stone or washed gravel to provide a capillary break between the floor slab and underlying subgrade soils. Depending upon the final elevations determined for the various retail and/or paddock area buildings, and especially if floor slabs are designed to step down to below grade levels, such as for a cinema, the final floor slab levels should be reviewed and recommendations be made to provide adequate drainage.

Immediately prior to at-grade slab construction, the exposed subgrade materials should be compacted to an unyielding condition under the observation of a qualified geotechnical engineer. Any subgrade materials which cannot be compacted as required should be excavated to the surface of suitable materials and replaced with controlled compacted fill or clean, three-quarter inch crushed stone.

We estimate that post-construction settlements of floor slabs supported by materials which are prepared in accordance with our recommendations would be less than one-quarter of one inch.

Below-Grade Walls: Significant retaining walls will be required to accommodate the difference in floor slab levels between the entrance level supported at-grade stepping down to the Parking Level 2 supported at-grade approximately 25 feet lower, and for the second step between the Lower Level 2 parking area and Lower Level 3 parking, an 11 foot change in elevation. Consequently, to accommodate the difference in floor slab levels, two retaining walls approximately 11 feet and 25 feet in height will be required along the entire length of the east-central portion of the structure where parking will be located. In addition, a single wall approximately 36 feet high will be required between the entry level in the area of the hotel and the office/training/service rooms west of

the hotel and north of the below-grade parking. We recommend that the below-grade walls be provided with a vertical drainage system to prevent the buildup of hydrostatic pressure behind the walls. The vertical drain should consist of a synthetic drainage material (Enkadrain, or equivalent) or a column of crushed stone which extends from the top of the wall foundation for the full height of the interior retaining walls. The vertical drainage layer should be connected to a foundation drain consisting of a minimum eight-inch diameter porous concrete or perforated ADS pipe surrounded on all sides by a minimum of six inches of free-draining crushed stone wrapped in filter fabric. The foundation drain should be sloped to drain by gravity to the storm sewer system or to daylight downslope.

All below-grade walls should be designed to resist lateral earth pressures imposed by the adjacent soils, as well as surcharge loads due to adjacent footings and surface improvements, as well as temporary construction traffic, material stockpiles, sloping backfills, etc. Walls which are free to rotate slightly during backfilling may be designed to resist lateral earth pressures assuming an active earth pressure condition. If the retaining walls are restrained, they should be designed assuming an at-rest earth pressure condition. If sandier portions of the on-site soils are used as backfill, a total unit weight of 145 to 150 pounds per cubic foot should be used, based on the Proctors obtained from the on-site soils compacted to 95 percent of their maximum dry density, and an approximate moisture content of 5 percent. A friction angle of 34 degrees may be used. We estimate that a friction factor between mass concrete and the on-site soils would be 0.40. If the footings are underlain by at least eight inches of crushed stone, the friction factor could be increased to 0.55.

Based on our previous experience with below-grade walls which accommodate interior steps between floor slabs greater than ten feet in height, such as those planned for the proposed casino, it is common practice for the structural engineer to require the framing of the upper level and upper floor

slab(s) to be in-place to brace the interior building wall before allowing backfilling. Significant construction delays could be encountered if backfilling of the proposed wall is delayed until the frame of the structure is complete and this would then dictate use of at-rest pressures for design of the walls.

Our conversations with the structural engineer indicated that due to the current plans requiring the decking for the proposed parking areas to be precast prior to installation, the below-grade walls would need to be tied back through the use of soil anchors. Based on our review of the Post Tensioning Institute (PTI) publication, "Recommendations for Pre-Stressed Rock and Soil Anchors" 2004 Edition, typical ultimate bond stresses between the soil and grouted portion of pressure grouted anchors for dense glacial till range from 43 to 75 psi. We suggest assuming 50 psi for preliminary design. However, since the actual anchor capacities will be dependent on the installation methods, we recommend a performance specification where an anchor capacity is specified and an experienced specialty contractor provides a design to achieve that capacity. All tie backs should be performance and proof tested in accordance with the PTI recommendations. In areas where fills are required for the walls, the use of tiebacks attached to deadmen installed before backfilling should be considered.

Pavement Design Criteria: We recommend that paved areas be prepared in general accordance with our prior discussions, including stripping of topsoil, proofrolling of subgrades, and placement and compaction of controlled compacted fill. Immediately prior to pavement construction, the exposed subgrade soils should be recompacted to a firm and unyielding consistency, and the upper two feet of the subgrade soils compacted to at least 95 percent of their maximum dry density as determined by the ASTM D-1557 test procedure. If the pavements are established on the natural soils consisting of silty sands, subgrade support conditions should be

considered "fair" with an estimated California Bearing Ratio (CBR) value of approximately five percent.

During the current study, detailed evaluation of the current condition of Joyland Road and Thompsonville Road which may need to be improved to access the proposed casino development was not performed. Our visual observations of the existing roadway surface indicate that the existing roads were constructed using a "chip-seal" method utilizing gravel and an asphalt emulsion which is reapplied and regraded every few years to restore the surface. Consequently, the existing pavement may not serve to be incorporated into a final pavement section.

We believe that the fill materials required to reach the proposed subgrade levels for the proposed track surface should be installed as described in previous sections of this report. The final site grades and the surface section required to accommodate horse racing has not been provided to us at this time. We recommend that the proposed section, once available, be provided for review to determine if materials generated on-site could provide the required support conditions if used within the racing surface section of the track.

Proposed Stormwater Management: Based on our ongoing discussions, you have indicated that it is currently desired to construct subsurface stormwater management systems below landscaped and/or parking areas as part of the overall site development. As part of our preliminary assessment of the permeability of the natural subgrade soils, tubes were driven into the test pit excavation sidewalls and the tube samples brought to our laboratory where they were saturated and subjected to falling head permeability tests. These results were transmitted to you in our correspondence of April 23, 2012. In general, the measured permeabilities were relatively low, likely due to the compactness and silty nature of the natural soils at the site. A summary of the tube permeameter results are included as Plate 8 to this report. As planning for the proposed stormwater

management systems on the site progress, we would be pleased to perform additional in-place permeability tests in accordance with NYDEC Appendix "D" in order to satisfy New York State requirements, or to discuss alternate groundwater management practices.

Proposed Sanitary Sewer Lines: Borings No. S-1 through S-16 were performed along a portion of the proposed new sanitary line route in the area of the proposed retail development between Joyland Road and Thompsville Road, and to the west along Thompsville Road for a total length of approximately 4,500 feet. Based on preliminary information provided to us, the borings performed along the proposed sanitary pipeline route were advanced to depths of between 15 and 20 feet below the existing surface grades. However, a boulder encountered in Boring S-8 terminated that exploration at a depth of eight and one-half feet below grade. In addition, bedrock was encountered at depths of approximately 15 to 20 feet below grade in Borings No. S-14 and S-16 located towards the eastern end of the proposed pipeline route included as part of this phase of the project. It should be anticipated that large boulders could be encountered in the excavations to install the proposed sanitary line which could require jackhammering and/or blasting for removal. Wider than anticipated excavations could be necessary in order to remove large boulders. In addition, any areas where the proposed sanitary line is anticipated to extend to depths of below 15 to 20 feet below grade could encounter sedimentary bedrock which would likely require blasting for removal.

Future Work

Proposed floor slab levels were provided to us for the casino/hotel/garage structure for preparation of this report. However, grading plans and proposed floor levels were not provided for the remainder of the site. Consequently, the findings and recommendations presented in this report

may need to be revised based on the final design levels. We recommend that as plans are developed, they be provided to us for review to confirm that the items discussed in this report remain valid.

Please feel free to contact us if you have any questions regarding this report.

The following Plates are attached and complete this report:

Plate 1 – Site Location Map
Plate 2 – Plot Plan
Plates 3-C-1 through 3-C-32 – Logs of Borings (Casino)
Plates 3-S-1 through 3-S-16 – Logs of Borings (Sanitary Line)
Plates 4-T-1 through 4-T-7 – Logs of Test Pits (Track/Paddock Area)
Plates 4-P-1 through 4-P-25 – Logs of Test Pits (Parking Area)
Plates 4-R-1 through 4-R-9 – Logs of Test Pits (Retail Area)
Plate 5 – Unified Soil Classification System
Plate 6 – Engineering Rock Classification and Core Description Chart
Plates 7A through 7K – Gradation Curves
Plates 7L through 7Q – Gradation Curves/Compaction Test Reports
Plate 8 – Summary of Tube Permeameter Test Results
Plates 9A through 9C – Monitoring Well Details
Plates 10A through 10E – Subsurface Profiles
Appendix – Limitations

Respectfully submitted,

MELICK-TULLY and ASSOCIATES, P.C.

James H. Beattie, P.E.
Senior Associate

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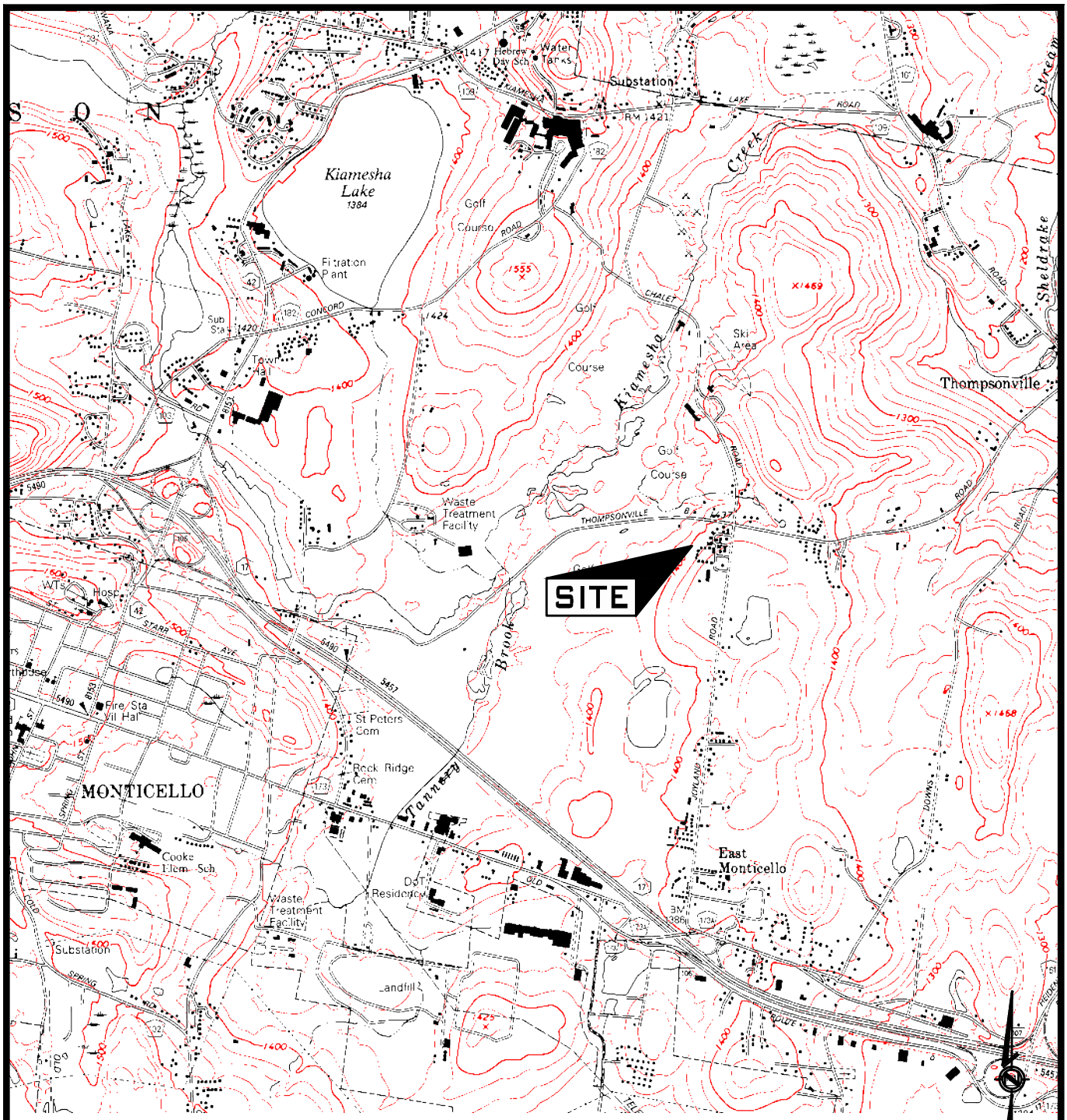
Vice President

JHB:TEH/mh
8979-001*1D
(3 copies submitted)



FROM: "Digital Raster Quadrangles" at 1:24,000 scale provided by New York State GIS Clearinghouse website (http://www.nysgis.state.ny.us/gisdata/quads/).

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SITE LOCATION MAP

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
8979-001*1D	25299	VJD	JHB	4-23-12	1"=2,000'	1

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch =100 ft.

KEY:

B-C-1 NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

B-1 SURVEY CONTROL POINTS PROVIDED BY OTHERS

A A' INDICATES NAME, APPROXIMATE LOCATION AND DIRECTION OF SUBSURFACE PROFILE

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-001*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from an unlabeled drawing provided by the client.

PLOT PLAN

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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JOB NO.	FILE NO.
8979-001*1D	25299

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	3-29-12	1"=100'	2

LOG OF BORING

BORING NO. C-1

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,421 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	6				Red-brown fine to coarse sand, some silt, little fine gravel (moist)(loose to very dense)	
	S2	55	7.0		SM		
5						- driller notes boulder @ 4'	5
	S3	50	9.3			Red-brown fine to coarse sand, and silt, little fine gravel (moist)(dense to very dense) - driller notes boulder @ 8'	
10	S4	46	8.3				10
15					SM	- grading with cobbles and boulders	15
	S5	50/5"					
20	S6	94					20
25	S7	68					25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-1

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,421 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	62				Red-brown fine to coarse sand, some silt, little fine gravel (moist)(dense to very dense)	
35	S9	39					35
					SM		
40	S10	54					40
45	S11	40					45
50	S12	50/5"				- piezometer installed to 50'	50
						Boring completed @ 50'-11"	
55						Date / Water Level 3/09/12 19'-0" 3/23/12 24'-0" 4/04/12 28'-7" 4/13/12 24'-4"	55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-2

COMPLETION DATE: 3/01/12 | SURFACE ELEVATION: +1,425 ft (±) | WATER LEVEL: 9'

JOB NUMBER: 8979-001*1D | READING DATE: 3/01/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	4				Red-brown fine to coarse sand, and silt, trace fine gravel (wet)(loose to dense)	
	S2	32	9.2				
5					SM	- grading to little fine gravel	5
	S3	39	8.9				
						- driller notes boulder @ 9'	
10						Light gray fine to coarse sand, little silt, some fine gravel (moist)(very dense)	10
	S4	52	3.1		SM		
						Red-brown fine to coarse sand, and silt, some fine to coarse gravel (wet)(very dense)	
15							15
	S5	81					
					SM		
20							20
	S6	64/9"					
						- driller notes boulder @ 23'	
						Gray fine to medium sand, little silt, some fine to coarse gravel (moist)(very dense)	
25							25
	S7	94/8"					
					SM	- grading with frequent cobbles and boulders	
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-2

COMPLETION DATE: 3/01/12 | SURFACE ELEVATION: +1,425 ft (±) | WATER LEVEL: 9'

JOB NUMBER: 8979-001*1D | READING DATE: 3/01/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	67				Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(very dense)	
35	S9	42			SM	- grading (wet)(dense)	35
40	S10	90/11"				- grading (very dense) with frequent cobbles and boulders - auger refusal @ 43' on boulder	40
45	CORE RUN NO. 1			3 3 3 4 4	SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel, frequent cobbles and boulders (wet)(very dense) CORE RUN NO. 1: 43' to 48'	45
50	NO. 2			3 3		CORE RUN NO. 2: 48' TO 50'	50
55						Boring completed @ 50' Groundwater encountered @ 9'	55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-3

COMPLETION DATE: 2/29/12 | SURFACE ELEVATION: +1,424 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-001*1D | READING DATE: 2/29/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	6	3.0		SM	6" Topsoil Red-brown fine to coarse sand, and silt, trace fine gravel (moist)(loose to dense)	
	S2	43					
5	S3	92/9"			SM	Gray fine to medium sand, little silt, little fine gravel, occasional cobbles and boulders (moist)(very dense)	5
10	S4	35			SM	Red-brown fine to coarse sand, some silt, and fine to coarse gravel (wet)(dense)	10
15	S5	76/11"			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (wet)(very dense)	15
20	S6	50/5"				- grading with frequent cobbles and boulders	20
25	S7	50/3"					25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-3

COMPLETION DATE: 2/29/12 | SURFACE ELEVATION: +1,424 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-001*1D | READING DATE: 2/29/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	70				Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (wet)(very dense)	
35	S9	50/3"			SM		35
40	S10	52					40
45	S11	50/3"					45
	CORE RUN NO. 1			3 4 4 5 5		Green-gray medium grained, poor quality, closely jointed sandstone bedrock ROCK CORE RUN NO. 1: 46' to 51' REC = 97% RQD = 28%	
50							50
55						Boring completed @ 51' Groundwater encountered @ 2'	55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-4

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,424 ft (±) | WATER LEVEL: 10'

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
					SM	6" Topsoil	
	S1	4				Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(loose)	
	S2	55	8.8		SM	Red-brown fine to coarse sand, some to and silt, little fine gravel (moist)(very dense)	
5	S3	87	6.2				5
10	CORE RUN 1	68		5 5 6 6 10 10	SM	Red-brown fine to medium sand, some silt, little fine gravel (wet)(very dense) NQ CORE RUN NO. 1: 10' to 12' NQ CORE RUN NO. 2: 12' to 15' - driller coring from 10' to 42' anticipating rock - no rock, glacial till with frequent cobbles and boulders NQ CORE RUN NO. 3: 15' to 20'	10
	CORE RUN 2						
15	CORE RUN NO. 3			4 4 5 5			15
20	CORE RUN NO. 4			5 3 3 4 5		NQ CORE RUN NO. 4: 20' TO 25'	20
25	S5 CORE RUN NO. 5	82		5 3 4 4 4	SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense) NQ CORE RUN NO. 5: 25' to 30'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-4

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,424 ft (±) | WATER LEVEL: 10'

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S6 CORE RUN NO. 6	39		5 5 6 6 5	SM	NQ CORE RUN NO. 6: 30' to 35'	
35	S7 CORE RUN NO. 7	82		6 4 4 5 5		NQ CORE RUN NO. 7: 35' to 40'	35
40	S8 CORE RUN NO. 8	53		6 4 4 5 6			40
45	CORE RUN NO. 9			6 5 6 7 6		NQ CORE RUN NO. 8: 40' to 45' - rock encountered @ 42' REC = 100% RQD = 63% Red-brown, fair quality, medium grained, closely jointed sandstone bedrock NQ RUN NO. 9: 45 to 50' REC = 100% RQD = 90% - grading to green-gray sandstone rock, excellent quality	45
50				6			50
55						Boring completed @ 50' Groundwater encountered @ 10'	55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-5

COMPLETION DATE: 3/12/12 | SURFACE ELEVATION: +1,426 ft (±) | WATER LEVEL: 15'

JOB NUMBER: 8979-001*1D | READING DATE: 3/09/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	5				Red-brown fine to coarse sand, and silt, little fine gravel (moist)(loose to dense)	
	S2	42	8.0		SM		
5	S3	41	9.4				5
10	S4	73				Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense to dense)	10
15	S5	50/1"			SM		15
20	S6	38					20
25	S7	63				- grading (very dense)	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-5

COMPLETION DATE: 3/12/12 | SURFACE ELEVATION: +1,426 ft (±) | WATER LEVEL: 15'

JOB NUMBER: 8979-001*1D | READING DATE: 3/09/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	68				Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense)	
35	S9	92			SM		35
40	S10	50/4"					40
45	CORE RUN NO. 1			2 2 3 3 4		- auger refusal @ 45' atop sandstone bedrock Red-brown fair quality, fine grained, closely jointed sandstone bedrock NQ ROCK CORE RUN NO. 1: 45' to 50' REC = 70% RQD = 60%	45
50							50
55						Boring completed @ 50' Groundwater encountered @ 15'	55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-6

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,428 ft (±) | WATER LEVEL: 18'

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	8				Red-brown fine to coarse sand, and silt, little fine gravel (moist)(loose to very dense)	
	S2	68/11"					
5					SM		5
	S3	64		7.4			
10						Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(dense to very dense)	10
	S4	44		7.2			
15							15
	S5	50					
20					SM	- grading with frequent cobbles and boulders	20
	S6	86					
25							25
	S7	50/4"					
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-6

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,428 ft (±) | WATER LEVEL: 18'

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	100/6"			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense)	
35	S9	50/4"					35
40						Green to red-brown medium to fine grained, good quality, closely jointed sandstone bedrock NQ ROCK CORE NO. 1: 39' to 44' REC = 97% RQD = 80%	40
45							45
50						Boring completed @ 44' Groundwater encountered @ 18'	50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-7

COMPLETION DATE: 3/14/12 | SURFACE ELEVATION: +1,430 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/14/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	8				12" Topsoil	
	S2	44			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist)(loose to very dense)	
5	S3	74					5
10	S4	88					10
15	S5	42				- grading (dense)	15
20	S6	50/1"				- grading (very dense)	20
25	S7	54					25
						Red-brown decomposed sandstone bedrock	
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-7

COMPLETION DATE: 3/14/12 | SURFACE ELEVATION: +1,430 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/14/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	50/1"				Red-brown decomposed sandstone bedrock	
35							35
	S9	50/1"		3		Green-gray, good quality, medium grained, medium jointed, sandstone bedrock	
	CORE			4		NQ CORE RUN NO. 1: 35' to 40'	
	RUN			4		REC = 90%	
	NO. 1			5		RQD = 75%	
				5			
40				4		NQ CORE RUN NO. 2: 40' to 45'	40
	CORE			5		REC = 92%	
	RUN			7		RQD = 73%	
	NO. 2			5		- grading to red-brown claystone bedrock from 44'-10" to 45'	
				5		- piezometer installed to 40'	
45							45
50						Boring completed @ 44'	50
						Date / Water Level	
						3/14/12 18'-0"	
						3/15/12 26'-2"	
55						3/19/12 27'-6"	55
						3/23/12 30'-0"	
						4/04/12 29'-7"	
						4/13/12 29-9"	
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-8

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,410 ft (±) | WATER LEVEL: 7'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	32				Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(dense to very dense)	
	S2	45					
5	S3	50/5"			SM	- grading with occasional cobbles and boulders @ 5'	5
10	S4	37				Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	10
15	S5	48					15
					SM		
20	S6	24				- grading to trace fine gravel (medium dense)	20
25	S7	50/5"				- grading (very dense) - driller notes boulder from 26' to 27'-6"	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-8

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-8

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,410 ft (±) | WATER LEVEL: 7'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	37			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense to very dense)	
35	S9	50/1"					35
40							40
45						Boring completed @ 37' Groundwater encountered @ 7'-6"	45
50							50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-8

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-9

COMPLETION DATE: 3/01/12 | SURFACE ELEVATION: +1,414 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/01/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	5				Red-brown fine to medium sand, some silt, little fine gravel (moist)(loose to dense)	
	S2	41			SM		
5							5
	S3	47	7.8		SM	Red-brown fine to coarse sand, and silt, little fine gravel, occasional cobbles and boulders (moist)(dense)	
10	S4	50/4"					10
					SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
15							15
	S5	50					
20							20
	S6	71					
25							25
	S7	38	8.3		SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (wet)(dense)	
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-9

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-9

COMPLETION DATE: 3/01/12 | SURFACE ELEVATION: +1,414 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/01/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	41			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (wet)(dense)	
35	S9	40					35
40							40
45							45
50						Boring completed @ 37' * Perched groundwater seepage encountered @ 2'-6"	50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-9

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-10

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,414 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	25				12" Topsoil	
	S2	80			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(medium dense to very dense)	
5	S3	36			SM	Red-brown fine to coarse sand, and silt, little fine to coase gravel, occasional cobbles and boulders (moist)(dense to very dense)	5
10	S4	40			SM		10
15	S5	48			SM		15
20	S6	95			SM		20
25	S7	50/1"			SM	- driller notes boulder from 26' to 30'	25
30	S8	43			SM		30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-10

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-10

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,414 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
					SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(dense to very dense)	
	CORE NO. 1			2 3		NQ ROCK CORE RUN NO. 1: 33' to 35' REC = 92% RQD = 42% - green poor quality, medium grained, closely jointed, sandstone bedrock	
35							35
40							40
45							45
50						Boring completed @ 35' *Groundwater not encountered	50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-10

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-11

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,410 ft (±) | WATER LEVEL: 21'

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	17				12" Topsoil	
	S2	47	5.4		SM	Red-brown fine to coarse sand, some silt, and fine gravel (moist)(medium dense to very dense)	
5	S3	89					5
10	S4	31	9.7		SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(dense to very dense)	10
15	S5	70					15
20	S6	31				- grading with cobbles and boulders @ 20'	20
25	S7	70					25
30	S8	50/5"					30
						Boring completed @ 30'-5" Groundwater encountered @ 21'	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-11

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-12

COMPLETION DATE: 3/12/12 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/12/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	4			SM	Red-brown fine to medium sand, little fine to coarse gravel (moist)(loose to dense)	
	S2	26					
5	S3	49					5
10	S4	62			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(very dense)	10
15	S5	63					15
20	S6	45			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	20
25	S7	23				- grading (medium dense)	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-12

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-12

COMPLETION DATE: 3/12/12 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/12/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	81			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	
						Decomposed sandstone bedrock - auger and sampler refusal encountered @ 35' - piezometer installed to 34'	
35	S9	50/0"					35
40							40
45						Boring completed @ 35'	45
						Date / Water Level 3/12/12 15'-0" 3/13/12 15'-0" 3/19/12 27'-0" 3/23/12 28'-8" 4/04/12 29'-2" 4/13/12 29'-2"	
50							50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-12

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-13

COMPLETION DATE: 3/13/12 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: 16'

JOB NUMBER: 8979-001*1D | READING DATE: 3/13/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	18			SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(medium dense)	
	S2	65			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(very dense)	
5	S3	57					5
10	S4	52	7.7		SM	Red-brown fine to coarse sand, some silt, little fine gravel, occasional cobbles and boulders (moist)(very dense)	10
15	S5	50					15
20	S6	50/4"			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense to dense)	20
25	S7	38					25
						Highly fractured sandstone bedrock	
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-13

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-13

COMPLETION DATE: 3/13/12 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: 16'

JOB NUMBER: 8979-001*1D | READING DATE: 3/13/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	CORE RUN NO. 1			4 4 5 6 7		Red-brown, good quality, closely jointed, siltstone bedrock NQ CORE RUN NO. 1: 30' to 35' REC = 100% RQD = 75%	
35							35
40							40
45							45
50						Boring completed @ 35' Groundwater encountered @ 16'	50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-13

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. 14

COMPLETION DATE: 3/14/12 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: 18'

JOB NUMBER: 8979-001*1D | READING DATE: 3/14/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	3				Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(loose to very dense)	
	S2	48					
5	S3	71					5
10	S4	68					10
					SM		
15	S5	74					15
20	S6	50/1"				- driller notes boulder from 22' to 24'	20
25	S7						25
	CORE RUN NO. 1 S8			3 2 3 4 4		NQ CORE RUN NO. 1: 27' to 32' Bedrock encountered @ 28': Red-brown poor quality, closely jointed claystone REC = 88% RQD = 35%	
30							30
						Boring completed @ 32' Groundwater encountered @ 18'	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C14

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-15

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,399 ft (±) | WATER LEVEL: 15'

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	3			SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(loose to very dense)	
	S2	58					
5	S3	38				Red-brown fine to medium sand, and silt, little fine gravel (moist)(dense)	5
10	S4	44			SM	- grading to little fine to coarse gravel	10
15	S5	50/5"	5.4			- grading (very dense) with cobbles and boulders	15
20	S6	50/5"				- driller notes boulder from 20'-6" to 22'	20
25	S7	27				- grading (medium dense)	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 2 PLATE: 3-C-15

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-15

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,399 ft (±) | WATER LEVEL: 15'

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S8	75			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(very dense)	
35							35
40							40
45						Boring completed @ 31'-11" *Groundwater encountered @ 15'	45
50							50
55							55
60							60

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 2 of 2 PLATE: 3-C-15

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-16

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,404 ft (±) | WATER LEVEL: 8'

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	13				8" Topsoil	
	S2	50/5"			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to very dense)	
5	S3	35				- grading (dense)	5
10	S4	62				- grading (very dense) with occasional cobbles and boulders @ 10'	10
15	S5	58			SM	Red-brown fine sand, and silt, some fine to coarse gravel (moist to wet)(very dense)	15
20	S6	85/8"					20
25	S7	50/3"				- grading to little fine to coarse gravel @ 25' - driller notes frequent cobbles and boulders @ 27'	25
30	S8	50/3"					30
						Boring completed @ 30'-3" Groundwater encountered @ 8'	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-16

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-17

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,404 ft (±) | WATER LEVEL: 17'

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	11				12" Topsoil	
	S2	60			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to very dense)	
5	S3	29				- grading (medium dense)	5
10	S4	46				Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(dense to very dense)	10
15	S5	65					15
20	S6	26			SM	- grading (medium dense)	20
25	S7	50/4"				- grading (very dense) with frequent cobbles and boulders	25
30	S8	50/3"					30
						Boring completed @ 30'-3" Groundwater encountered @ 17'	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-17

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-18

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,401 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	6				12" Topsoil	
	S2	31			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(loose to medium dense)	
5	S3	37					5
10	S4	61				- grading (very dense) with frequent cobbles and boulders	10
15	S5	46				- grading (dense)	15
20	S6	25			SM	Red-brown fine to coarse sand, and clayey silt, little fine to coarse gravel (moist)(medium dense)	20
25	S7	83			SM	Brown fine to medium sand, and silt, little fine to coarse gravel (decomposed sandstone)(moist)(very dense)	25
30	S8	75/3"					30
						Boring completed @ 30'-3" *Groundwater not encountered	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-18

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. C-19

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,409 ft (±) | WATER LEVEL: 17'

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	7				12" Topsoil	
	S2	44			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(loose to very dense)	
5	S3	70					5
10	S4	79			SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(very dense)	10
15	S5	56	8.1				15
20	S6	50/1"			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(very dense)	20
25	S7	50/1"				- grading with increased sandstone fragments @ 25'	25
30	S8	50/1"					30
35						Boring completed @ 30' Groundwater encountered @ 17'	35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-19

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-20

COMPLETION DATE: 3/13/12 | SURFACE ELEVATION: +1,409 ft (±) | WATER LEVEL: 17'

JOB NUMBER: 8979-001*1D | READING DATE: 3/13/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	3				8" Topsoil	
	S2	27			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(loose to dense)	
5	S3	41					5
10	S4	34					10
15	S5	68			SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(very dense)	15
20	S6	50/1"					20
	CORE RUN 1			3 2		Red-brown, good quality, medium jointed claystone - grading to siltstone NQ ROCK CORE RUN NO. 1: 22' to 25' REC = 89% RQD = 78%	
25	CORE RUN NO. 2			3 4 4 5 4		Red-brown, good quality, medium jointed siltstone - grading to sandstone NQ ROCK CORE RUN NO. 2: 25' to 30' REC = 97% RQD = 80%	25
30							30
						Boring completed @ 30' Groundwater encountered @ 17'	
35							35

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-20

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-21

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,388 ft (±) | WATER LEVEL: 11'

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	6			SM	Red-brown fine to medium sand, some silt, little fine to coarse gravel (very moist)(loose to dense)	
	S2	49					
5							5
	S3	29			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
10							10
	S4	30					
15						- grading (dense) with occasional cobbles and boulders	15
	S5	32					
						- driller notes boulder @ 18' to 19'	
20							20
	S6	44					
25						Boring completed @ 22' Groundwater encountered @ 11'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-21

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-22

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,394 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	2			SM	Red-brown fine to coarse sand, some clayey silt, little fine to coarse gravel (moist)(loose to very dense)	
	S2	50					
5	S3	36				- grading (dense)	5
10	S4	67			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(very dense)	10
15	S5	50/2"				- driller notes boulder from 14' to 15'	15
20	S6	74					20
25						Boring completed @ 22' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-22

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-23

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,393 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	2				Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist)(loose to dense)	
	S2	50					
5	S3	36					5
10	S4	67			SM	- grading (very dense) with frequent cobbles and boulders @ 10'	10
15	S5	50/2"				- driller notes boulder from 15' to 19'	15
20	S6	74				Highly decomposed sandstone bedrock	20
25						Boring completed @ 20'-3" *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-23

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-24

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,386 ft (±) | WATER LEVEL: 12'

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	5				Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(loose to dense)	
	S2	26					
5	S3	40					5
					SM		
10	S4	49					10
15							15
	S5	53				Red-brown fine to coarse sand, and silt, little fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
					SM		
20	S6	50/1"					20
25						Boring completed @ 20'-7" Groundwater encountered @ 12'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-24

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-25

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,397 ft (±) | WATER LEVEL: 17'

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	8				Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist)(loose to very dense)	
	S2	75					
5							5
	S3	88					
10					SM	- grading (dense)	10
	S4	47					
						- driller notes boulder @ 13'	
15						- grading (very dense)	15
	S5	58					
						- driller notes boulder @ 19'	
20	S6	50/0"					20
25						Boring completed @ 20' Groundwater encountered @ 17'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-25

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-26

COMPLETION DATE: 3/14/12 | SURFACE ELEVATION: +1,398 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/14/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	15				Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to dense)	
	S2	45					
5	S3	44			SM		5
10	S4	36			SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(dense)	10
15	S5	63			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense)	15
20	S6	52					20
25						Boring completed @ 22' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-26

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-27

COMPLETION DATE: 3/14/12 | SURFACE ELEVATION: +1,380 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/14/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	4			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(loose to very dense)	
	S2	57					
5	S3	52			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense)	5
10	S4	50/5"				- driller notes boulder @ 10'	10
15	S5	28				- grading (medium dense)	15
20	S6	22					20
25						Boring completed @ 22' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-27

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-28

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,381 ft (±) | WATER LEVEL: 9'

JOB NUMBER: 8979-001*1D | READING DATE: 3/09/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	4			SM	Red-brown fine to coarse sand, some silt, little fine gravel (moist)(loose to medium dense)	
	S2	22					
5	S3	50			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(very dense)	5
10	S4	50/5"				- grading with cobbles and boulders	10
15	S5	22			SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(medium dense)	15
20	S6	50/1"				Decomposed sandstone bedrock	20
25						Boring completed @ 20'-1" Groundwater encountered @ 9'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-28

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-29

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,381 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	5				Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(loose to very dense)	
	S2	60					
5						- grading (dense)	5
	S3	38					
10						- grading (very dense) with frequent cobbles and boulders	10
	S4	50/3"					
15							15
	S5	50/3"					
20	S6	50/0"					20
25						Boring completed @ 20' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-29

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-30

COMPLETION DATE: 3/19/12 | SURFACE ELEVATION: +1,376 ft (±) | WATER LEVEL: 13'

JOB NUMBER: 8979-001*1D | READING DATE: 3/19/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	9			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(loose to very dense)	
	S2	57					
5						- grading (dense)	5
	S3	47					
10							10
	S4	38					
15						- grading (very dense) with frequent cobbles and boulders	15
	S5	50					
20	S6	50/3"					20
25						Boring completed @ 20'-3" Groundwater encountered @ 13'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-30

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-31

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,374 ft (±) | WATER LEVEL: 7'

JOB NUMBER: 8979-001*1D | READING DATE: 3/09/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	15			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense to dense)	
	S2	49					
5	S3	50					5
10	S4	52			SM	Red-brown fine to medium sand, some clayey silt, little fine to coarse gravel, occasional cobbles and boulders (wet)(very dense to dense)	10
15	S5	34					15
20	S6	50/1"				Decomposed sandstone bedrock	20
25						Boring completed @ 20'-1" Groundwater encountered @ 9'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-31

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. C-32

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,371 ft (±) | WATER LEVEL: 7'

JOB NUMBER: 8979-001*1D | READING DATE: 3/09/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						12" Topsoil	
	S1	5			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(loose to medium dense)	
	S2	35					
5	S3	56			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense)	5
10	S4	45				- grading (dense)	10
15	S5	37					15
20	S6	65				- grading (very dense)	20
25						Boring completed @ 22' Groundwater encountered @ 7'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-C-32

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-1

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,455 ft (±) | WATER LEVEL: 10'

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	6			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(loose)	
	S2	60	5.3			Red-brown fine to coarse sand, some to and silt, little to some fine gravel (moist)(very dense to dense)	
5	S3	46	5.9				5
	S4	85/11"					
					SM		
10	S5	43					10
15							15
	S6	68					
20							20
						Boring completed @ 17' Groundwater encountered @ 10'	
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-2

COMPLETION DATE: 2/19/12 | SURFACE ELEVATION: +1,455 ft (±) | WATER LEVEL: 15'

JOB NUMBER: 8979-001*1D | READING DATE: 2/19/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	9			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(loose)	
5	S2	62			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(very dense)	5
10	S3	50/0"				- driller notes boulder @ 10'	10
15	S4	50/5"					15
20							20
25						Boring completed @ 15'-11" Groundwater encountered @ 15'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-3

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,452 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	5			ML	Red-brown silt, and fine to coarse sand, trace fine gravel (moist)(medium to hard)	
	S2	32	8.7				
5	S3	52			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist)(very dense) - driller notes boulder @ 7'-6"	5
10	S4	52					10
15	S5	98/10"					15
20						Boring completed @ 16'-4" *Groundwater not encountered	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-4

COMPLETION DATE: 3/19/12 | SURFACE ELEVATION: +1,445 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/19/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	18	32.2		SM	Red-brown fine to coarse sand, some silt, little to some fine gravel, occasional cobbles and boulders (moist)(medium dense)	
5	S2	24	8.8				5
10	S3	64	7.6		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(very dense)	10
15	S4	75					15
20						Boring completed @ 16'-10" *Groundwater not encountered	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-5

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,435 ft (±) | WATER LEVEL: 10'

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						6" Topsoil	
	S1	8	24.4		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(loose to dense)	
	S2	36	7.9			Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense to very dense)	
5	S3	60	8.4				5
10	S4	35			SM		10
15	S5	66					15
20	S6	50/2"					20
25						Boring completed @ 20'-8" Perched groundwater encountered @ 10'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-6

COMPLETION DATE: 3/19/12 | SURFACE ELEVATION: +1,412 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/19/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	5				Red-brown fine to coarse sand, and silt, little to some fine to coarse gravel, occasional cobbles and boulders (moist)(loose to very dense)	
5	S2	42					5
10	S3	65			SM		10
15	S4	50/1"				- driller notes numerous cobbles and boulders @ 15'	15
20	S5	50/1"					20
						Boring completed @ 20'-1"	
25						*Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-7

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,383 ft (±) | WATER LEVEL: 10'

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						6" Topsoil	
	S1	4	22.8		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (loose to very dense)	
	S2	17	12.6				
5							5
	S3	43	7.3				
10							10
	S4	87/10"	4.8				
						- driller notes boulder @ 14'	
15							15
	S5	75/10"				- driller notes boulder @ 16'	
20							20
						Highly fractured sandstone bedrock	
	S6	50/1"					
25						Boring completed @ 20'-7" Perched groundwater encountered at 10'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-8

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,354 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						4" Topsoil	
	S1	12				FILL - Fine to coarse sand, little silt, little fine to coarse gravel	
	S2	36			SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (wet)(dense)	
5	S3	45				- grading with cobbles and boulders @ 6'	5
	S4	50/0"					
	S5	50/0"				- auger refusal atop boulder @ 8'-6"	
10							10
15							15
						Boring completed @ 8'-6"	
20						Perched groundwater encountered @ 3'	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-8

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-9

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,350 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	24				FILL - Red-brown fine to coarse sand, and silt, some fine to coarse gravel	
	S2	46			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to dense)	
5	S3	28					5
	S4	50/1"					
	S5	61			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles and boulders (wet)(dense to very dense)	
10	S6	47					10
	S7	86					
15	S8	50/2"					15
20						Boring completed @ 14'-8" *Groundwater encountered @ 6'	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-9

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-10

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,357 ft (±) | WATER LEVEL: 5'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	9				4" Topsoil	
	S2	41				FILL - Brown fine to coarse sand, some silt, little fine gravel	
5	S3	86				Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(dense to very dense)	5
	S4	59			SM		
	S5	81					
10	S6	86					10
	S7	122					
15	S8	80					15
20						Boring completed @ 15'-10" Groundwater encountered @ 5'-6"	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-10

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-11

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,360 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						6" Topsoil	
	S1	10			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist to wet)(medium dense to very dense)	
	S2	26					
5	S3	47					5
	S4	35			SM	Red-brown fine to coarse sand, little silt, little fine to coarse gravel (wet)(dense)	
	S5	90			SM	Red-brown fine to coarse sand, little to some silt, little fine to coarse gravel, occasional cobbles and boulders (wet)(very dense)	
10	S6	130					10
	S7	96					
15	S8	100/5"					15
20	S9	100/4"				- driller noted cobbles @ 21'-6"	20
25						Boring completed @ 22' Groundwater encountered @ 6'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-11

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-12

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						2" Topsoil and pine needles	
	S1	4			SM	Brown to dark brown fine to coarse sand, little silt, trace fine to coarse gravel (moist)(loose to very dense)	
	S2	50/4"				- driller notes cobbles @ 3'	
5	S3	56	39.0		SM	Red-brown fine to coarse sand, and silt, trace fine gravel (wet)(very dense)	5
	S4	66					
	S5	158/10"			SM	Gray and red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional to frequent cobbles and boulders (moist)(very dense)	
10	S6	100/4"					10
	S7	100/4"					
15							15
20	S8	100/1"					20
25						Boring completed @ 20'-1" Groundwater encountered @ 6'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-12

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-13

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: 12'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						4" Topsoil	
	S1	4			SM	Red-brown fine to coarse sand, some silt, trace fine gravel (moist)(loose)	
					ML	Red-brown clayey silt, and fine to medium sand, trace fine to coarse gravel (wet)(hard)	
	S2	70					
5	S3	55				Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist to wet)(very dense)	5
	S4	56					
	S5	69					
10					SM		10
	S6	75					
	S7	104					
						- grading with frequent cobbles and boulders	
15	S8	100/3"					15
20							20
25						Boring completed @ 20' Groundwater encountered @ 12'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-13

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-14

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Topsoil	
	S1	28				FILL - Fine to coarse gravel, and fine to coarse sand, trace silt	
	S2	66				Red-brown fine to coarse sand, some silt, little fine gravel (moist)(very dense)	
5	S3	59	25.7				5
	S4	159/11"			SM		
	S5	81					
10	S6	112					10
	S7	100/4"					
15	S8	50/0"					15
	CORE RUN NO. 1			6 2 3 3 3		NQ ROCK CORE RUN NO. 1: 15' to 20' REC = 97% RQD = 77% Red-brown good quality, closely jointed siltstone, grading to sandstone @ 16'	
20	—						20
25						Boring completed @ 20' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-14

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-15

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,355 ft (±) | WATER LEVEL:

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Topsoil	
	S1	11				FILL - Brown-dark gray fine to coarse sand, some silt, little fine gravel	
	S2	59				Gray to red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense)	
5	S3	83					5
	S4	100/5"					
					SM		
	S5	100/5"					
10							10
	S6	75/2"				- driller notes cobbles @ 10'-6"	
	S7	100/5"				- possible bedrock @ 14'-5"	
15							15
20							20
						Boring completed @ 14'-5"	
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-15

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-16

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,344 ft (±) | WATER LEVEL: 7'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Gravel pavement	
	S1	41				Red-brown fine to coarse sand, little to some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to very dense)	
	S2	78					
5	S3	37					5
	S4	32	10				
	S5	40					
10					SM		10
	S6	192/11"					
	S7	28					
15	S8	66					15
20	—						20
	CORE RUN NO. 1			6 3 3 4 4		NQ ROCK CORE RUN NO. 1: 20' to 25' REC = 90% RQD = 83% Light green-gray good quality, medium jointed, coarse grained sandstone, and conglomerate	
25	—						25
						Boring completed @ 25' Groundwater encountered @ 7'-6"	
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 3-S-16

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-1

COMPLETION DATE: 2/28/12 | SURFACE ELEVATION: +1,373 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/28/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1	9.9	SM	Red-brown fine to coarse sand, some silt, little fine gravel (wet)(dense)	
5	S2		SM	Red-brown fine to coarse sand, little silt, little fine to coarse gravel (moist)(medium dense)	5
	S3	8.7	SM	Red-brown fine to medium sand, and silt, some fine to coarse gravel (moist)(very dense)	
10				- grading with cobbles/boulders @ 9'	10
				- refusal @ 11' on dark green sandstone boulder, or bedrock	
				Test pit completed @ 11' *Groundwater not encountered Mottling observed @ 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-2

COMPLETION DATE: 2/28/12 | SURFACE ELEVATION: +1,366 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/28/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense) - refusal @ 7' on sandstone bedrock	5
10				Test pit completed @ 7' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-3

COMPLETION DATE: 2/29/12
JOB NUMBER: 8979-001*1D

SURFACE ELEVATION: +1,367 ft (±)

WATER LEVEL: *
READING DATE: 2/29/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1			FILL - Orange-brown fine to medium sand, some silt, trace fine gravel	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(dense) - refusal @ 4' on dark gray/green sandstone bedrock	
5					5
10				Test pit completed @ 4' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-4

COMPLETION DATE: 2/28/12 | SURFACE ELEVATION: +1,368 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/29/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(dense to very dense) - refusal @ 8' on green/gray sandstone bedrock	5
10				Test pit completed @ 8' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-5

COMPLETION DATE: 2/29/12 | SURFACE ELEVATION: +1,356 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/29/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				24" Topsoil	
	S1	11.5	SM	Light brown fine to coarse sand, and silt, little fine gravel (moist)(dense)	
5	S2	7.4	SM	Red-brown fine to coarse sand, and silt, little fine gravel, frequent cobbles (moist)(very dense) - refusal @ 7'-6" on green/gray sandstone bedrock	5
10				Test pit completed @ 7'-6" *Groundwater not encountered Mottling observed @ 3.5'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-6

COMPLETION DATE: 2/29/12
JOB NUMBER: 8979-001*1D

SURFACE ELEVATION: +1,361 ft (±)

WATER LEVEL: *
READING DATE: 2/29/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
	S2	16.6	ML	Red-brown silt, trace fine sand (moist)(hard)	
5				- refusal @ 7'-6" on sandstone bedrock	5
10				Test pit completed @ 7'-6" *Groundwater not encountered Mottling observed @ 1'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: T-7

COMPLETION DATE: 2/29/12
JOB NUMBER: 8979-001*1D

SURFACE ELEVATION: +1,367 ft (±)

WATER LEVEL: *
READING DATE: 2/29/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (very moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense to very dense) - refusal @ 8' on gray/green sandstone bedrock	5
10				Test pit completed @ 8' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-T-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-1

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,385 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1	11.3	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5	S2			- grading with and fine to coarse gravel	5
				- backhoe refusal encountered @ 7'-6" on nested boulders	
10				Test pit completed @ 7'-6" *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-2

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,414 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(dense)	
5	S2 S3		SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense)	5
10			ML	Red-brown clayey silt, and fine to coarse sand, little fine to coarse gravel (moist)(hard) - backhoe refusal encountered at 10' on sandstone bedrock	10
15				Test pit completed @ 10' *Groundwater not encountered	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-3

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,442 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1	21.5	SM	Red-brown fine to coarse sand, and silt, some fine gravel (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(dense) - grading (very dense) with cobbles and boulders	5
10	S3				10
				Test pit completed @ 12' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-4

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,448 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, trace fine to coarse gravel (moist)(medium dense)	
5	S2			- grading to some fine to coarse sand, some fine to coarse gravel (very dense)	5
				Red-brown highly fractured, weathered sandstone	
10	S3			- backhoe refusal encountered @ 11' atop sandstone bedrock	10
				Test pit completed @ 11' *Groundwater not encountered Mottling observed @ 4'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-5

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,440 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1	12.5	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(dense)	5
	S3				
10	S4				10
				Test pit completed @ 12' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-6

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,448 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, little to some fine to coarse gravel, occasional to frequent cobbles and boulders (moist)(dense to very dense)	
5	S2				5
	S3				
10					10
				Test pit completed @ 12' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-7

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,446 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1	15.4	SM	Red-brown fine to coarse sand, some silt, some fine gravel (wet)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(dense to very dense) - refusal @ 5' on red sandstone bedrock	
5					5
10				Test pit completed @ 5' *Groundwater not encountered Mottling observed @ 2'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-8

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,450 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Asphalt over 8" of sandy fill	
	S1			Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional to frequent cobbles and boulders (moist)(dense)	
5	S2		SM		5
	S3				
10					10
				Test pit completed @ 12' *Perched groundwater seepage encountered @ 10" Mottling observed from 4' to 6'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-8

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-9

COMPLETION DATE: 3/02/12 | SURFACE ELEVATION: +1,448 ft (±) | WATER LEVEL: 12'

JOB NUMBER: 8979-001*1D | READING DATE: 3/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand,some silt, little fine to coarse gravel (moist)(medium dense)	
5	S2			- grading with some fine to coarse gravel, frequent cobbles and boulders (very dense)	5
10	S3				10
	S4			- backhoe refusal encountered @ 13' on sandstone bedrock	
				Test pit completed @ 13' Groundwater encountered @ 12' Mottling observed from 2' to 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-9

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-10

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,450 ft (±) | WATER LEVEL: 7.5'

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles (moist)(dense to very dense)	
5				- bulk sample taken from 5' to 6'	5
	S2			- backhoe refusal encountered @ 9' on sandstone bedrock	
10				Test pit completed @ 9' Perched water encountered @ 7'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-10

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-11

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,368 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				24" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
5					5
	S2			- grading with cobbles/boulders @ 6'	
10				Test pit completed @ 8' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-11

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-12

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,365 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
5	S2			- grading with frequent cobbles and boulders @ 6'	5
10				Test pit completed @ 7'-6" *Groundwater not encountered Mottling observed @ 3'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-12

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-13

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,375 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				24" Topsoil	
	S1	10.0	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
5	S2	10.5	SM	Red-brown fine to coarse sand, and silt, some fine gravel, frequent cobbles and boulders (moist)(very dense) - backhoe refusal encountered @ 8'-6" on nested boulders	5
10				Test pit completed @ 8'-6" *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-13

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-14

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,388 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(dense)	
5	S2	7.8	GM	Red-brown fine to coarse gravel, and fine to coarse sand, some silt (moist)(very dense) - bulk sample taken from 5'-6" to 6'-6"	5
				Green gray highly fractured weathered sandstone - backhoe refusal encountered @ 10' on sandstone bedrock	
10					10
				Test pit completed @ 10' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-14

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-15

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,380 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, frequent cobbles (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
10				Test pit completed @ 8' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-15

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-16

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,448 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1	8.4	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional to frequent cobbles and boulders (moist)(dense to very dense) - mottling observed from 3' to 5'	
5	S2				5
10	S3				10
				Test pit completed @ 12' Slight perched groundwater seepage encountered @ 1'-6" Mottling observed from 3' to 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-16

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-17

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,455 ft (±) | WATER LEVEL: 6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and clayey silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(dense to very dense)	
5	S2	4.0	GM	Red-brown fine to coarse gravel, some fine to coarse sand, some silt (moist)(very dense)	5
10	S3				10
				Test pit completed @ 11' Slight perched groundwater seepage encountered from 6" to 12" Mottling observed from 3' to 4'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-17

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-18

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,434 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
	S3			- backhoe refusal encountered @ 10' atop nested boulders	
10					10
				Test pit completed @ 10' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-18

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-19

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,447 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
5	S3				5
10	S4				10
				Test pit completed @ 12' Slight perched groundwater seepage encountered @ 1'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-19

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-20

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,454 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
10	S3				10
15				Test pit completed @ 13' Slight perched groundwater seepage encountered @ 1'-6" Mottling observed from 4' to 8'	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-20

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-21

COMPLETION DATE: 3/08/12 | SURFACE ELEVATION: +1,417 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-001*1D | READING DATE: 3/08/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1	8.8	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense)	
5					5
	S2 S3	8.3	SM	Red-brown and gray fine to coarse sand, and silt, some fine to coarse gravel, few cobbles (moist)(very dense)	
10					10
				Test pit completed @ 10' Slight perched groundwater seepage encountered @ 3' to 4'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-21

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-22

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,428 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
10	S3				10
15				Test pit completed @ 12' *Groundwater not encountered Mottling observed from 4' to 6'	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-22

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-23

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,433 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine gravel (moist)(dense)	
5	S2		SM	Brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
	S3				
	S4				
10					10
				Test pit completed @ 11' Slight perched groundwater seepage encountered @ 1'-6" Mottling observed from 8' to 9'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-23

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-24

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,442 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(dense)	
5					5
	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
	S3				
10					10
				Test pit completed @ 11' Slight perched groundwater seepage encountered @ 1'-6" Mottling observed from 5'-6" to 8'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-24

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: P-25

COMPLETION DATE: 3/07/12 | SURFACE ELEVATION: +1,410 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-001*1D | READING DATE: 3/07/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (moist)(very dense)	
5	S2			- grading with frequent cobbles and boulders	5
	S3				
10	S4				10
				Test pit completed @ 12' Slight perched groundwater seepage encountered @ 2' Mottling observed from 8' to 10'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-P-25

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-1

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,427 ft (±) | WATER LEVEL: 2'-3'

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1	9.4	SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (moist)(dense) - grading (wet)	
5	S2	4.7	GM	Red-brown fine to coarse gravel, and fine to coarse sand, some silt, frequent cobbles and boulders (moist)(very dense)	5
10				Test pit completed @ 10' Perched groundwater seepage encountered from 2' to 3'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-1

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-2

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,410 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	
5					5
	S2		SM	Red-brown fine to coarse sand, and silt, trace fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	
10	S3			- backhoe refusal encountered @ 10'-6" on sandstone bedrock	10
				Test pit completed @ 10'-6" *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-2

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-3

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,439 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
				FILL - Light brown silt, little fine to coarse sand, trace fine gravel	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine gravel (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
10				- backhoe refusal encountered @ 11' on nested boulders	10
				Test pit completed @ 11' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-3

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-4

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,432 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				24" Topsoil	
	S1	7.8	SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel, occasional cobbles (moist)(dense)	
5					5
	S2	8.3	SM	Red-brown fine to coarse sand, and silt, little fine gravel, frequent cobbles and boulders (moist)(very dense)	
10					10
	S3				
				Test pit completed @ 12' Perched groundwater seepage encountered @ 2'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-4

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-5

COMPLETION DATE: 3/06/12
JOB NUMBER: 8979-001*1D

SURFACE ELEVATION: +1,442 ft (±)

WATER LEVEL: *
READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist)(dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
10	S3				10
15				Test pit completed @ 12' Slight perched groundwater seepage encountered @ 18" Mottling observed @ 3'	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-5

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-6

COMPLETION DATE: 3/06/12 | SURFACE ELEVATION: +1,432 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/06/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				18" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some to and silt, little fine to coarse gravel, occasional cobbles (moist)(very dense)	
5	S2				5
				- grading with frequent cobbles and boulders @ 7'	
	S3				
10					10
				Test pit completed @ 12' *Groundwater not encountered Mottling observed from 4' to 6'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-6

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-7

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,448 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1	8.9	ML	Red-brown silt, some fine to coarse sand (moist)(medium)	
	S2	6.8	SM	Red-brown fine to coarse sand, and silt, some fine gravel, frequent cobbles and boulders (moist)(very dense)	
5					5
	S3				
10					10
				Test pit completed @ 10' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-7

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: R-8

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,453 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
	S2				
5			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense)	5
				- backhoe refusal encountered @ 10' on nested boulders	
10	S3				10
				Test pit completed @ 10' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-8

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: R-9

COMPLETION DATE: 3/05/12 | SURFACE ELEVATION: +1,453 ft (±) | WATER LEVEL: 7'-8'

JOB NUMBER: 8979-001*1D | READING DATE: 3/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasionial cobbles and boulders (moist)(very dense)	
5					5
	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, frequent cobbles and boulders (moist)(very dense) - backhoe refusal encountered @ 9' on nested boulders	
10				Test pit completed @ 9' Slight perched groundwater seepage encountered from 7' to 8' Mottling observed @ 6'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-R-9

MELICK-TULLY AND ASSOCIATES, P.C.
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MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
			SP	Poorly-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS	Liquid limit LESS than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS	Liquid limit GREATER than 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION*		COMPACTNESS* sand and/or gravel		CONSISTENCY* clay and/or silt	
% Finer by Weight		Relative Density		Range of Shearing Strength in Pounds per Square Foot	
Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

**Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.*

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

ENGINEERING ROCK CLASSIFICATION AND CORE DESCRIPTION CHART (1)

DESCRIPTIVE TERMINOLOGY FOR JOINT SPACING

Description Term	Spacing of Joints
Very Close	Less than 2 inches
Close	2 inches to 1 foot
Moderately Close	1 foot to 3 feet
Wide	3 feet to 10 feet
Very Wide	Greater than 10 feet

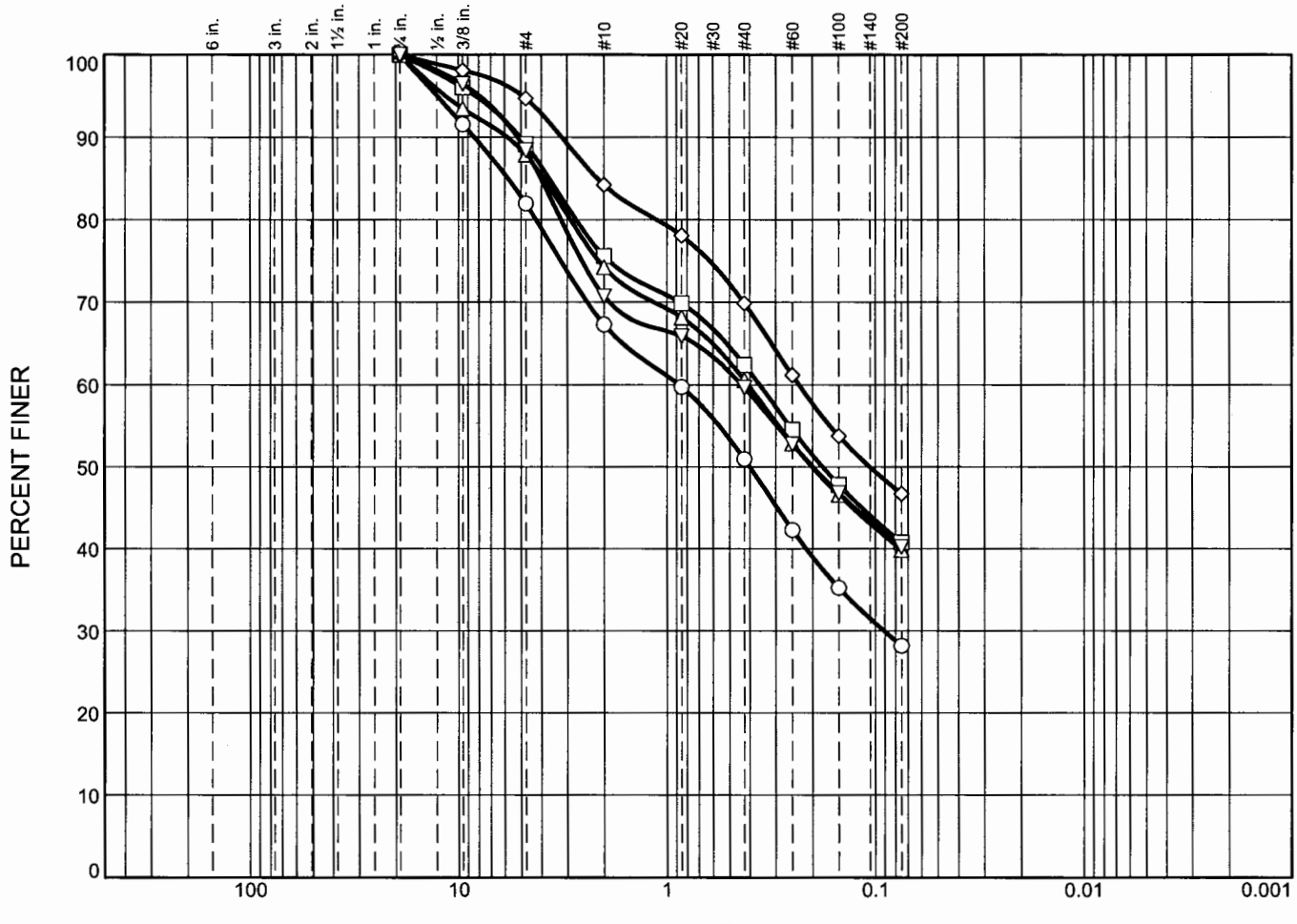
RELATIONSHIP OF RQD AND ROCK QUALITY

Rock Quality Designation (RQD) (2)	Description of Rock Quality
0 - 25%	Very Poor
25 - 50%	Poor
50 - 75%	Fair
75 - 90%	Good
90 - 100%	Excellent

(1) Core description system is based on a suggested system proposed in the ASCE Rock Mechanics Seminar in April and May of 1968 entitled "Geologic Considerations of Rock Mechanics" as presented by Don V. Deere.

(2) "Rock Quality Designation" is defined as a modified core recovery ratio which considers only pieces of core that are at least 4 inches long. Obvious fractures induced by drilling are ignored in this system.

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	18.0	14.7	16.3	22.8	28.2
□	0.0	0.0	10.8	13.6	13.1	21.7	40.8
△	0.0	0.0	12.1	13.6	13.7	20.7	39.9
◇	0.0	0.0	5.3	10.5	14.3	23.2	46.7
▽	0.0	0.0	11.6	17.7	11.0	19.5	40.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	C-1	S-2	2-4	Fine to coarse Sand, some Silt, little fine Gravel. (MC=7.0%)	SM
□	C-1	S-4	10-12	Fine to coarse Sand, and Silt, little fine Gravel. (MC=9.3%)	SM
△	C-1	S-7	25-27	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.3%)	SM
◇	C-2	S-2	2-4	Fine to coarse Sand, and Silt, trace fine Gravel. (MC=9.2%)	SM
▽	C-2	S-3	5-7	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.9%)	SM

Melick-Tully & Associates, P.C.

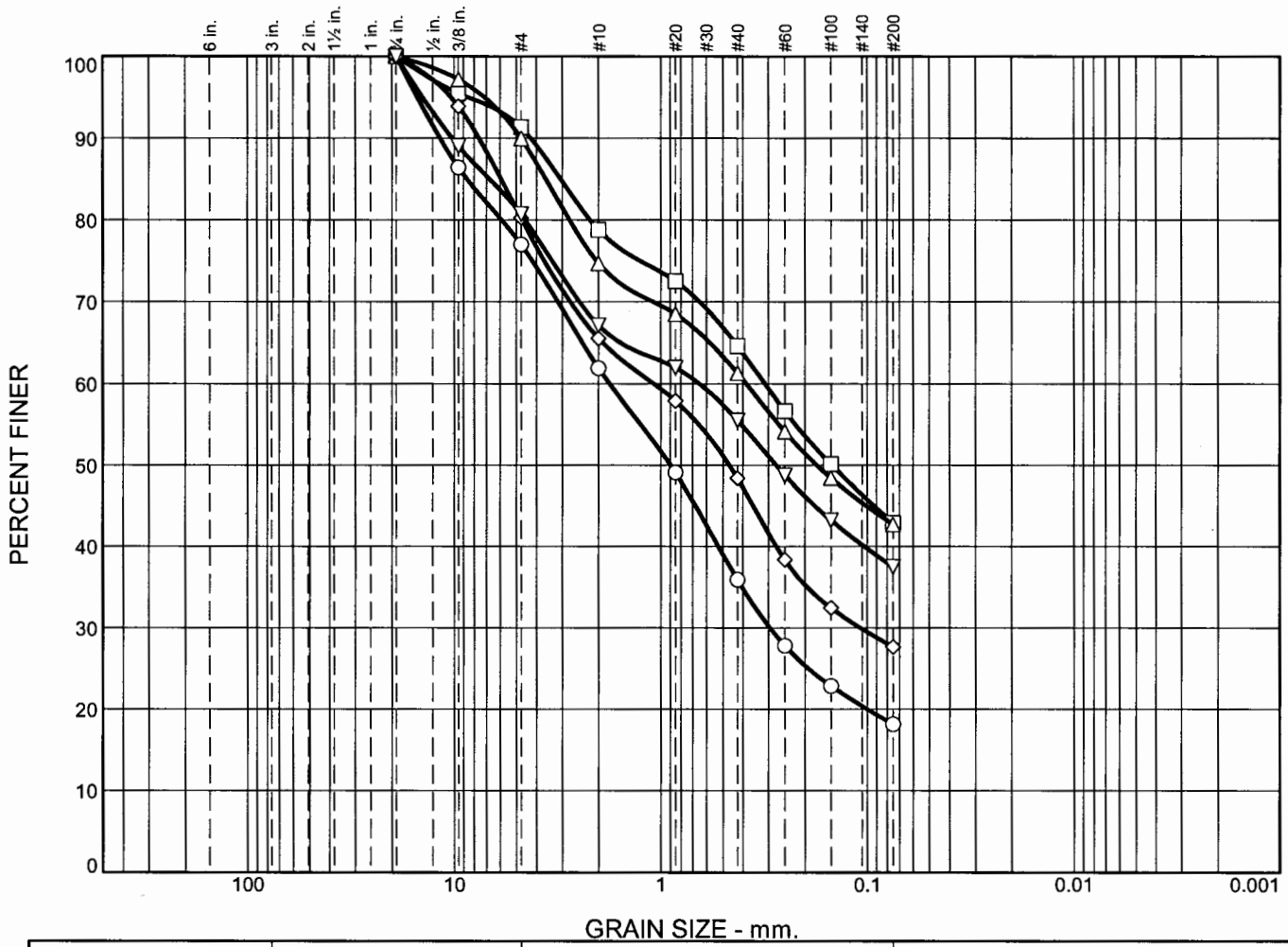
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7A

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	23.0	15.1	26.0	17.8	18.1
□	0.0	0.0	8.7	12.5	14.2	21.7	42.9
△	0.0	0.0	10.0	15.3	13.4	18.6	42.7
◇	0.0	0.0	19.7	14.7	17.2	20.8	27.6
▽	0.0	0.0	19.3	13.5	11.7	18.0	37.5

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	C-2	S-4	10-12	F-c Sand, some fine Gravel, little Silt. (MC=3.1%)	SM
□	C-3	S-1	0-2	Fine to coarse Sand, and Silt, trace fine Gravel. (MC=3.0%)	SM
△	C-4	S-2	2-4	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.8%)	SM
◇	C-4	S-3	5-7	Fine to coarse Sand, some Silt, little fine Gravel. (MC=6.2%)	SM
▽	C-5	S-2	2-4	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.0%)	SM

Melick-Tully & Associates, P.C.

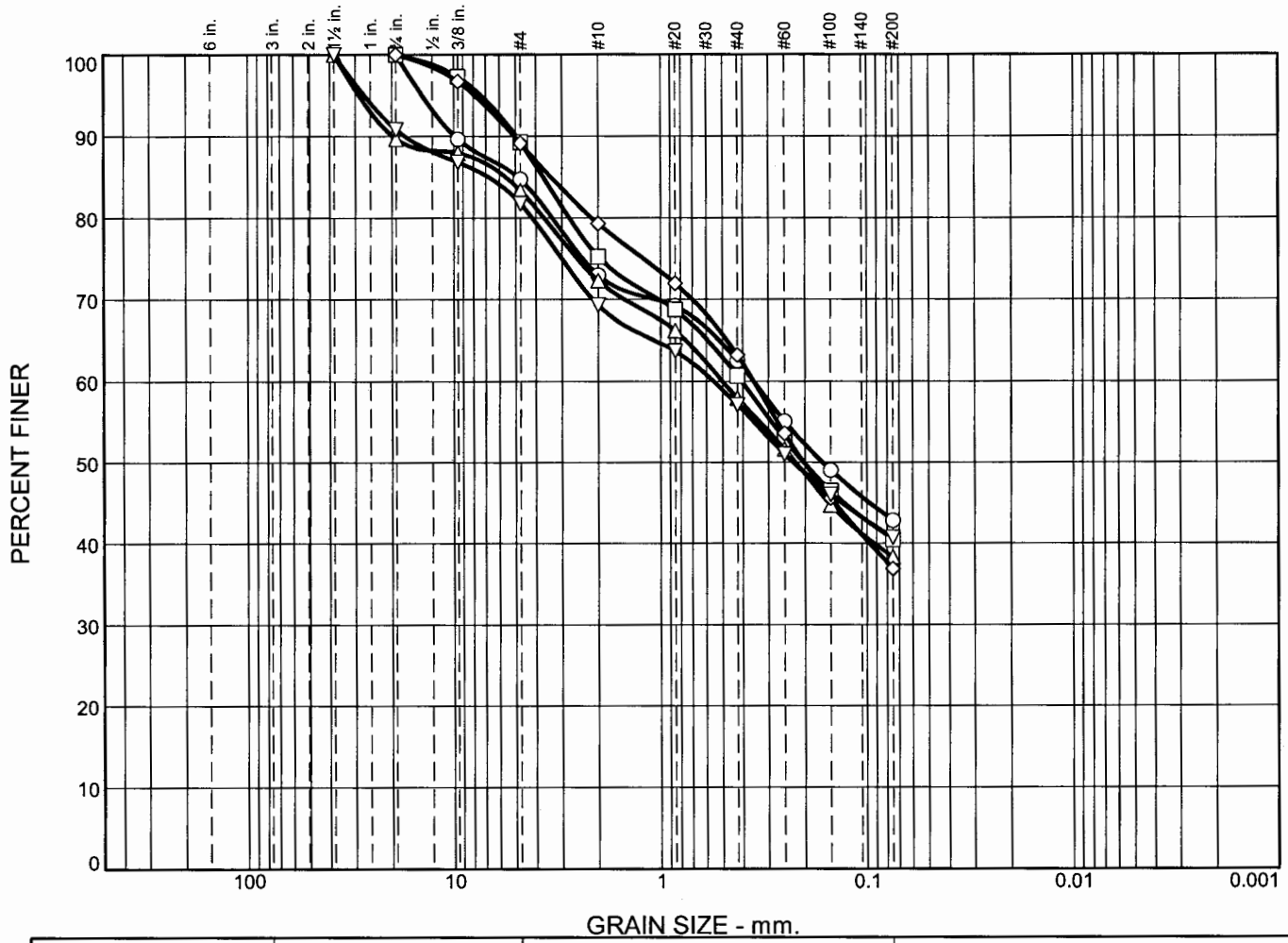
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7B

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	15.3	11.7	10.5	19.7	42.8
□	0.0	0.0	10.7	14.0	14.6	20.2	40.5
△	0.0	10.3	6.4	11.0	14.4	19.6	38.3
◇	0.0	0.0	10.9	9.8	16.1	26.3	36.9
▽	0.0	9.2	9.0	12.5	12.2	16.4	40.7

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	C-5	S-3	5-7	Fine to coarse Sand, and Silt, little fine Gravel. (MC=9.4%)	SM
□	C-6	S-3	5-7	Fine to coarse Sand, and Silt, little fine Gravel. (MC=7.4%)	SM
△	C-6	S-4	10-12	Fine to coarse Sand, and Silt, little f-c Gravel. (MC=7.2%)	SM
◇	C-9	S-3	5-7	Fine to coarse Sand, and Silt, little fine Gravel. (MC=7.8%)	SM
▽	C-9	S-7	25-27	Fine to coarse Sand, and Silt, little f-c Gravel. (MC=8.3%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

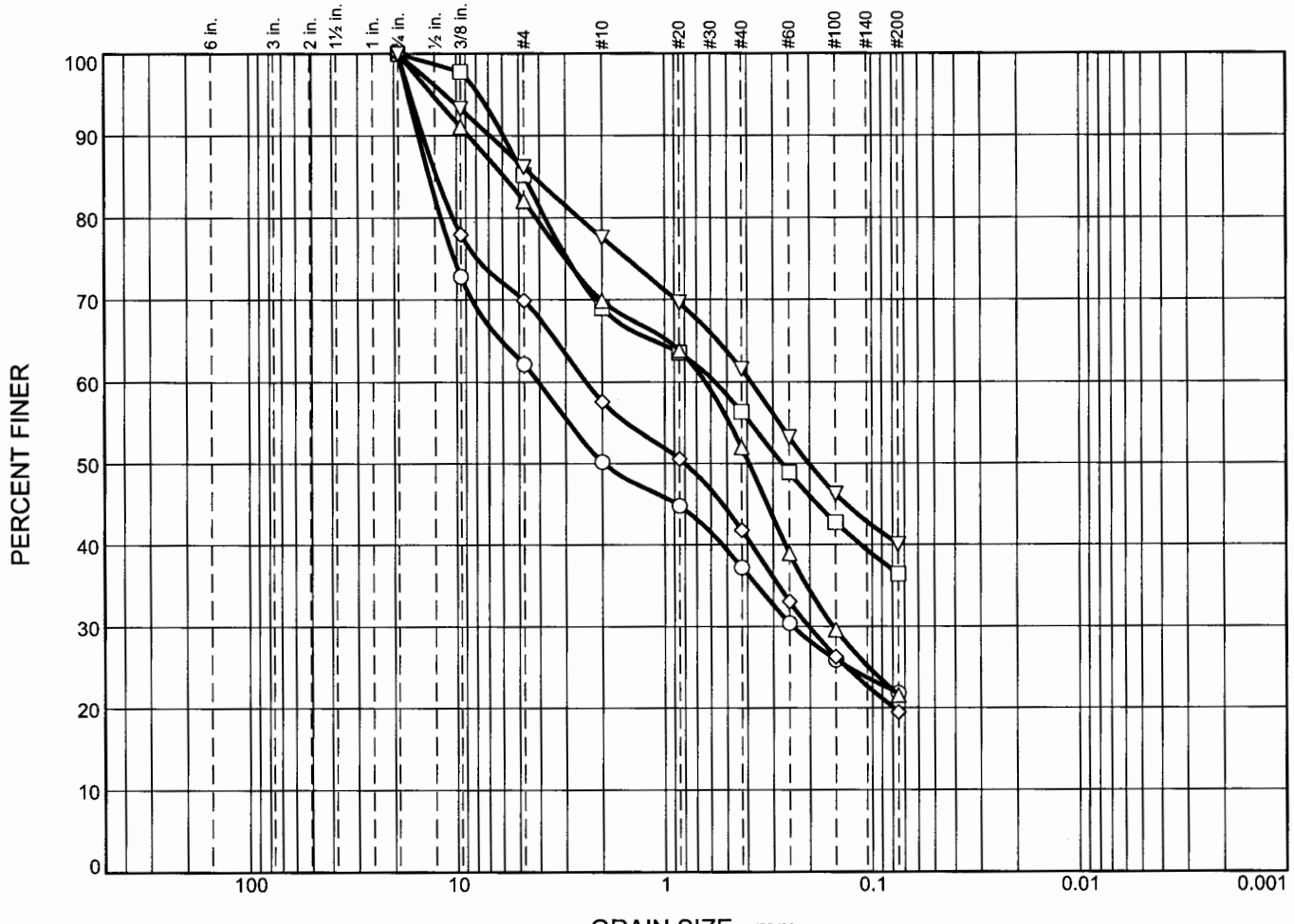
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7C

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	37.9	11.9	13.0	15.4	21.8
□	0.0	0.0	14.8	16.2	12.7	19.9	36.4
△	0.0	0.0	17.9	12.2	17.9	30.4	21.6
◇	0.0	0.0	30.1	12.3	15.8	22.3	19.5
▽	0.0	0.0	13.8	8.6	16.1	21.4	40.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	C-11	S-2	2-4	Fine to coarse Sand, and fine Gravel, some Silt. (MC=5.4%)	SM
□	C-11	S-4	10-12	Fine to coarse Sand, and Silt, little fine Gravel. (MC=9.7%)	SM
△	C-13	S-4	10-12	Fine to coarse Sand, some Silt, little fine Gravel. (MC=7.7%)	SM
◇	C-15	S-5	15-17	Fine to coarse Sand, some fine Gravel, little Silt. (MC=5.4%)	SM
▽	C-19	S-5	15-17	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.1%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

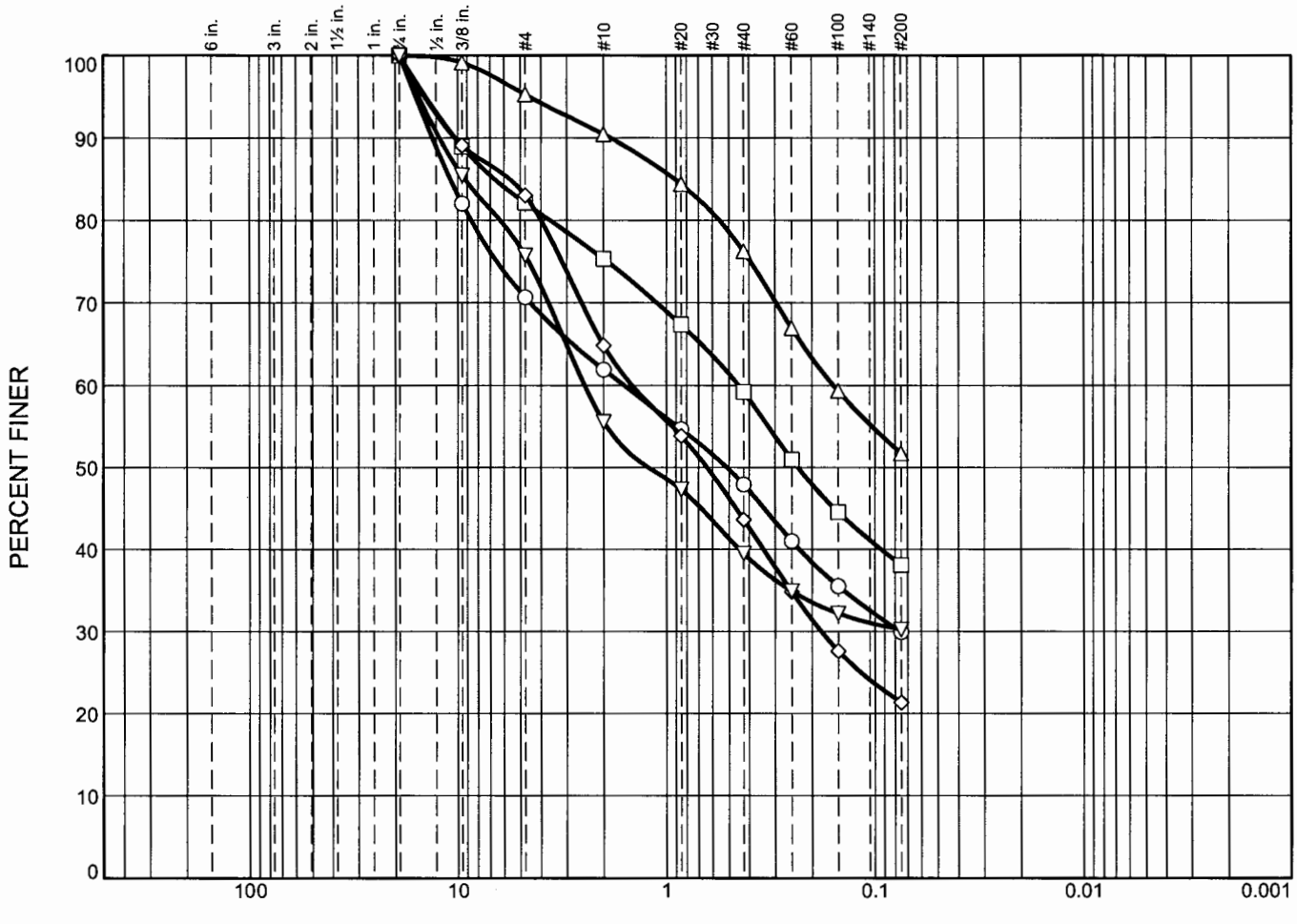
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7D

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	29.3	8.8	14.0	18.0	29.9
□	0.0	0.0	17.9	6.7	16.2	21.1	38.1
△	0.0	0.0	4.7	4.9	14.1	24.6	51.7
◇	0.0	0.0	16.9	18.2	21.3	22.3	21.3
▽	0.0	0.0	24.2	20.2	16.1	9.3	30.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	S-1	S-2	2-4	Fine to coarse Sand, some Silt, some fine Gravel. (MC=5.3%)	SM
□	S-1	S-3	4-6	Fine to coarse Sand, and Silt, little fine Gravel. (MC=5.9%)	SM
△	S-3	S-2	2-4	Silt, and fine to coarse Sand, trace fine Gravel. (MC=8.7%)	ML
◇	S-4	S-1	0-2	Fine to coarse Sand, some Silt, little fine Gravel. (MC=32.2%)	SM
▽	S-4	S-2	5-7	Fine to coarse Sand, some Silt, some fine Gravel. (MC=8.8%)	SM

Melick-Tully & Associates, P.C.

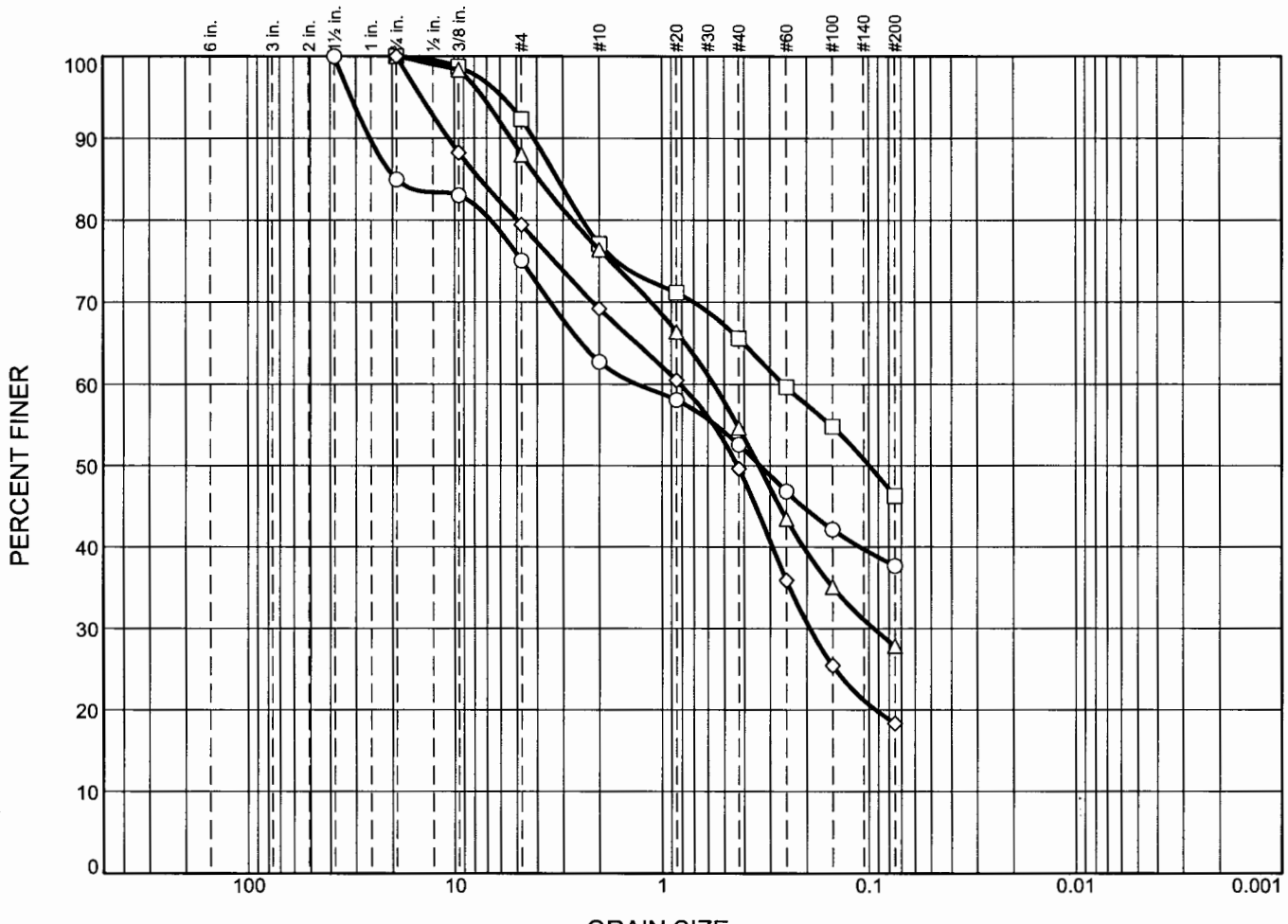
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7E

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	15.0	9.9	12.4	10.1	14.9	37.7
□	0.0	0.0	7.7	15.2	11.5	19.3	46.3
△	0.0	0.0	12.0	11.6	21.7	26.9	27.8
◇	0.0	0.0	20.5	10.3	19.6	31.3	18.3

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	S-4	S-3	10-12	Fine to coarse Sand, and Silt, some f-c Gravel. (MC=7.6%)	SM
□	S-12	S-3	4-6	Fine to coarse Sand, and Silt, trace fine Gravel. (MC=39.0%)	SM
△	S-14	S-3	4-6	Fine to coarse Sand, some Silt, little fine Gravel. (MC=25.7%)	SM
◇	S-16	S-4	6-8	Fine to coarse Sand, some fine Gravel, little Silt. (MC=10.0%)	SM

Melick-Tully & Associates, P.C.

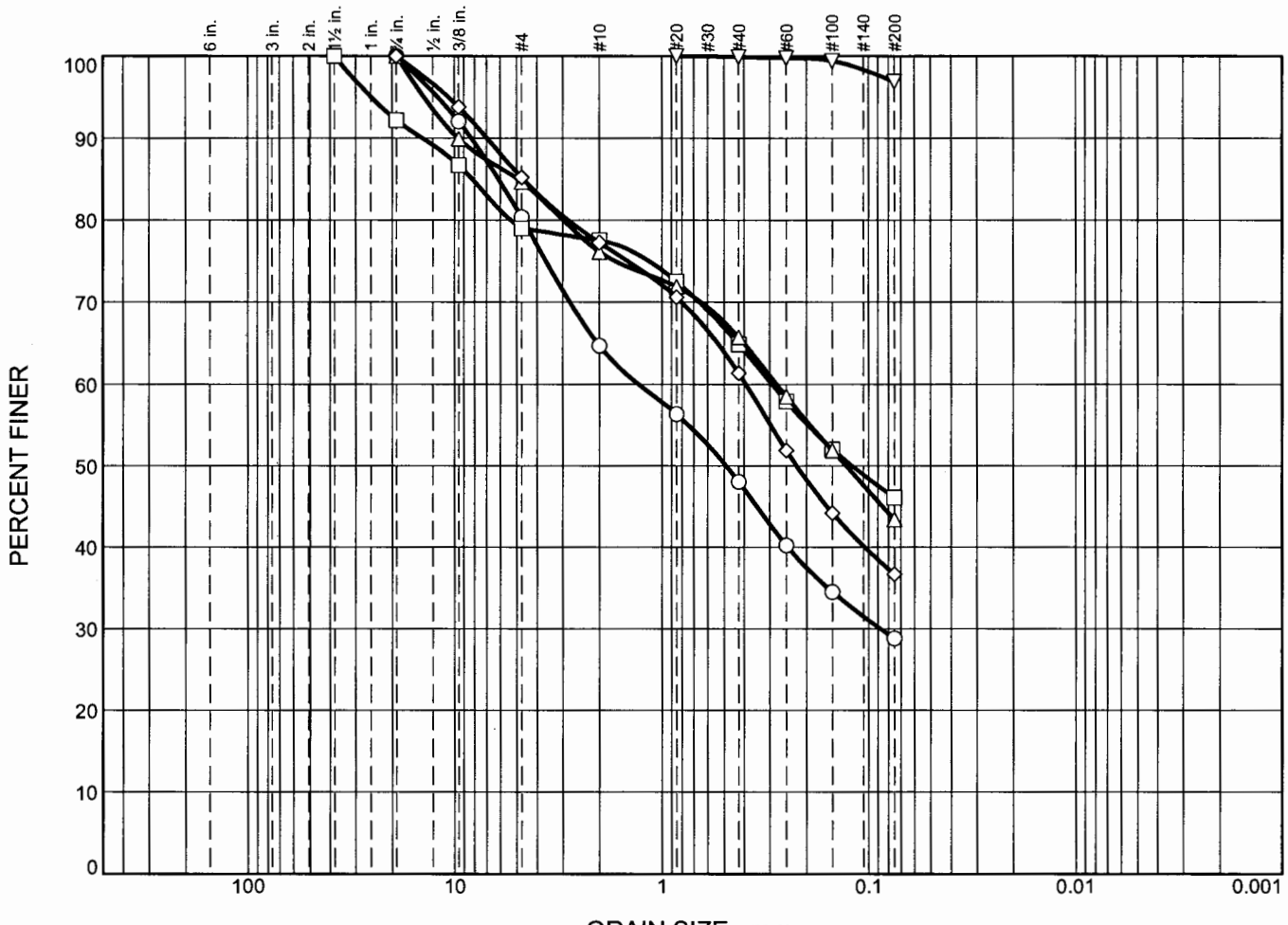
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7F

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	19.6	15.7	16.7	19.2	28.8
□	0.0	7.8	13.2	1.4	12.7	18.8	46.1
△	0.0	0.0	15.3	8.5	10.5	22.3	43.4
◇	0.0	0.0	14.8	7.9	16.0	24.6	36.7
▽	0.0	0.0	0.0	0.0	0.1	3.0	96.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-T-1	S-1	3	Fine to coarse Sand, some Silt, little fine Gravel. (MC=9.9%)	SM
□	TP-T-1	S-3	6.5	Fine to medium Sand, and Silt, some f-c Gravel. (MC=8.7%)	SM
△	TP-T-5	S-1	3	Fine to coarse Sand, and Silt, little fine Gravel. (MC=11.5%)	SM
◇	TP-T-5	S-2	6	Fine to coarse Sand, and Silt, little fine Gravel. (MC=7.4%)	SM
▽	TP-T-6	S-2	4.5	Silt, trace fine Sand. (MC=16.6%)	ML

Melick-Tully & Associates, P.C.

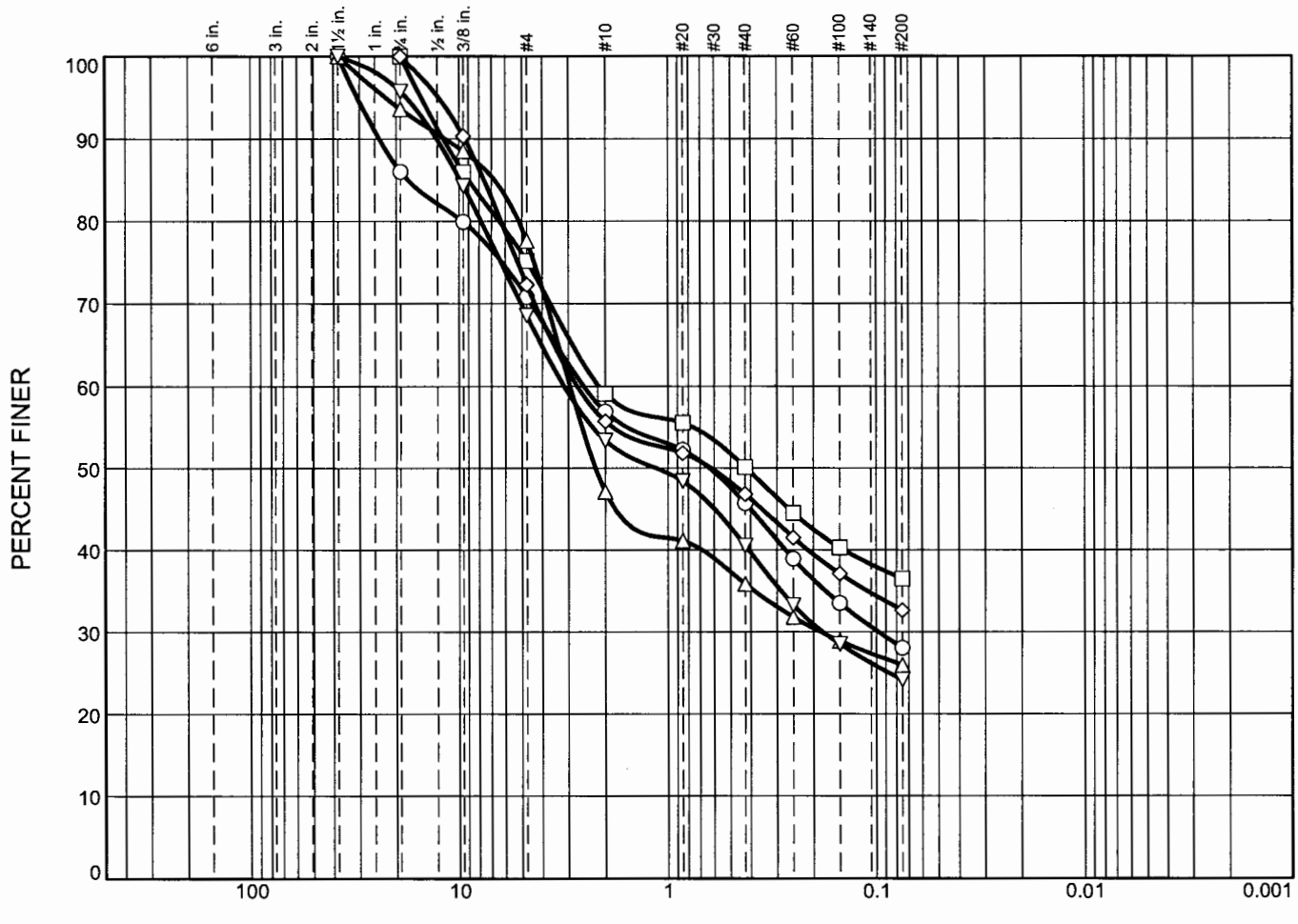
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7G

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	14.0	15.2	13.9	11.2	17.7	28.0
□	0.0	0.0	24.8	16.1	9.0	13.6	36.5
△	0.0	6.4	15.9	30.6	11.3	9.8	26.0
◇	0.0	0.0	27.7	16.6	8.9	14.2	32.6
▽	0.0	4.2	27.2	15.2	12.9	16.4	24.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-P-1	S-1	3.5	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=11.3%)	SM
□	TP-P-3	S-1	2	Fine to coarse Sand, and Silt, some fine Gravel. (MC=21.5%)	SM
△	TP-P-5	S-1	2	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=12.5%)	SM
◇	TP-P-7	S-1	1.5	Fine to coarse Sand, some Silt, some fine Gravel. (MC=15.4%)	SM
▽	TP-P-13	S-1	3.5	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=10.0%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

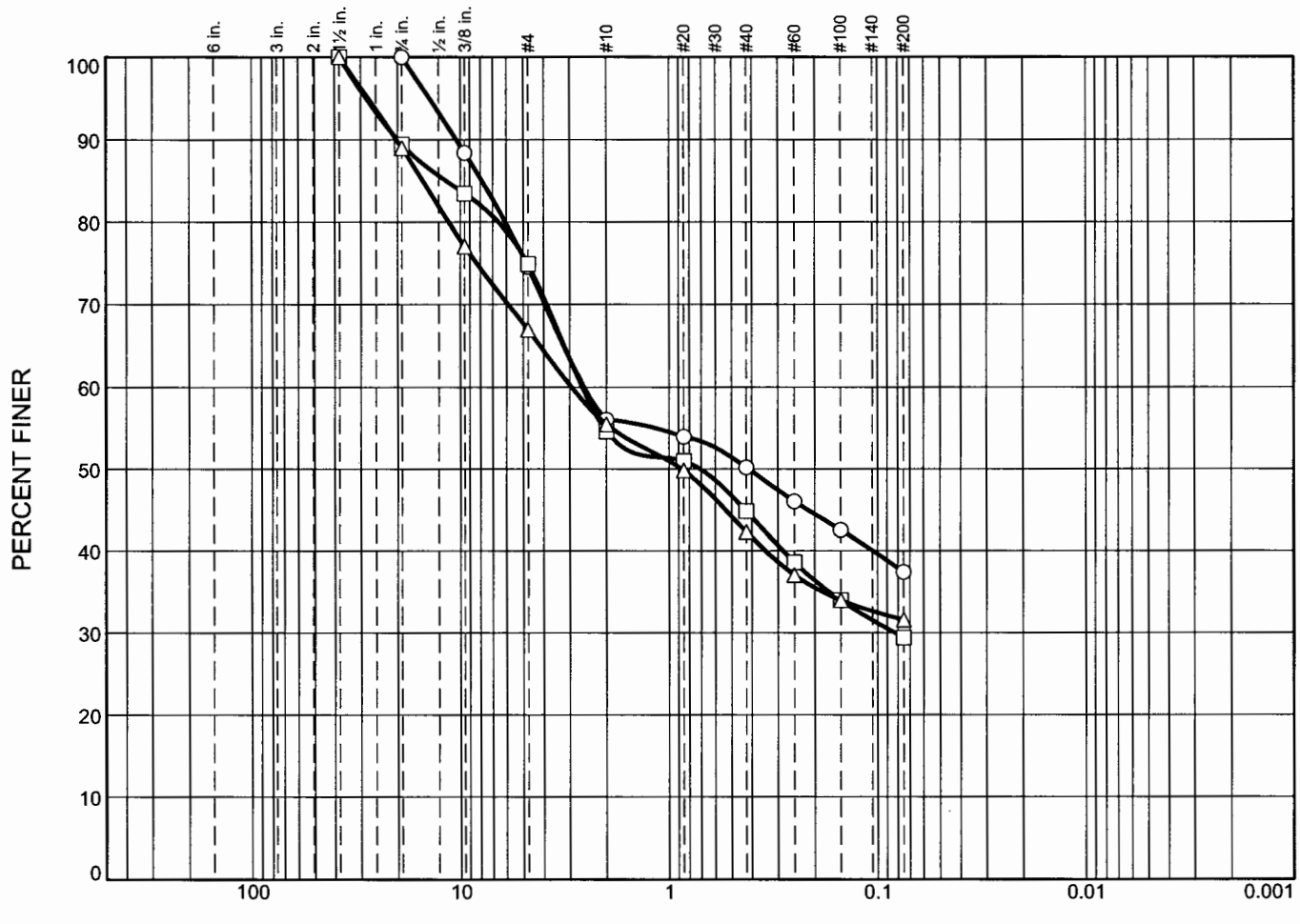
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7H

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	25.4	18.6	5.8	12.8	37.4
□	0.0	10.6	14.5	20.3	9.8	15.4	29.4
△	0.0	11.0	22.1	11.4	13.2	10.7	31.6

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-P-13	S-2	5	Fine to coarse Sand, and Silt, some fine Gravel. (MC=10.5%)	SM
□	TP-P-16	S-1	2	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=8.4%)	SM
△	TP-P-21	S-1	3	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=8.8%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

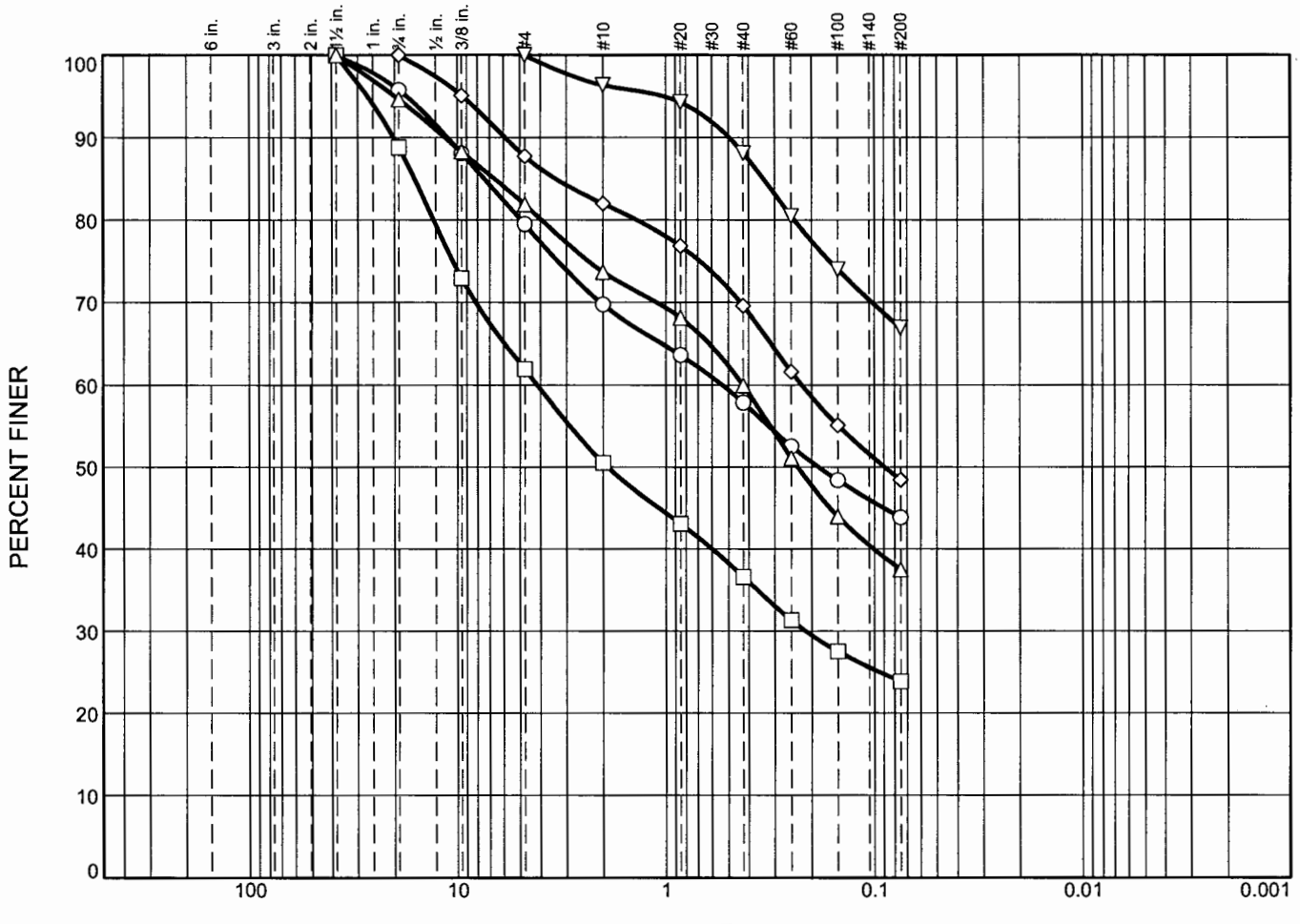
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7I

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	4.2	16.3	9.8	11.8	14.0	43.9
□	0.0	11.2	26.9	11.4	13.9	12.7	23.9
△	0.0	5.4	12.7	8.2	13.7	22.5	37.5
◇	0.0	0.0	12.2	5.8	12.4	21.2	48.4
▽	0.0	0.0	0.0	3.6	8.3	21.1	67.0

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-R-1	S-1	1.5	Fine to coarse Sand, and Silt, some f-c Gravel. (MC=9.4%)	SM
□	TP-R-1	S-2	5.0	Fine to coarse Gravel, and f-c Sand, some Silt. (MC=4.7%)	GM
△	TP-R-4	S-1	3.0	Fine to coarse Sand, and Silt, little f-c Gravel. (MC=7.8%)	SM
◇	TP-R-4	S-2	8.0	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.3%)	SM
▽	TP-R-7	S-1	2.0	Silt, some fine to coarse Sand. (MC=8.9%)	ML

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

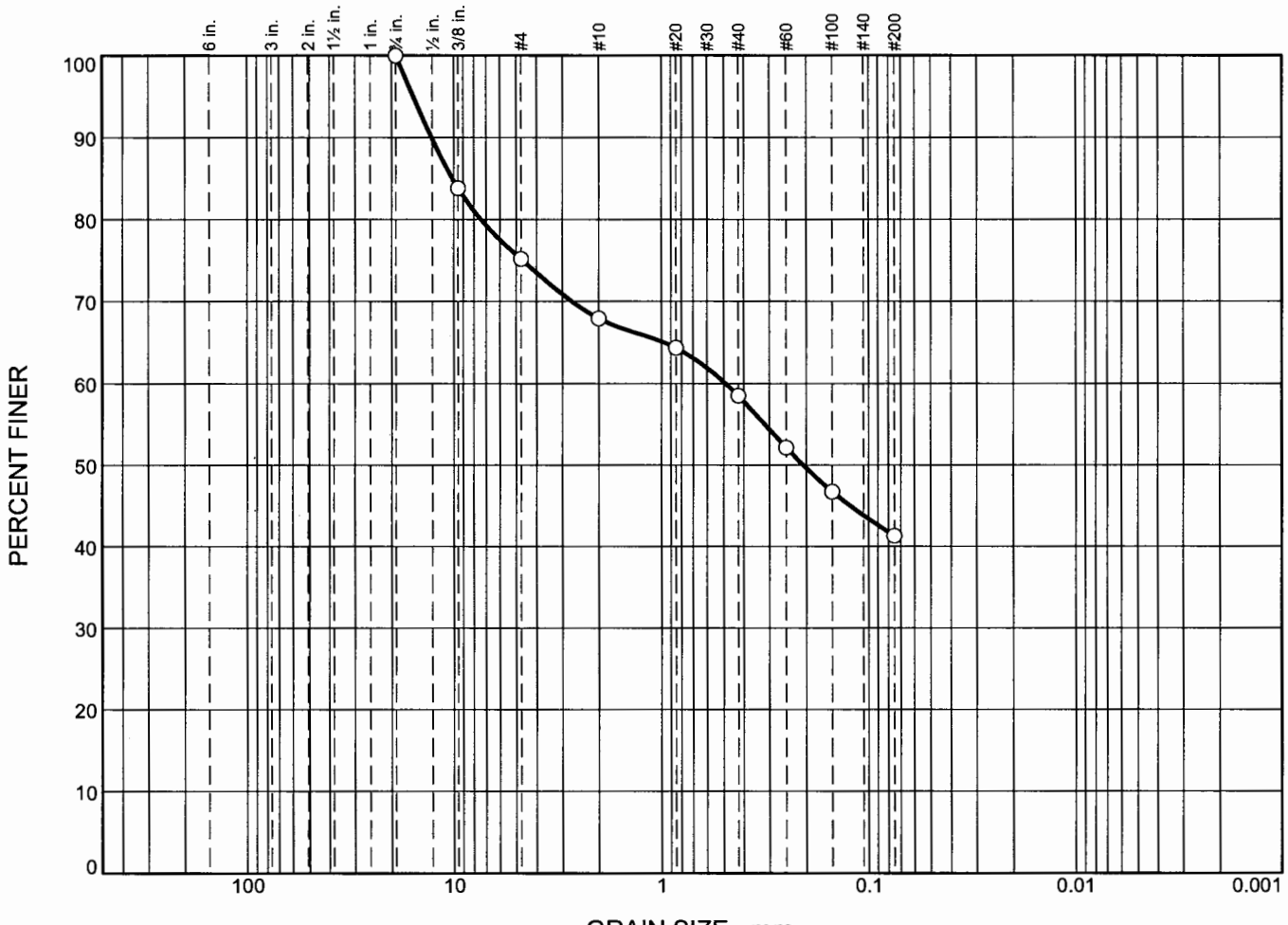
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7J

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	24.8	7.3	9.4	17.2	41.3

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-R-7	S-2	4.0	Fine to coarse Sand, and Silt, some fine Gravel. (MC=6.8%)	SM

Melick-Tully & Associates, P.C.

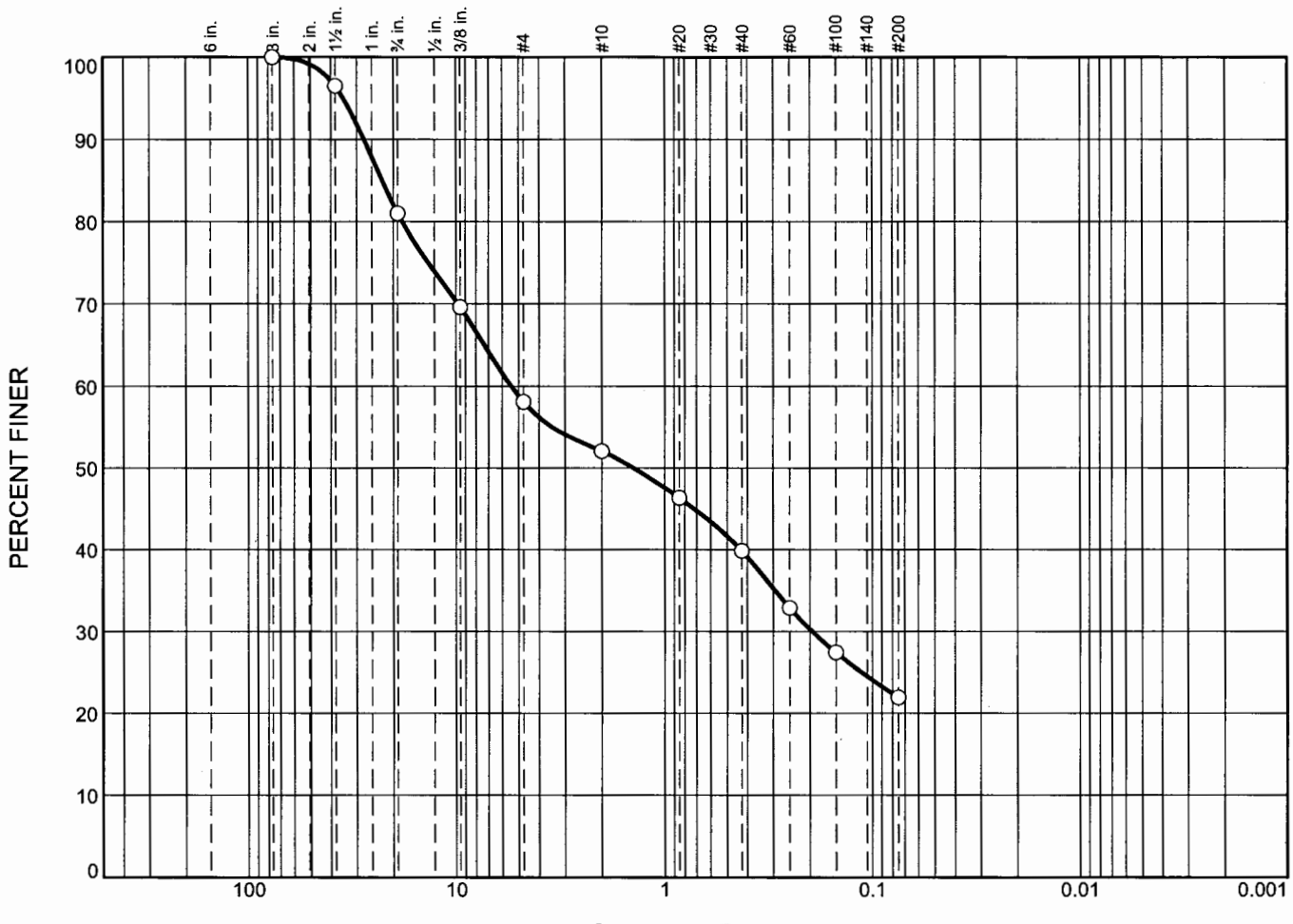
South Bound Brook, NJ

Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001 **Plate** 7K

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	19.0	22.9	6.0	12.3	17.9	21.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-P-14		5.0-6.5	Fine to coarse Gravel, and f-c Sand, some Silt. (MC=7.8%)	GM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

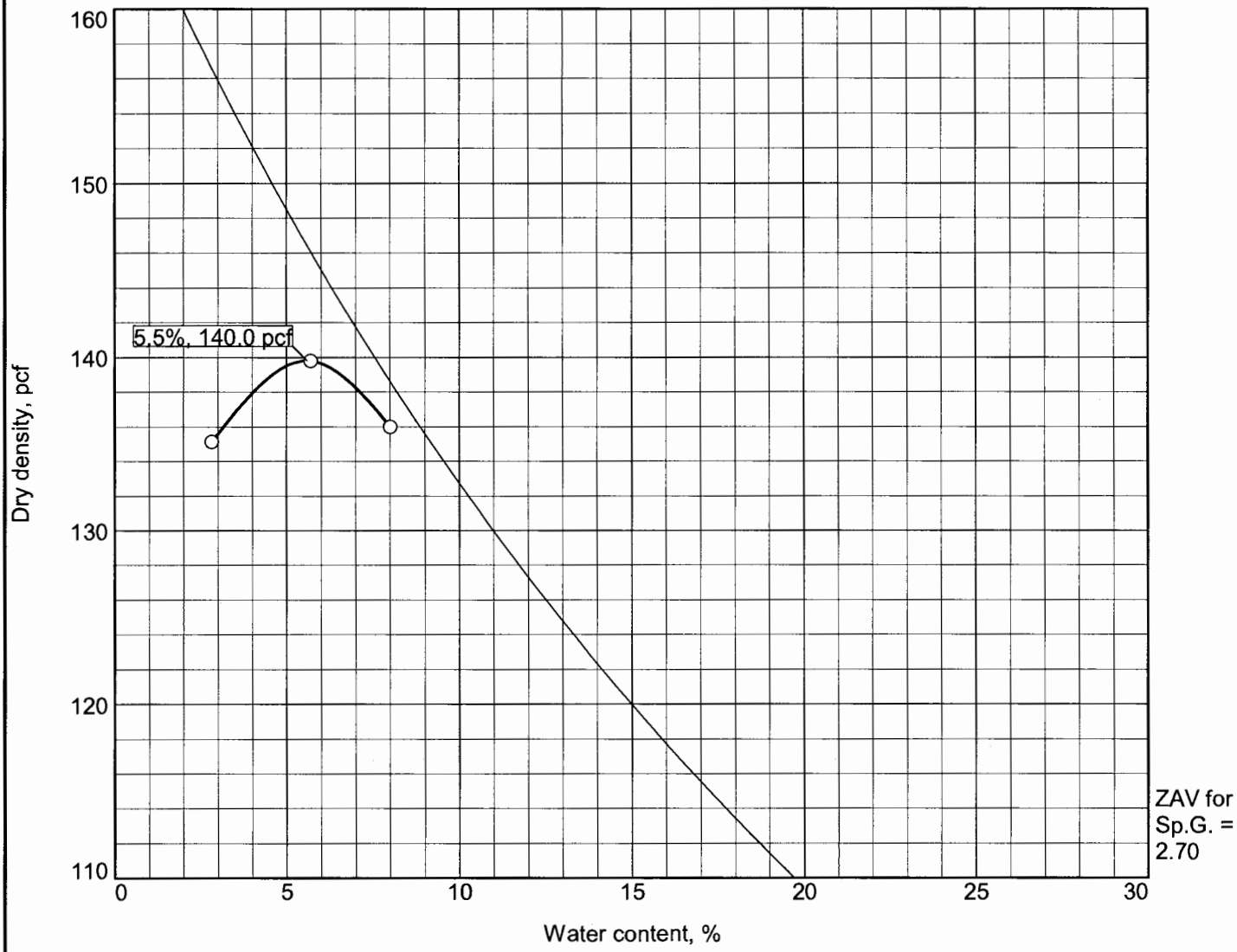
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7L

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method C Modified
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
5.0-6.5	GM		7.8				19.0	21.9

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 140.0 pcf Optimum moisture = 5.5 %	Fine to coarse Gravel, and f-c Sand, some Silt. (MC=7.8%)

Project No. 8979-001 **Client:** Concord Resort Development
Project: Concord Resort Development, Thompson, NY

○ **Source of Sample:** TP-P-14

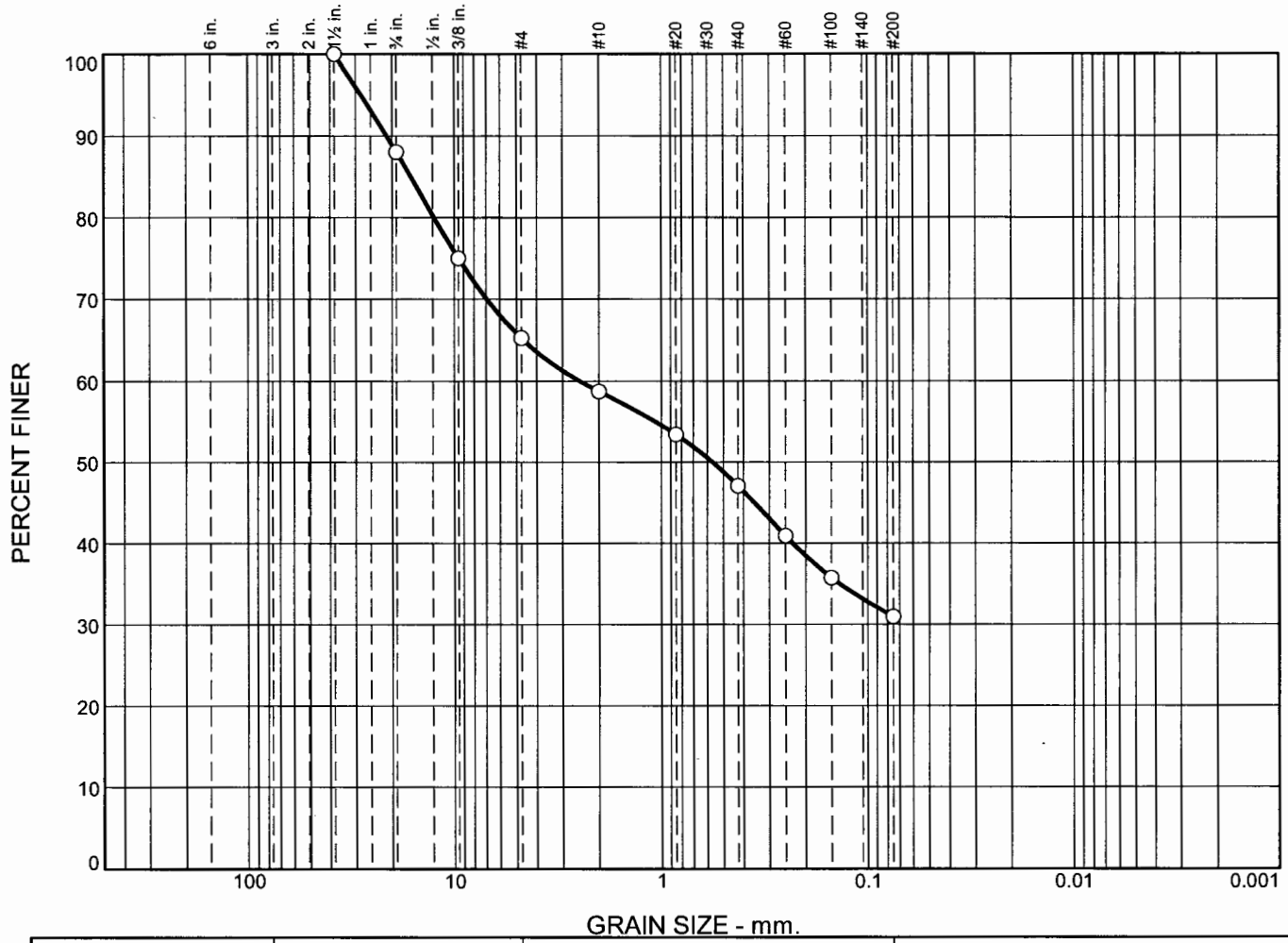
Remarks:

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

Plate 7M

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	12.0	22.7	6.6	11.6	16.1	31.0

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-P-17		6.5-7.5	Fine to coarse Gravel, some f-c Sand, some Silt. (MC=4.0%)	GM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

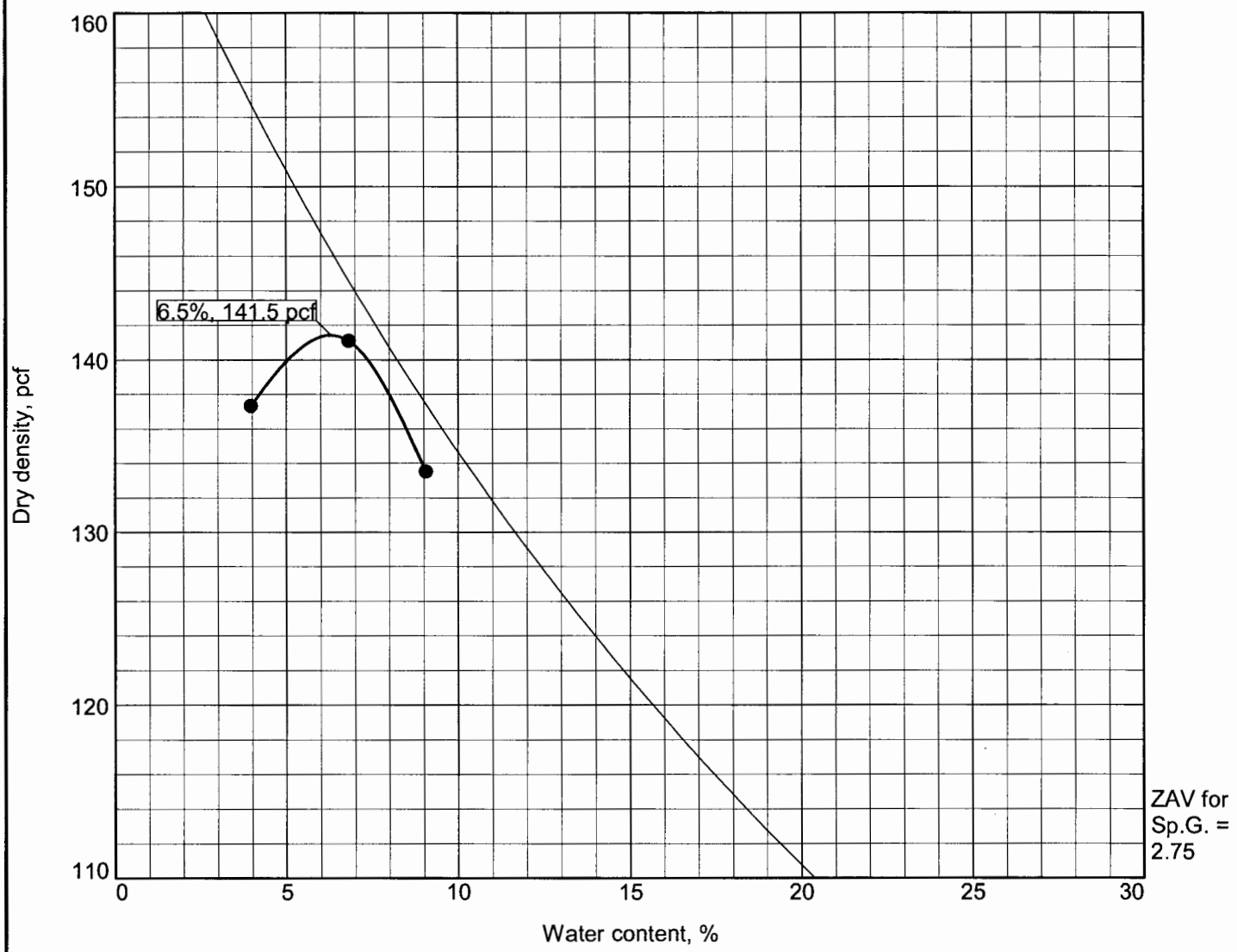
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7N

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method B Modified
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
6.5-7.5	GM		4.0				25.0	31.0

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 141.5 pcf Optimum moisture = 6.5 %	Fine to coarse Gravel, some f-c Sand, some Silt. (MC=4.0%)

Project No. 8979-001 **Client:** Concord Resort Development
Project: Concord Resort Development, Thompson, NY

○ **Source of Sample:** TP-P-17

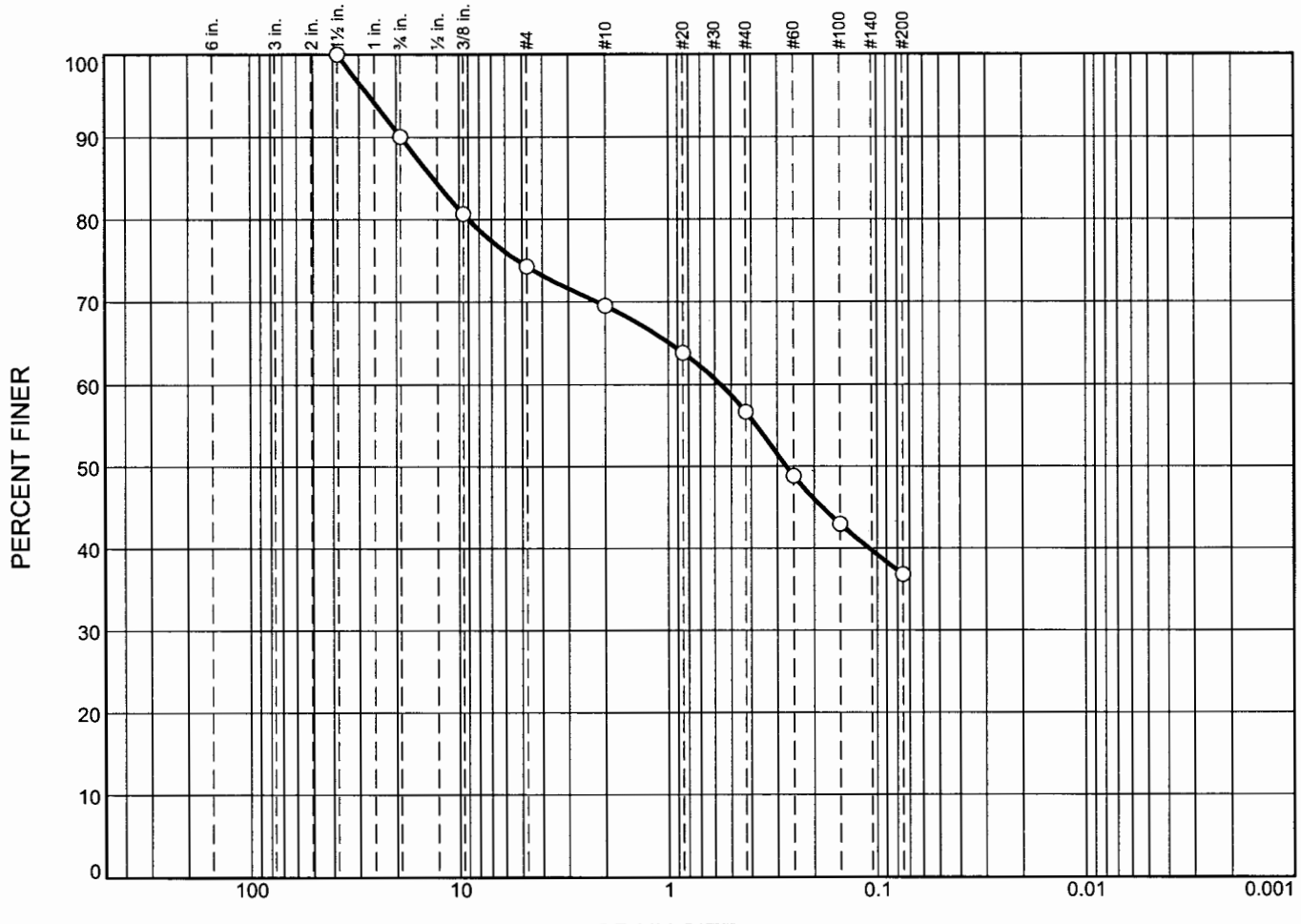
Remarks:

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

Plate 7O

Gradation Curve(s)



	% +3"	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	9.9	15.8	4.8	12.9	19.8	36.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-P-21		8.0	Fine to coarse Sand, and Silt, some f-c Gravel. (MC=8.3%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

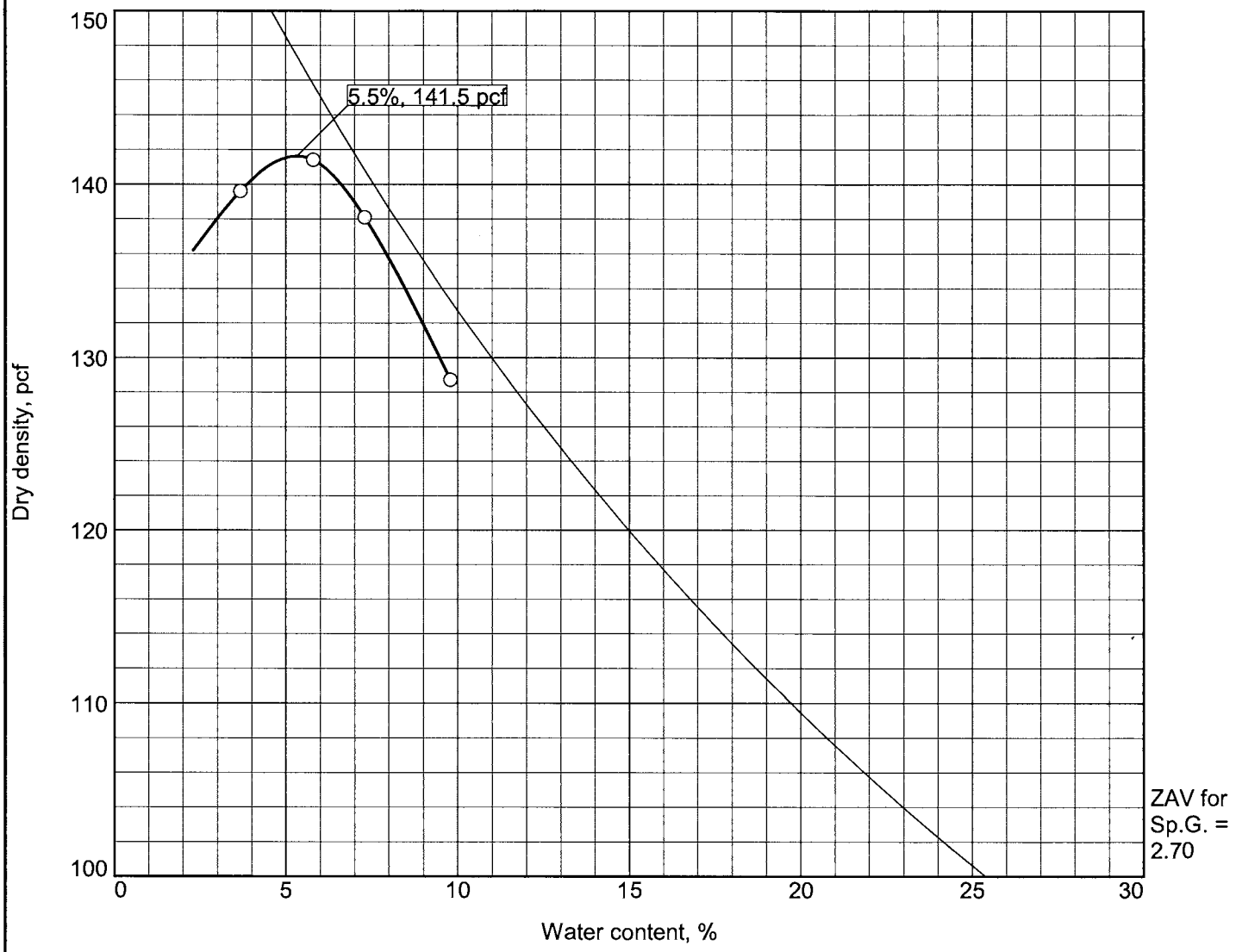
Client: Concord Resort Development

Project: Concord Resort Development, Thompson, NY

Project No.: 8979-001

Plate 7P

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method B Modified
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
8.0	SM		8.3				19.3	36.8

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 141.5 pcf Optimum moisture = 5.5 %	Fine to coarse Sand, and Silt, some f-c Gravel. (MC=8.3%)

Project No. 8979-001 **Client:** Concord Resort Development
Project: Concord Resort Development, Thompson, NY

○ **Source of Sample:** TP-P-21

Remarks:

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

Plate 7Q

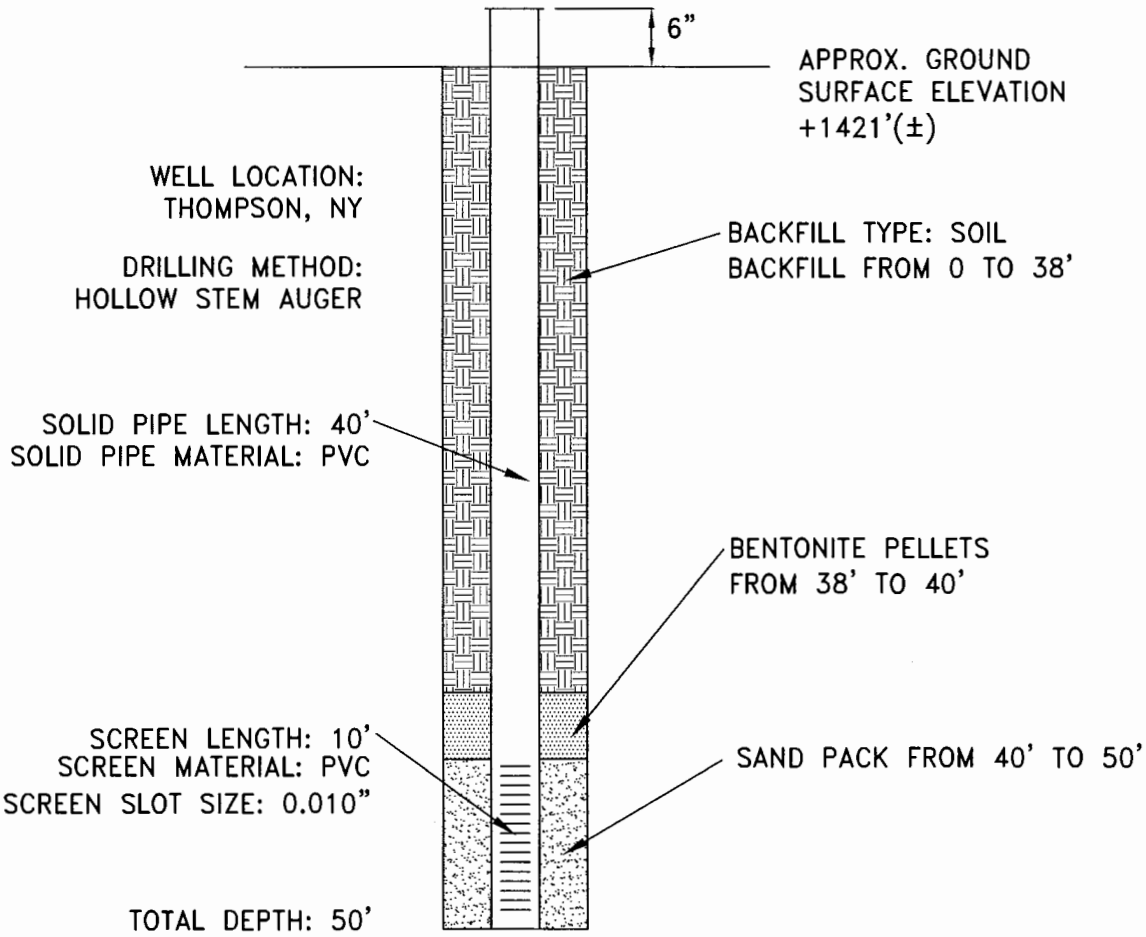
SUMMARY OF TUBE PERMEAMETER RESULTS
Thompson, New York
Concord Development

Exploration No.	Approximate Surface Elevation (ft)	Approximate Test Depth (ft)	Approximate Permeability (in/hr)
TP-P-1	1,385	2.0	1.3
TP-P-1	1,385	6.0	0.7
TP-P-2	1,414	2.0	0.06
TP-P-3	1,442	2.0	0.6
TP-P-4	1,448	2.0	0.5
TP-P-4	1,448	6.0	0.7
TP-P-5	1,440	1.5	1.9
TP-P-6	1,448	1.5	0.2
TP-P-7	1,446	1.5	0.4
TP-P-8	1,450	1.5	0.4
TP-P-9	1,448	2.0	0.05
TP-P-11	1,368	2.5	0.02
TP-P-12	1,365	2.0	0.1
TP-P-13	1,375	3.5	0.04
TP-P-14	1,388	2.0	0.04
TP-P-15	1,380	2.0	0.06
TP-P-18	1,434	2.0	0.02
TP-P-20	1,454	2.0	0.09

PIEZOMETER CONSTRUCTION DETAIL

PIEZOMETER C-1

DATE OF CONSTRUCTION 3/2/12



DATE	3/9/12	3/23/12	4/4/12	4/13/12
WATER LEVEL	19'0"	24'0"	28'7"	24'4"

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
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TEMPORARY PIEZOMETER DETAIL

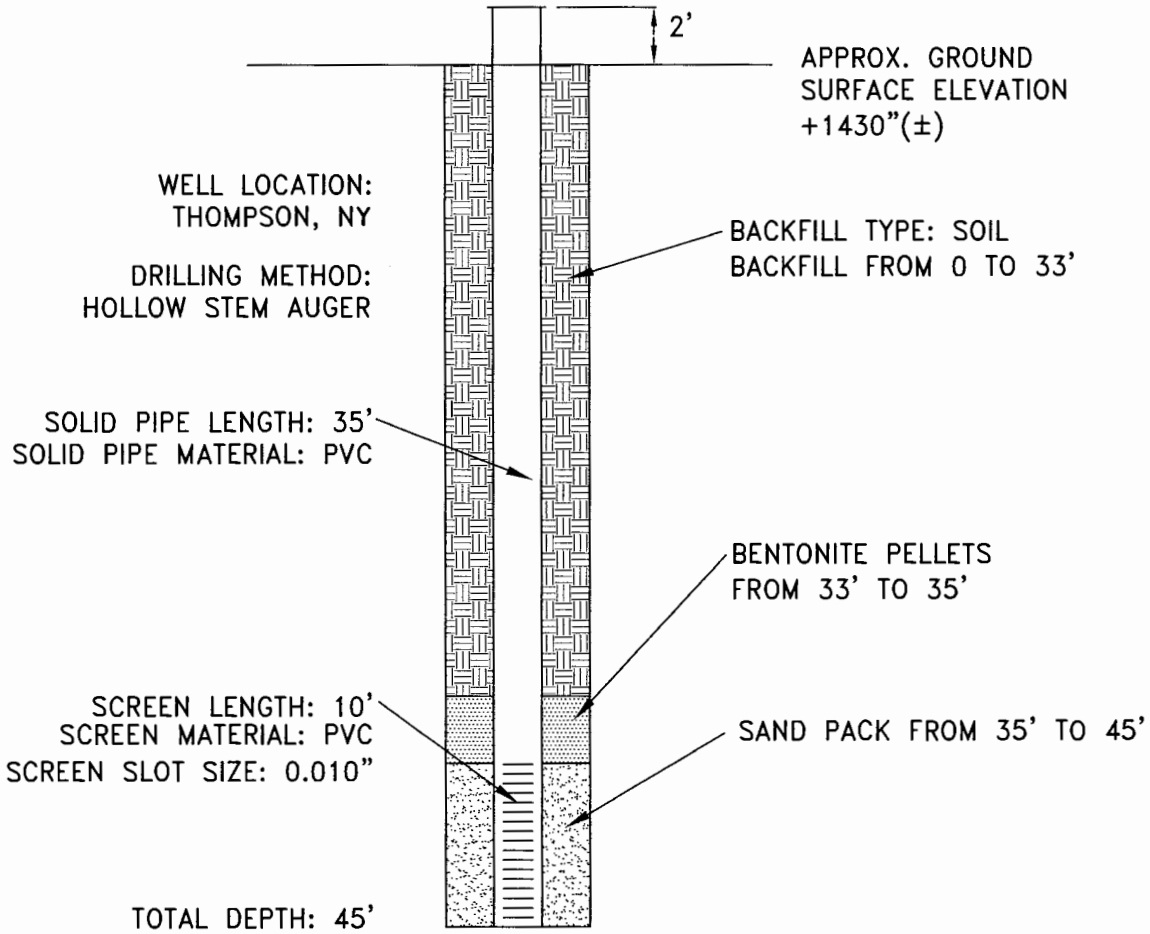
CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
8979-001*1D	25299	JCB	JHB	4-6-12	NTS	9A

PIEZOMETER CONSTRUCTION DETAIL

PIEZOMETER C-7

DATE OF CONSTRUCTION 3/1/12



DATE	3/14/12	3/15/12	3/19/12	3/23/12	4/4/12	4/13/12
WATER LEVEL	18'0"	26'2"	27'6"	30'0"	29'7"	29'9"

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TEMPORARY PIEZOMETER DETAIL

CONCORD RESORT DEVELOPMENT
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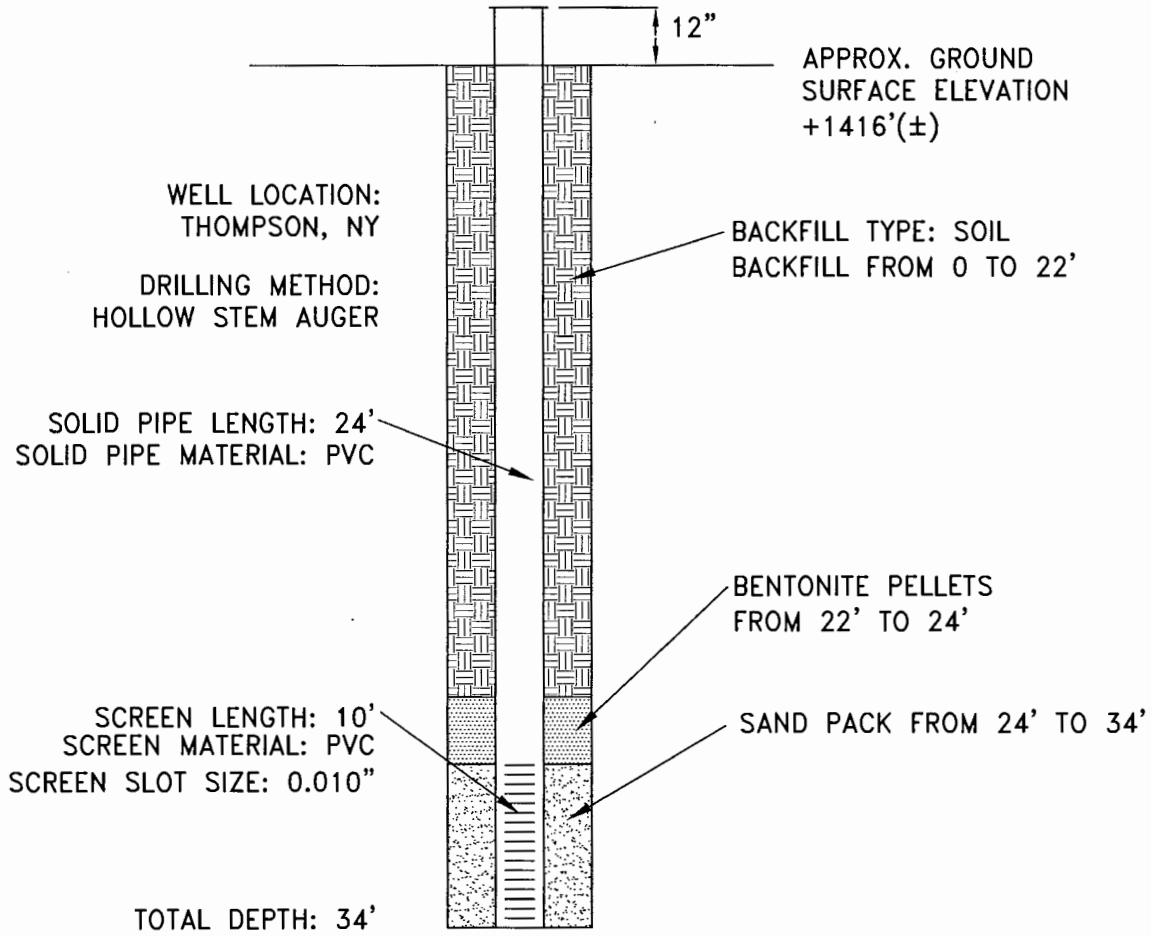
CONCORD RESORT DEVELOPMENT

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
8979-001*1D	25299	VJD	JHB	4-6-12	NTS	9B

PIEZOMETER CONSTRUCTION DETAIL

PIEZOMETER C-12

DATE OF CONSTRUCTION 3/12/12



DATE	3/12/12	3/13/12	3/19/12	3/23/12	4/4/12	4/13/12
WATER LEVEL	15'0"	15'0"	27'0"	28'8"	29'2"	29'2"

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TEMPORARY PIEZOMETER DETAIL

CONCORD RESORT DEVELOPMENT
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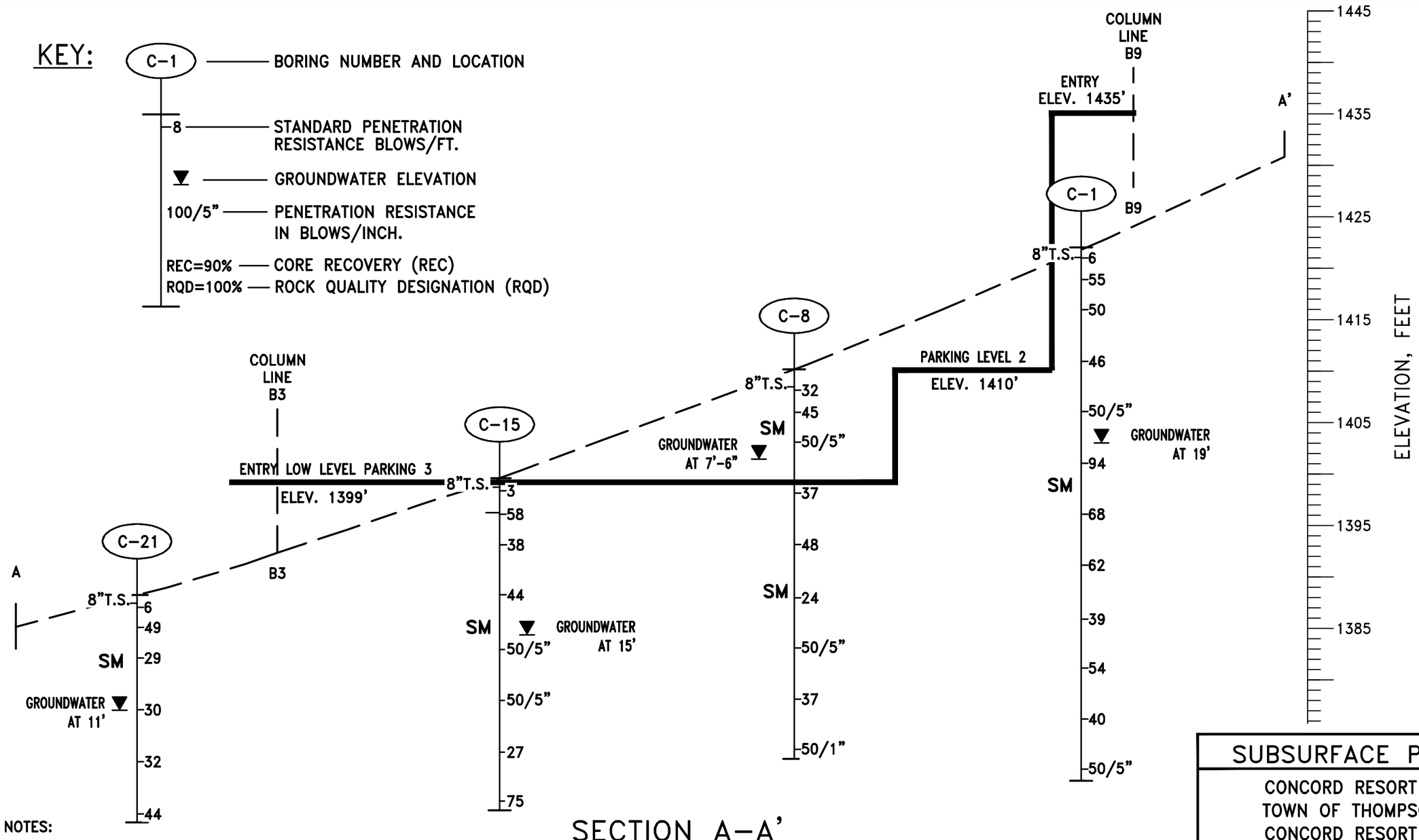
CONCORD RESORT DEVELOPMENT

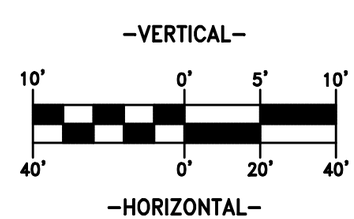
JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
8979-001*1D	25299	VJD	JHB	4-6-12	NTS	9C



SECTION A–A'

NOTES:

1. This drawing is part of Melick–Tully and Associates, Inc. Report No. 8979–001*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.



SUBSURFACE PROFILE A–A'

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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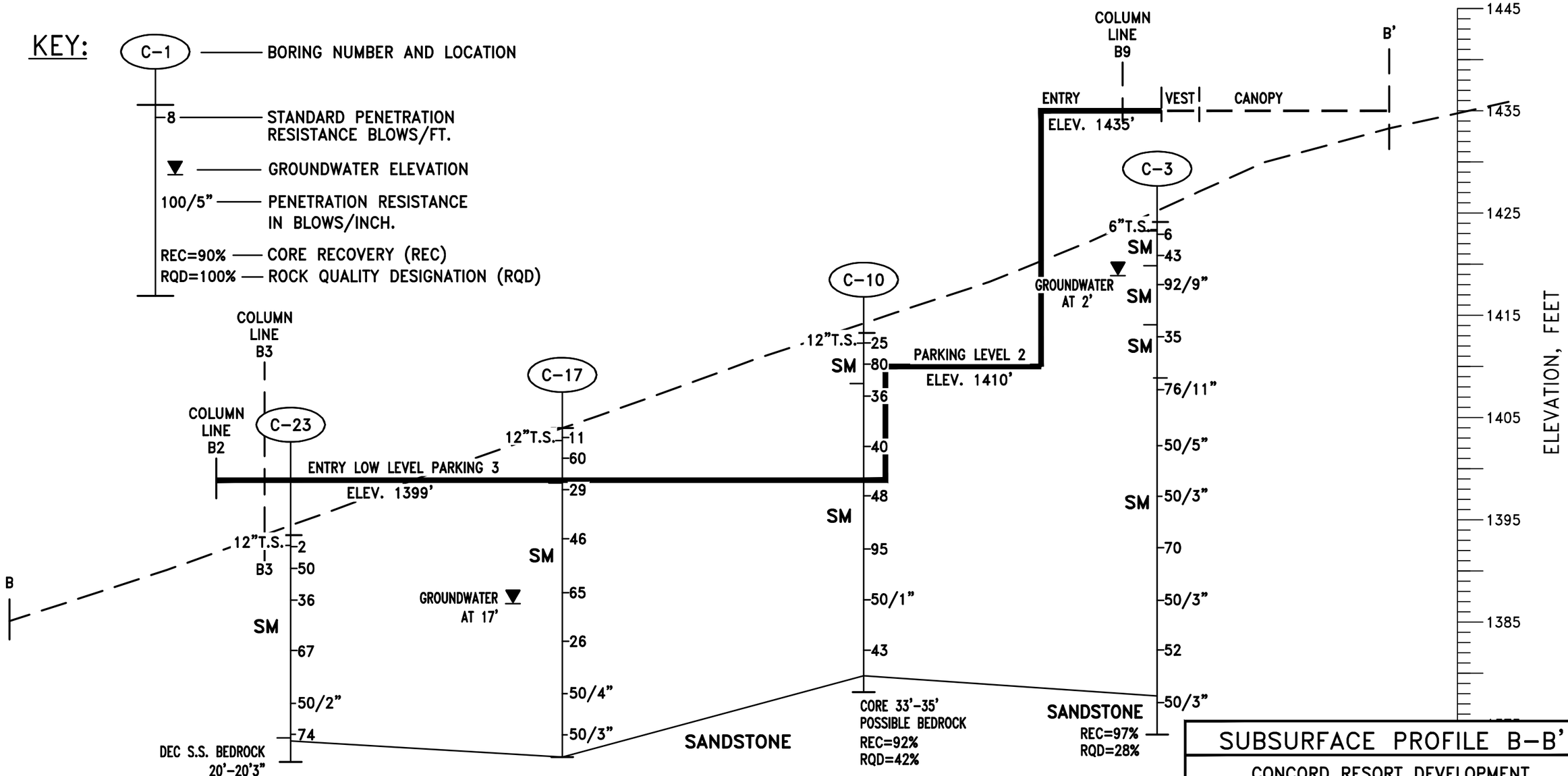
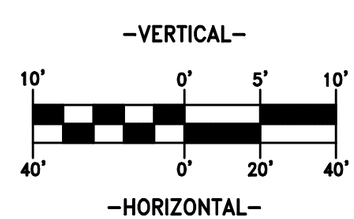
JOB NO.	FILE NO.			
8979–001*1D	25299			
DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	4–6–12	AS NOTED	10A



SECTION B-B'

NOTES:

1. This drawing is part of Melick-Tully and Associates, Inc. Report No. 8979-001*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.



SUBSURFACE PROFILE B-B'

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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South Bound Brook, New Jersey 08880
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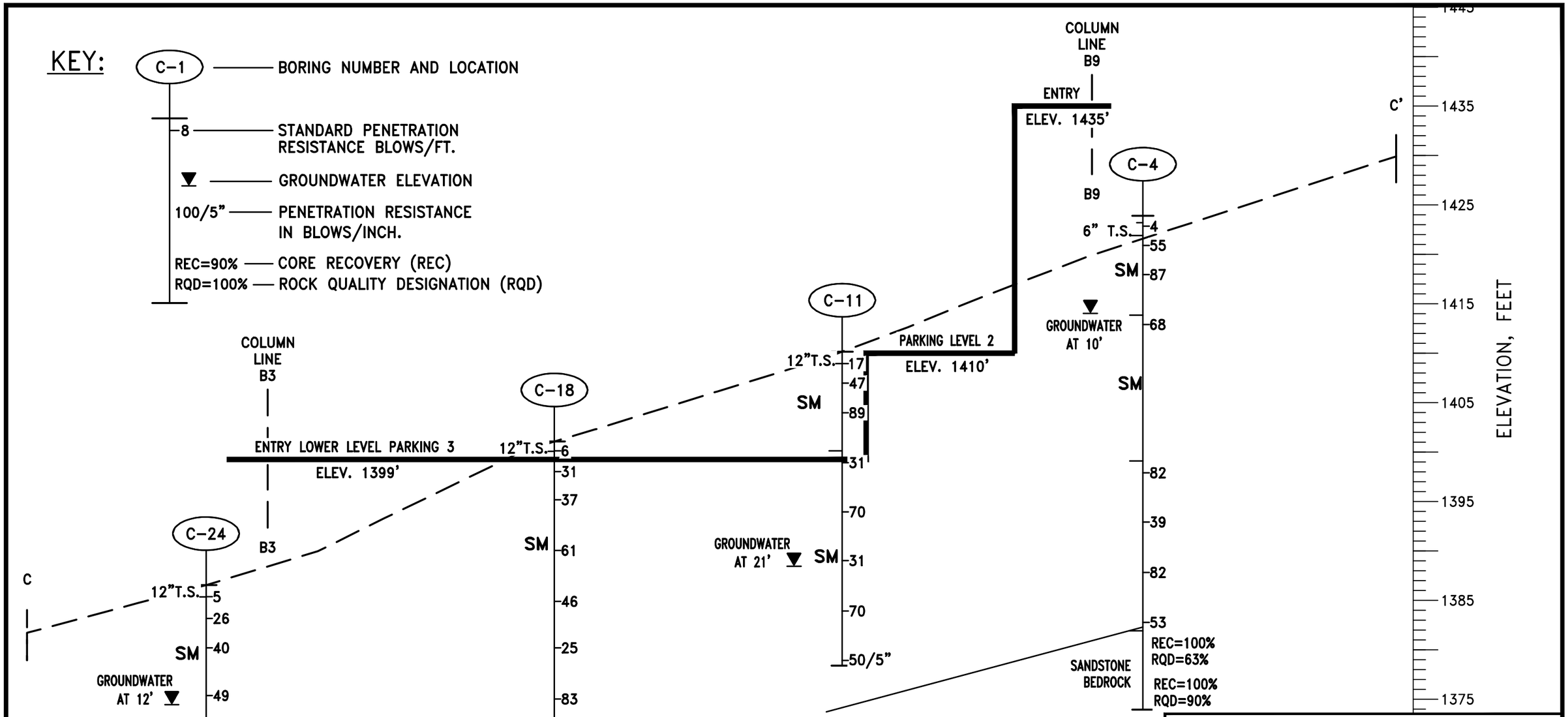
JOB NO.	FILE NO.
8979-001*1D	25299

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	4-6-12	AS NOTED	10B



SECTION C–C'

NOTES:

1. This drawing is part of Melick–Tully and Associates, Inc. Report No. 8979–001*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.

–VERTICAL–

10' 0' 5' 10'

40' 0' 20' 40'

–HORIZONTAL–

SUBSURFACE PROFILE C–C'

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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& Environmental Consultants
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South Bound Brook, New Jersey 08880
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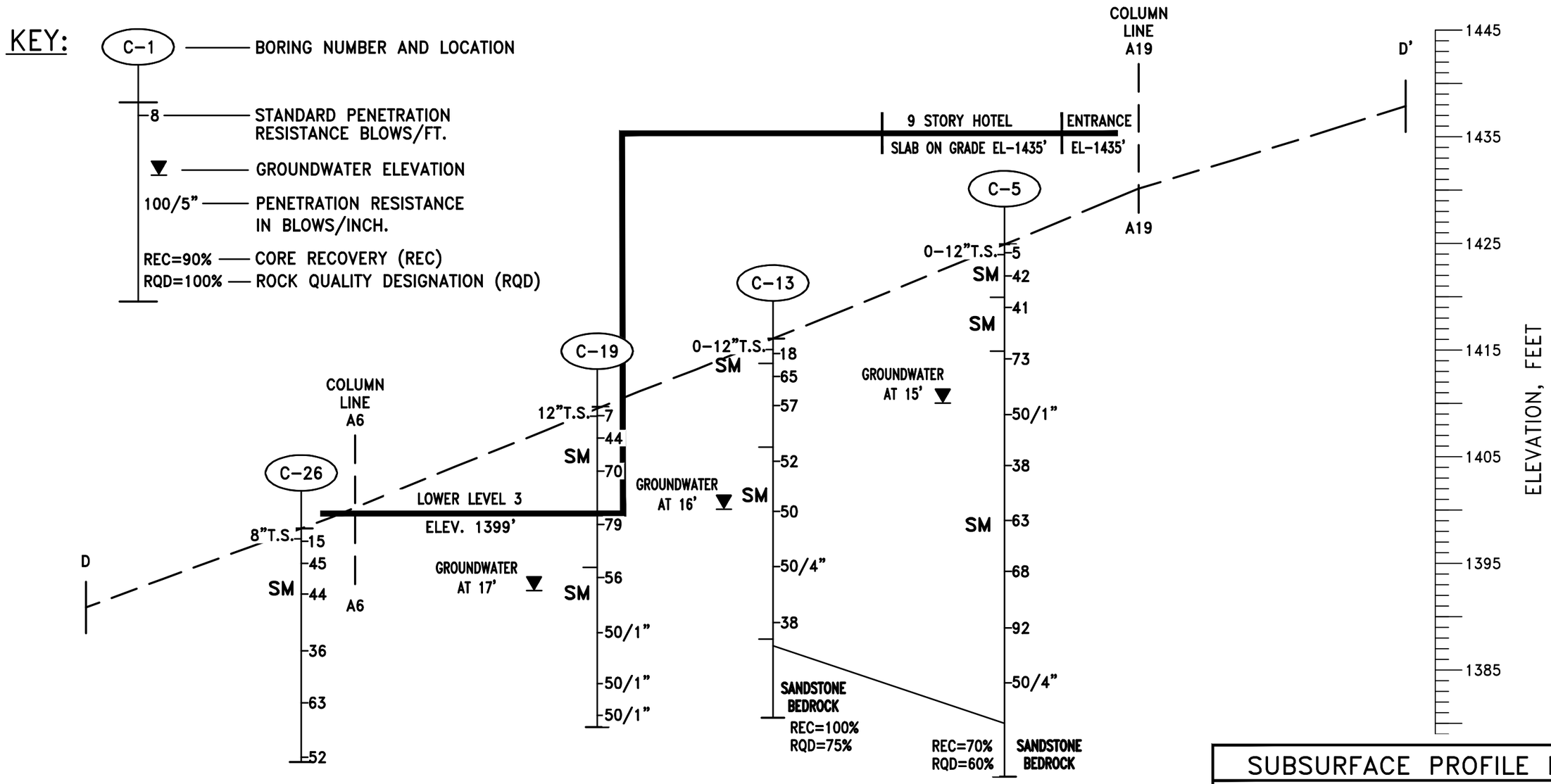
JOB NO.	FILE NO.
8979–001*1D	25299

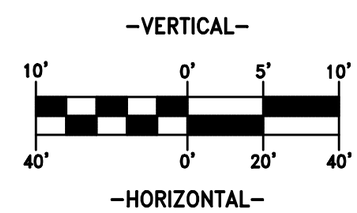
DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	4–6–12	AS NOTED	10C



SECTION D–D'

NOTES:

1. This drawing is part of Melick–Tully and Associates, Inc. Report No. 8979–001*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.



SUBSURFACE PROFILE D–D'

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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& Environmental Consultants
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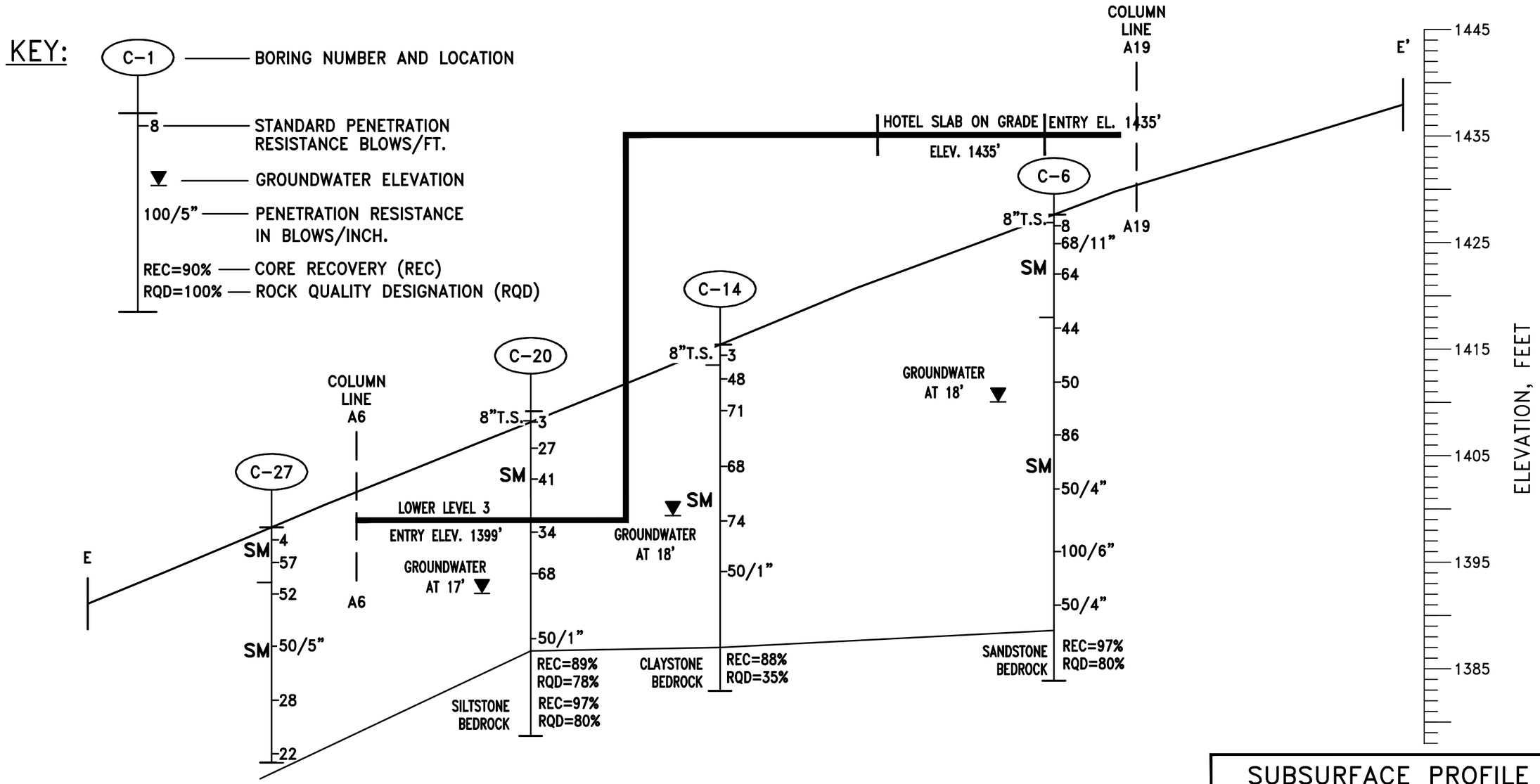
JOB NO.	FILE NO.
8979–001*1D	25299

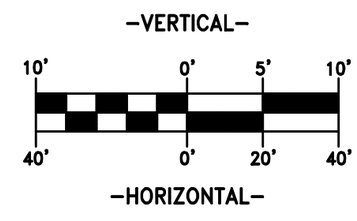
DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	4–6–12	AS NOTED	10D



SECTION E–E'

NOTES:

1. This drawing is part of Melick–Tully and Associates, Inc. Report No. 8979–001*1D and should be read together with the report for complete evaluation.
2. The stratification lines are based upon interpolations between widely spaced test borings and thus represent the approximate boundaries between soil types. Actual transitions may vary from those shown.
3. Stratum designations are generalized. See report for descriptions of each stratum and the test boring logs for detailed descriptions at specific locations.



SUBSURFACE PROFILE E–E'

CONCORD RESORT DEVELOPMENT
TOWN OF THOMPSON, NEW YORK
CONCORD RESORT DEVELOPMENT

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Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356–3400

JOB NO.	FILE NO.
8979–001*1D	25299

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	4–6–12	AS NOTED	10E

APPENDIX

APPENDIX

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from existing site features shown on an unlabeled plan provided to us by AKRF Engineers and survey control points provided by others in the area of the proposed casino. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us by the site engineer. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of AKRF for specific application to the design of the proposed Concord Resort Development. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from 48 widely-spaced test borings and 41 test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil and foundation engineering report was prepared for the project by Melick-Tully and Associates, P.C. for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that Melick-Tully and Associates, P.C. be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

REPORT
SUBSURFACE INVESTIGATION

PROPOSED RESORT ENTRY ROAD
TOWN OF THOMPSON, SULLIVAN COUNTY, NEW YORK
EPT CONCORD RESORT

March 5, 2013

Prepared By:
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MTA Project No.: 8979-004*1D

MELICK-TULLY AND ASSOCIATES, P.C.
GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANTS

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March 5, 2013

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016

Attention: Ms. Jennilee Harrison
Project Engineer

Report
Subsurface Investigation
Proposed Resort Entry Road
Town of Thompson, Sullivan County, New York
EPT Concord Resort

Introduction

This report presents the results of a subsurface investigation performed by Melick-Tully and Associates, P.C. (MTA) for the proposed new Resort Entry Road and stormwater management basins to be constructed to service the proposed EPT Concord Resort development in the Town of Thompson, Sullivan County, New York.

Background Data

MTA previously performed a subsurface investigation for the resort, as well as a subsequent study for wetland mitigation sites. The results of those studies were presented in our reports dated May 1 and September 28, 2012. Borings were performed along the western section of Thompsonville Road as part of our May 1, 2012 report.

Proposed Construction

Based on information AKRF, Inc. provided to us, we understand the improvements would include approximately 8,400 linear feet of new roadway from the area near the intersection

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of Joyland Road and Route 17 to the north and east where Resort Entry Road reconnects to Joyland Road. The improvements to Thompsonville Road and Joyland Road will consist of widening the north end of Joyland Road and re-grading and re-paving Thompsonville Road. A stream crossing along Resort Entry Road is planned to consist of either a pre-engineered "Contech" type bridge or bottomless culvert. Cuts and fills of approximately five feet or less would typically be required along the roadways. A sanitary sewer will be installed below portions of Joyland and Thompsonville Roads, reportedly at depths of less than 15 feet below the existing surface grades.

We further understand that bio-retention basins would be constructed along Resort Entry Road in currently heavily wooded portions of the site, and along Joyland Road and Thompsonville Road. The basins would be established at depths varying from three to five feet below the current grades.

This study presents the results of our testing along the new Resort Entry Road alignment in the undeveloped areas west of Joyland Road, the northern portion of Joyland Road south of its intersection with Thompsonville Road, and Thompsonville Road to the west of its intersection with Joyland Road, as shown on the "Site Location Map", Plate 1 and the "Key Plan", Plate 2-0.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil, rock and groundwater conditions within the proposed roadway alignments, at the stream crossing, and at numerous locations which may be developed as stormwater management basins;

2) estimate the relevant geotechnical engineering properties of the encountered materials;

3) initiate field permeability tests at or near locations and depths identified by AKRF;
4) recommend an appropriate type of foundation for support of the proposed stream crossing structure, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by the Building Code of the State of New York, 2010 Edition for seismic design purposes;

5) recommend an appropriate pavement section based on the encountered subsurface conditions and estimated traffic data provided to us by AKRF; and

6) discuss appropriate earthwork considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, a subsurface exploration program consisting of both test borings and test pit explorations was performed. A total of five borings were advanced along the northern portion of Joyland Road and the eastern portion of Thompsonville Road, west of its intersection with Joyland Road, to supplement the nine borings performed in our previous study. The borings were drilled using truck-mounted, hollow-stem auger drilling equipment and extended to depths of approximately 14 to 16 feet below the existing surface grades. A total of 99 test pit explorations were advanced utilizing both a rubber-tire backhoe and track-mounted excavator and extended to depths ranging from approximately 5-1/2 to 14 feet below the existing surface grades. The approximate locations of the explorations performed for this study are shown on the Plot Plans, Plates 2-1 through 2-11.

All work was performed under the direct technical observation of engineers and geologists from MTA. Our representatives located the explorations in the field utilizing the existing site features and survey points provided by others, maintained continuous logs of the explorations as the work proceeded, supervised the soil sampling procedures during the drilling

operations, and obtained bulk samples of the materials encountered in the test pits. Numerous closely spaced soil samples were obtained from the borings using the general procedures of the Standard Penetration Test. During advancement of the test pits, our representative obtained numerous bulk samples of the encountered materials.

All soil samples obtained from the explorations were brought to our office where they were further examined in our soil mechanics laboratory. Detailed descriptions of the materials encountered in the test pits are shown on the individual Logs of Test Pits, Plates 3-1 through 3-99. The results of the borings are shown on Plates 4-101 through 4-114. The soils were visually classified in general accordance with the Unified Soil Classification System presented on Plate 5.

Numerous soil samples were subjected to laboratory testing consisting of grain-size analyses (ASTM D-422) and moisture content determinations (ASTM D-2216), and two samples were subjected to California Bearing Ratio (CBR) testing (ASTM D-1883-07) to aid in their engineering classification and evaluation. The results of the grain-size tests are presented on Plates 6A through 6D, Gradation Curves. The results of the moisture content determinations are presented on Plates 6A through 6D and on the appropriate exploration logs.

The results of our subsurface exploration program, visual examination of the soil samples, and a review of the laboratory test results have provided the basis for our engineering analysis and findings. The following discussions of our findings are subject to the limitations attached as an Appendix to this report.

Site Conditions

Surface Features: Thompsonville Road and Joyland Road are currently two-lane paved roadways. The roadways will need to be widened and re-graded in order to accommodate the

increased volume of traffic. The majority of the remainder of the Resort Entry Road, from its intersection with Joyland Road to the west and south where it will connect with the new Route 17 intersection, is moderately to heavily wooded with several areas identified as wetlands and a stream crossing.

Topographic information shown on plans provided to us indicates that surface elevations slope moderately downward from east to west along Thompsonville Road from its intersection with Joyland Road from approximately Elevation +1,436 feet to a low of approximately Elevation +1,344 feet to the west where the explorations terminate in the area of B-S-16. The northern portion of Joyland Road slopes gently upward from its intersection with Thompsonville Road to the south from a low of approximately Elevation +1,436 feet to approximately Elevation +1,447 feet, where the new Resort Entry Road turns west. The remainder of the new Resort Entry Road alignment from its intersection with Joyland Road, west and south varies from Elevation +1,431 feet to Elevation +1,364 feet.

Subsurface Conditions: The following generalized strata were encountered in the explorations and are listed in order of increasing depth:

1) Topsoil: A surficial layer of topsoil was encountered in 94 of the 99 test pits and 6 of the 14 borings (current and previous) performed along the Joyland Road and Thompsonville Road alignments. In general, the topsoil was found to be approximately 4 to 8 inches thick in the majority of the explorations, but ranged up to approximately 14 inches in thickness in some of the test pits.

2) Pavement/Fill: A three to six inch thick layer of asphalt pavement was encountered in Borings 101 through 105 and in Boring S-8. The previous borings performed for Thompsonville Road were advanced adjacent to the existing pavement in order to minimize disturbance to the existing roadway surface. Our visual observations indicate that both Thompsonville Road and Joyland Road are likely constructed by "chip

seal" methods and do not consist of a true asphaltic concrete section. Shallow fill materials ranging from approximately one to two feet in thickness were encountered in 10 of the 14 borings and in only 7 of the 99 test pits, generally reflecting the grading required during construction of Joyland and Thompsonville Roads.

3) Silt: Below the surficial topsoil, asphalt and fill materials, silt and clayey silt was observed in two of the borings and twelve of the test pit explorations. The siltier materials were similar in nature to the glacial silty sands encountered throughout the area; however, their silt content was high enough to require classification as silt. In general, the silty soils were found to be stiff in consistency.

4) Silty Sand: Below the surficial topsoil, fill and silt, the natural soils typically consisted of sands and silty sands containing varying amounts of gravel, cobbles and boulders. The sandy soils are believed to be glacial in nature and extended to the completion depths in the majority of the explorations performed. The upper one to two feet of the sandy soils in several of the explorations were found to be somewhat loose in relative density, probably the result of freeze-thaw cycles. The deeper glacial materials were observed to be dense to very dense in relative density.

5) Siltstone/Sandstone Bedrock: In 4 of the 14 borings and 16 of the 99 test pits, siltstone/sandstone bedrock was encountered at depths varying from approximately 3 to 20 feet below grade. In several of the explorations, it could not be determined if refusal was encountered atop sedimentary bedrock or relatively large boulders. In general, the sedimentary rock was found to grade sounder with depth, where encountered.

Groundwater seepage was encountered in 10 of the 14 borings and 65 of the 99 test pits performed for this study upon their completion. The observed groundwater levels varied from approximately 1 to 14-1/2 feet below grade. In addition, mottling which is indicative of seasonal groundwater conditions or seasonally saturated soils, was observed in the majority of the test pit explorations at shallower levels.

Findings and Recommendations

General: Based on the results of our study, it is our opinion that:

1) The soils encountered in Test Pits No. 33 and 40 advanced closest to the stream consisted of medium dense to dense silty sands which in our opinion will provide suitable support for the bridge or culvert on spread footings.

2) Following the site preparation and earthwork procedures, the undisturbed glacial soils will provide adequate support for the roadways.

3) The moisture levels observed in the majority of the materials subjected to laboratory testing indicate that the natural glacial soils appear to be at or somewhat above moisture levels which would allow recompaction to 95 percent of their maximum dry density. Consequently, it should be assumed some moisture conditioning of the materials used as controlled compacted fill would be required.

4) The permeability rates observed in the explorations were variable along the route of the proposed Resort Entry Road. Details of that testing are summarized on the individual logs of test pits, and are summarized on Plate 7.

Further discussions of these items and others considered relevant to the proposed development are presented in subsequent sections of this report.

Site Preparation and Earthwork: The areas of the new Resort Entry Road should be cleared and grubbed of all vegetation. After clearing and grubbing, the topsoil should be stripped for its full depth from within and at least five feet beyond the proposed roadway limits. The topsoil would not be suitable for reuse as controlled compacted fill or backfill in paved areas.

After clearing and stripping, the exposed subgrade materials should be proofrolled and compacted to a dense and unyielding consistency with several passes of a heavy, self-propelled, vibrating drum compactor with a minimum static drum weight of ten tons under the observation of a qualified geotechnical engineer. Any subgrade materials which appear to be soft or unstable should be further excavated to the surface of competent soils and backfilled with controlled compacted fill. Although not encountered in our test pits outside the wetlands, potentially

compressible deposits could be encountered in wetland areas. Consequently, areas of soft compressible organic soils may be encountered that require removal prior to placing fill. In addition, areas of fill could be present along the sides of the existing roadways that require removal or recompaction.

We believe that the majority of the soils exposed after stripping of the topsoil will consist of glacial silty sand materials. For the most part, these materials are anticipated to be relatively dense; however, due to their high silt content and the moist nature of the upper portions of the materials encountered in the explorations and the presence of shallow perched groundwater, we anticipate that the surficial materials will be highly susceptible to softening and disturbance once subjected to construction equipment traffic. Therefore, it should be anticipated that some aeration and drying, or overexcavation and replacement of the surficial soils, may be necessary.

The current pavement section along Joyland and Thompsonville Roads appears to consist of a "chip seal" surface over several feet of fill materials placed during road construction. We do not believe it is feasible to incorporate the existing pavement into the new pavement section. We recommend that the existing asphaltic pavement be broken up and removed, or milled for possible reuse as general fill in areas below proposed paved parking or roadway areas.

The latest plans provided to us indicate that the new Resort Entry Road alignment will generally require cuts and fills on the order five feet or less throughout most of its planned route. The majority of the on-site soils in the cut areas were observed to consist of silty sands with varying amounts of cobbles and boulders. The moisture contents performed on selected samples obtained in the explorations indicated that the materials were at or above moisture contents that will permit compaction to the required degree in their existing condition. Consequently, some

aeration and drying should be anticipated. If the earthwork operations are performed during or following periods of wet or freezing weather, compaction of the on-site soils to the required degree may be difficult.

We recommend to the extent possible, that cobbles and boulders be utilized in areas requiring deeper fills where they would not interfere with future excavation for utility installation. Portions of the cobbles and boulders could be broken into smaller fragments where they may be reused to stabilize wetter areas prior to installation of granular controlled compacted fill. Care should be taken to provide sufficient soil to infill any voids between the cobbles and boulders to minimize the potential for migration of the upper fill soils into voids between the cobbles and boulders.

Any imported fill required to complete the site grading along the proposed roadway should consist of uncontaminated, relatively well graded granular soils containing less than 15 percent by weight of material passing a U.S. Standard No. 200 sieve and a maximum particle size of six inches. The fill supplier should provide documentation of the environmental quality of all imported fill.

All fill materials placed in the roadways should be spread in layers on the order of twelve inches or less in loose thickness and uniformly compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure. Backfill placed in confined areas such as utility trench excavations should be spread in thin layers and uniformly compacted to similar densities using manually operated compaction equipment.

Bedrock consisting of fractured sedimentary siltstone and sandstone was encountered in 16 of the test pits and 4 of the borings at depths varying from approximately 3 to 20 feet below

the existing surface grades. Based on information AKRF, Inc. provided to us, we understand that the deeper rock levels encountered in the borings are anticipated to be below the utility invert levels along Joyland and Thompsonville Road. The surface of fractured rock in the test pits was as shallow as three feet, but excavations into the rock extended to total depths of up to five and one-half feet below grade. Cut areas extending several feet into the fractured rock should not be a major construction-related concern. Excavations which extend below the refusal levels encountered in the explorations could require jack-hammering and/or blasting.

Groundwater was encountered in the majority of the explorations at depths varying from approximately 1 to 14-1/2 feet below grade, and shallower perched water from runoff and snow melt should be anticipated. The variable nature of the groundwater infiltration levels observed while the explorations were being performed indicates that groundwater could be encountered at various levels due to seepage through more pervious materials and from surface water runoff. Controlling groundwater through drains and diversion trenches upgrade from the roadway alignment should be anticipated during construction.

Bridge Foundation Design Criteria: Test pits were advanced in the area of the proposed stream crossing as close as possible without infringing upon the existing wetlands. At the time of our study, it was not determined whether the proposed new stream crossing would consist of a "Contech" type bridge or an open box culvert installed in the stream.

We believe that foundations established a minimum of four feet below the existing grades on the dense glacial soils could be designed to impose maximum allowable net bearing pressures of up to two tons per square foot. Depending upon the location of the bridge foundations in relation to the existing stream, dewatering of the excavations could be required. We recommend

that a qualified geotechnical engineer familiar with the site conditions observe the excavations at the time of construction and determine that adequate bearing soils are reached.

Wing walls should be designed to resist lateral earth pressures imposed by the adjacent soils, as well as surcharge loads due to adjacent footings and surface improvements, as well as temporary construction traffic, material stockpiles, sloping backfills, etc. Walls which are free to rotate slightly during backfilling may be designed to resist lateral earth pressures assuming an active earth pressure condition. If the walls are restrained, they should be designed assuming an at-rest earth pressure condition. If sandier portions of the on-site soils are used as backfill, a total unit weight of 145 to 150 pounds per cubic foot should be used, based on the Proctors previously obtained from the on-site soils compacted to 95 percent of their maximum dry density, and an approximate moisture content of five percent. A friction angle of 34 degrees may be used. We estimate that a friction factor between mass concrete and the on-site soils would be 0.40. If the footings are underlain by at least eight inches of crushed stone, the friction factor could be increased to 0.55.

Once a bridge design and more detailed plans are developed, we would review the proposed bridge to evaluate if the design assumptions are consistent with our recommendations.

Seismic Design Criteria: Based on the subsurface conditions encountered in the explorations performed for this and our previous studies, we estimate that the site would be a Site Class "C" as defined by the Building Code of the State of New York, 2010 Edition, for seismic design purposes.

Pavement Design Criteria: We recommend that roadway areas be prepared in accordance with our recommendations outlined in previous sections of this report. Immediately prior to

pavement construction, the exposed subgrade soils should be recompacted to a firm and unyielding consistency, and the upper two feet of the subgrade soils compacted to at least 95 percent of their maximum dry density as determined by the ASTM D-1557 test procedure.

Based on the traffic information provided to us for the various sections of the development by AKRF, the results of our CBR testing of bulk samples obtained in the test pit explorations as part of this study, and utilizing the design procedures outlines in the "AASHTO Guide for Design of Pavement Structures, 1993", we believe the that the following pavement sections would be appropriate:

Roadway Section	**AADT**	**CBR %**	**Design EAL**	**Asphalt Surface Course**	**Asphaltic Binder Course**	**Aggregate Subbase**
Entry Roadway between Interchange and Joyland Road	45,000	6	6.6×10^6	2"	5"	12"
Joyland Road between Entry Road and Thompsonville Road	20,000	6	2.9×10^6	2"	4"	12"
Thompsonville East and West of Joyland Road	5,000	6	7.3×10^5	2"	2"	12"

Proposed Stormwater Management: Based on our investigation and the locations provided to us which were adjusted during the course of our study, infiltration rates are provided on the individual exploration logs and are summarized on Plate 7. In general, all infiltration tests were performed in accordance with NYSDEC Appendix "D" in order to satisfy New York State requirements. In some areas, as discussed with AKRF, Inc. at the time of our study, percolation tests were performed as an alternate.

Please feel free to contact us if you have any questions regarding this report.

The following Plates and Appendix are attached and complete this report:

Plate 1 – Site Location Map
Plate 2-0 – Key Plan
Plates 2-1 through 2-11 – Plot Plans
Plates 3-1 through 3-99 – Logs of Test Pits
Plates 4-101 through 4-114 – Logs of Borings
Plate 5 – Unified Soil Classification System
Plates 6A through 6D – Gradation Curves
Plate 7 – Data Summary Sheet
Appendix – Limitations

Respectfully submitted,

MELICK-TULLY and ASSOCIATES, P.C.

James H. Beattie, P.E.
Senior Associate

Todd E. Horowitz, P.E.
Vice President

JHB:TEH/mh
8979-004*1D
(3 copies submitted)

FROM: "Digital Raster Quadrangles" at 1:24,000 scale provided by New York State GIS Clearinghouse website (http://www.nysgis.state.ny.us/gisdata/quads/).

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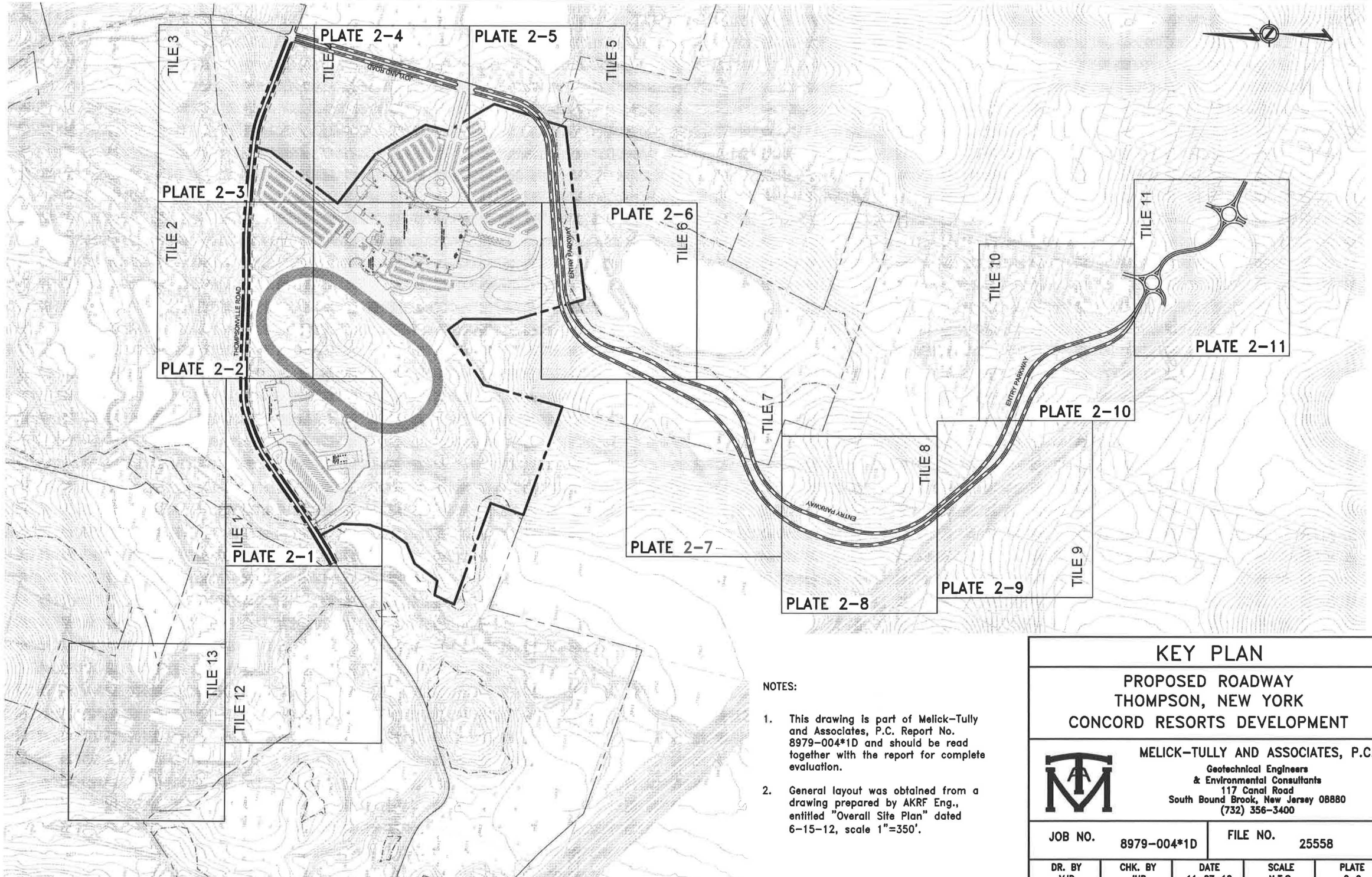
SITE LOCATION MAP

PROPOSED RESORT ENTRY ROAD
TOWN OF THOMPSON, NEW YORK
EPT CONCORD RESORT

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
8979–004*1D	25558	VJD	JHB	3–5–13	1"=2,000'	1



NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Overall Site Plan" dated 6-15-12, scale 1"=350'.

KEY PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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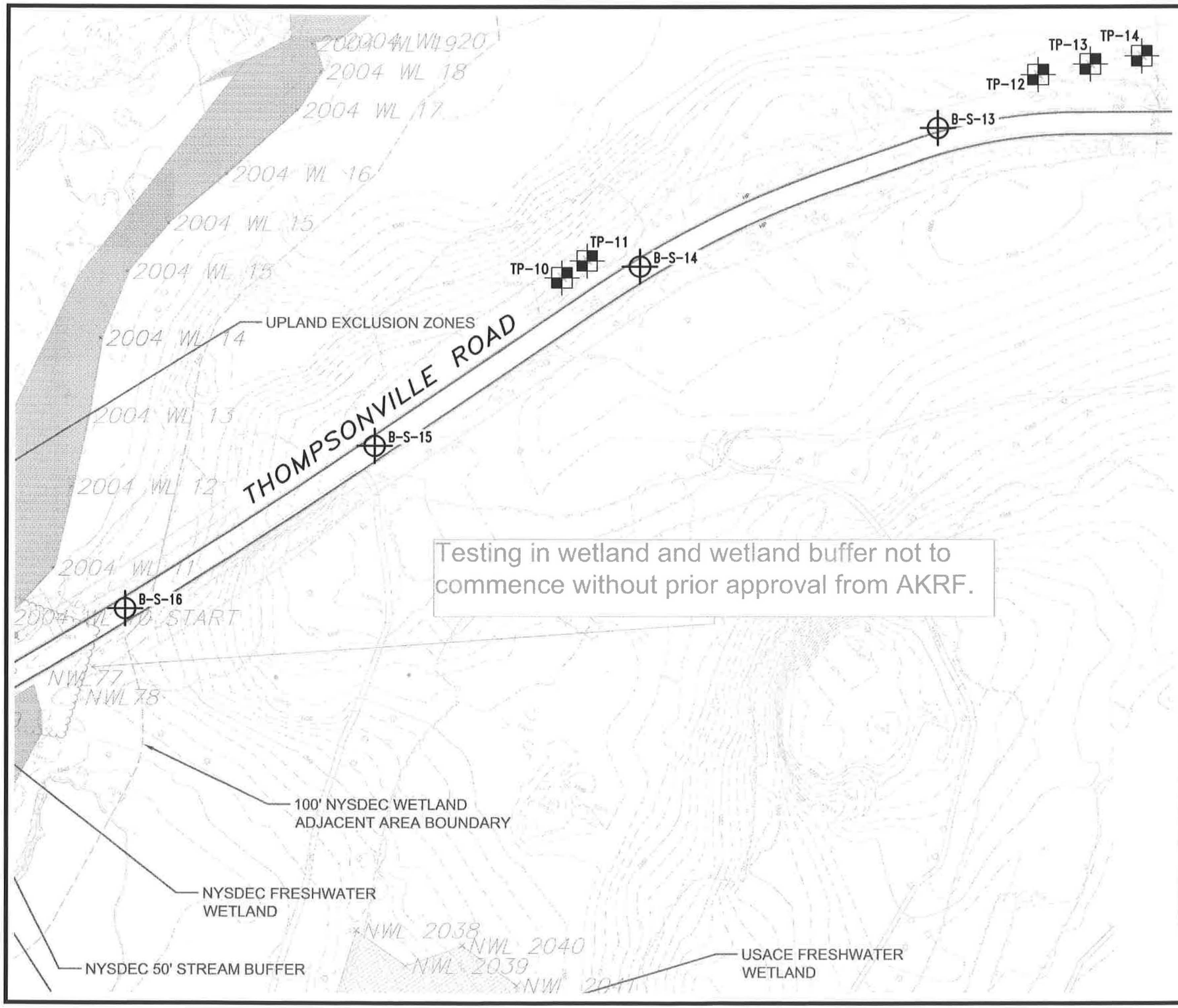
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 11-27-12	SCALE N.T.S.	PLATE 2-0



KEY:

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

B-S-13 NUMBER AND APPROXIMATE LOCATION OF BORINGS PREVIOUSLY PERFORMED BY MTA

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 1" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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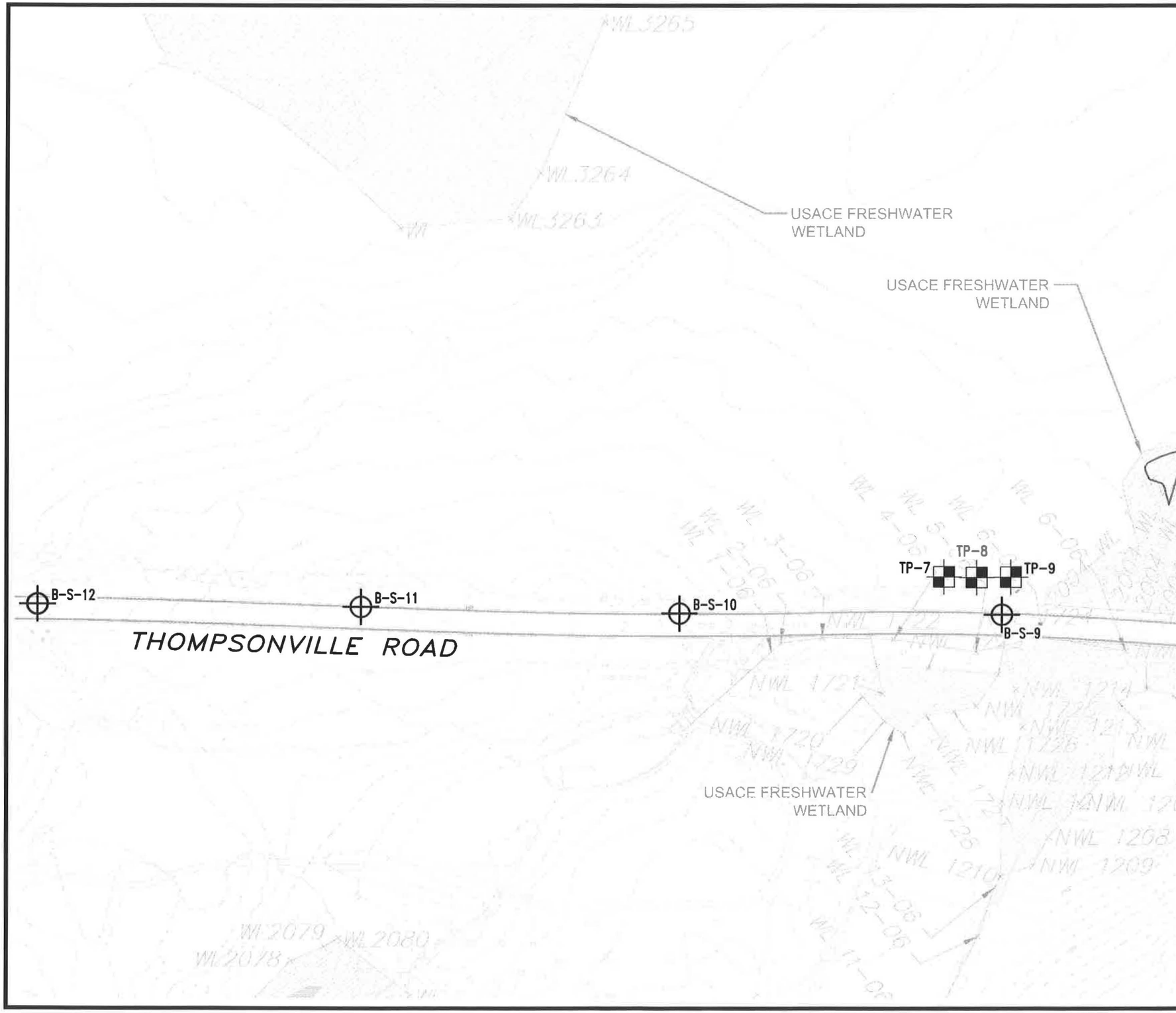
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 11-27-12	SCALE 1"=100'	PLATE 2-1



KEY:

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

B-S-9 NUMBER AND APPROXIMATE LOCATION OF BORINGS PREVIOUSLY PERFORMED BY MTA

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 2" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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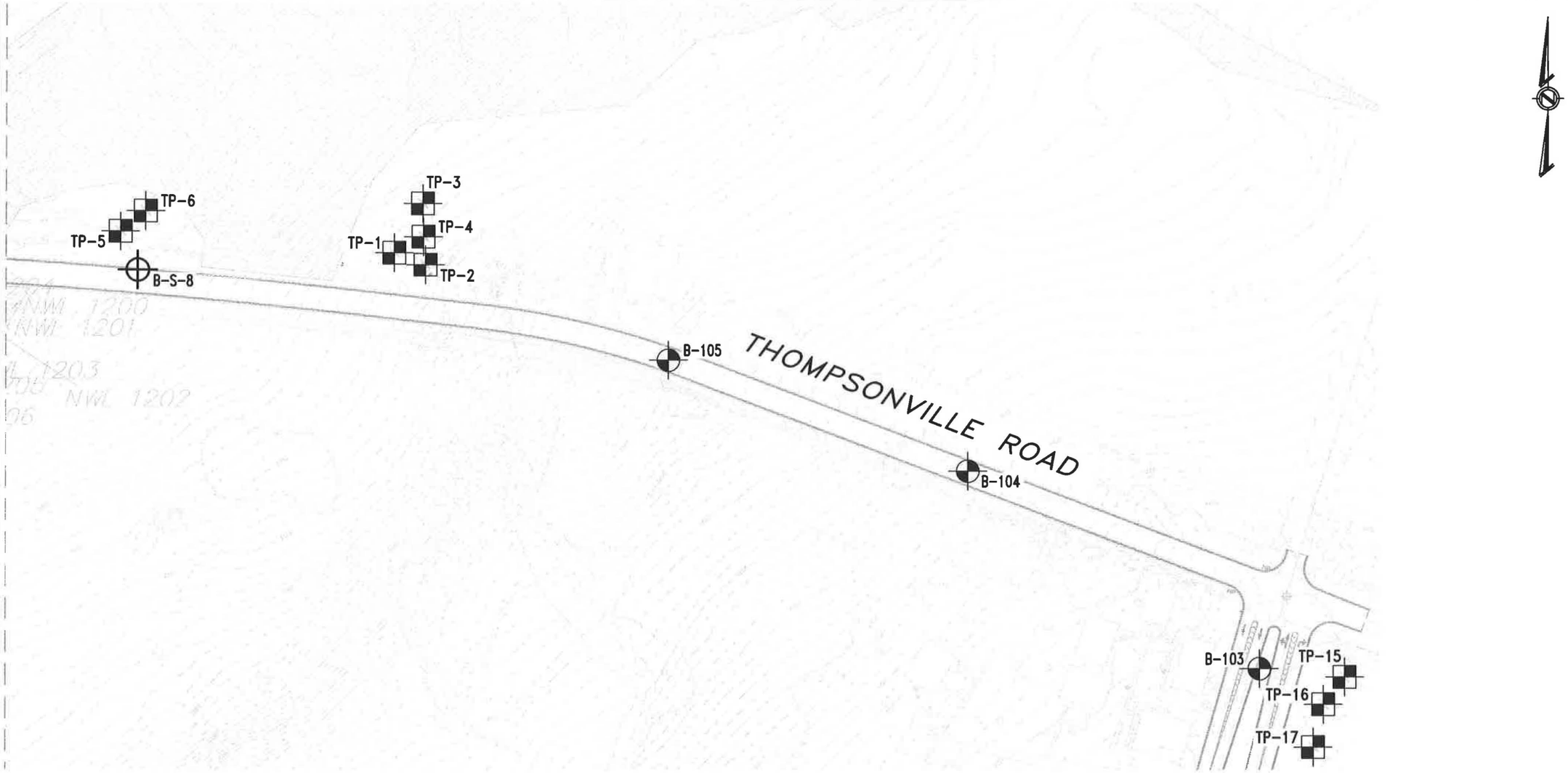
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 11-27-12	SCALE 1"=100'	PLATE 2-2



KEY:

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

B-103 NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY

B-S-8 NUMBER AND APPROXIMATE LOCATION OF BORINGS PREVIOUSLY PERFORMED BY MTA

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 3" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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JOB NO.	FILE NO.
8979-004*1D	25558

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	JHB	11-27-12	1"=100'	2-3

KEY:

TP-18 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

B-102 NUMBER AND APPROXIMATE LOCATION OF BORING PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 4" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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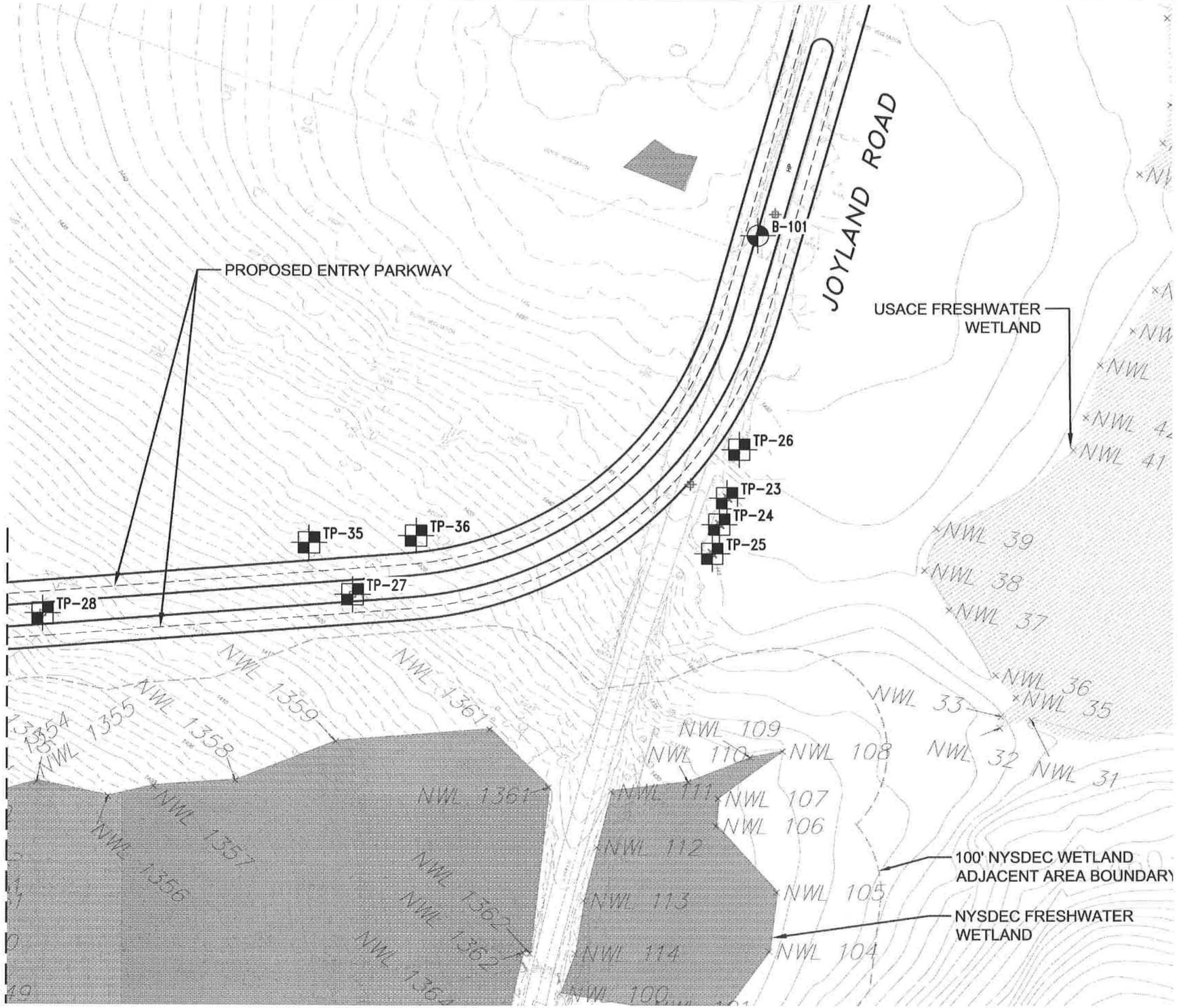
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 12-12-12	SCALE 1"=100'	PLATE 2-4



KEY:

TP-23 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 5" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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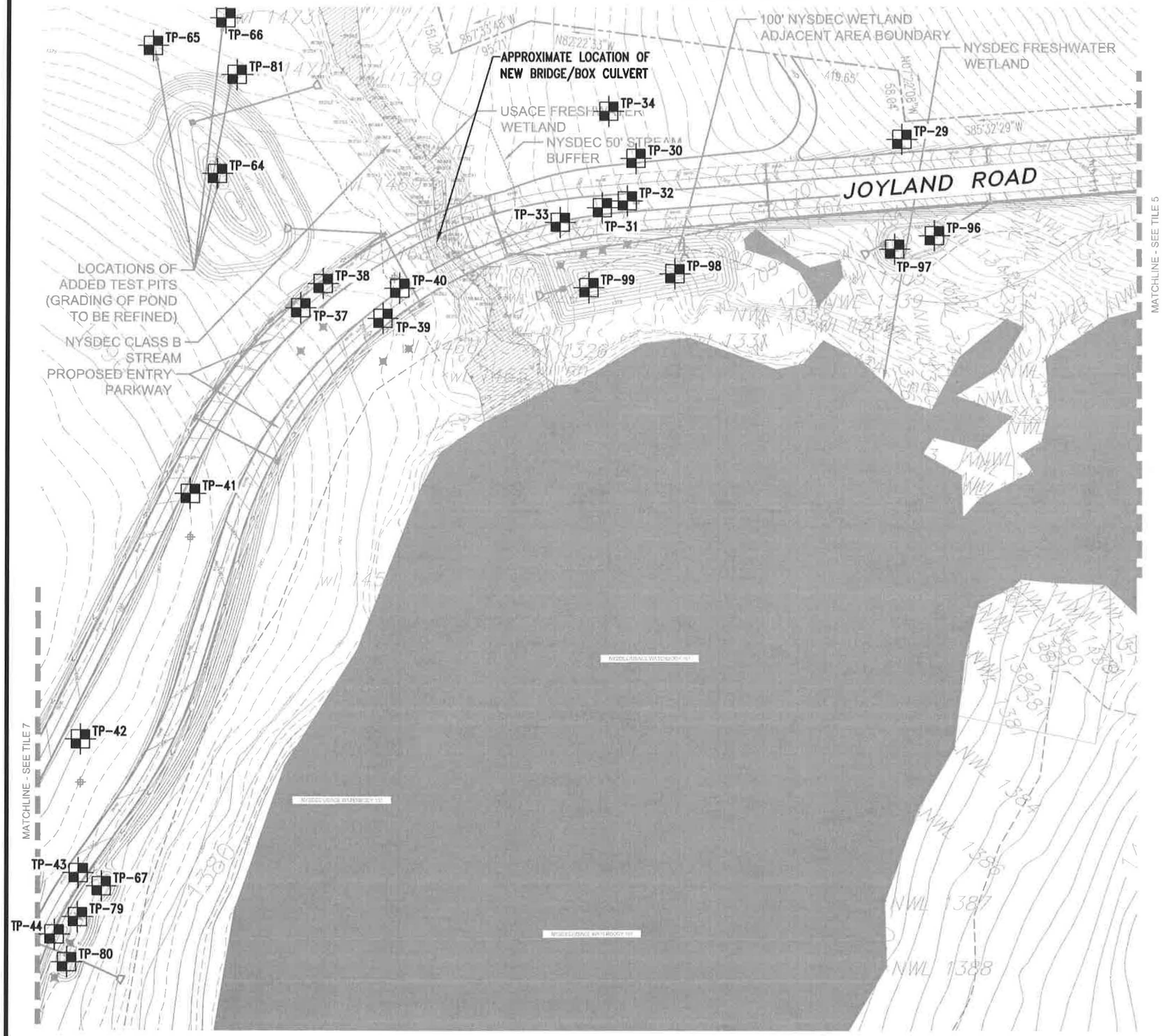
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 12-12-12	SCALE 1"=100'	PLATE 2-5



KEY:

TP-29 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

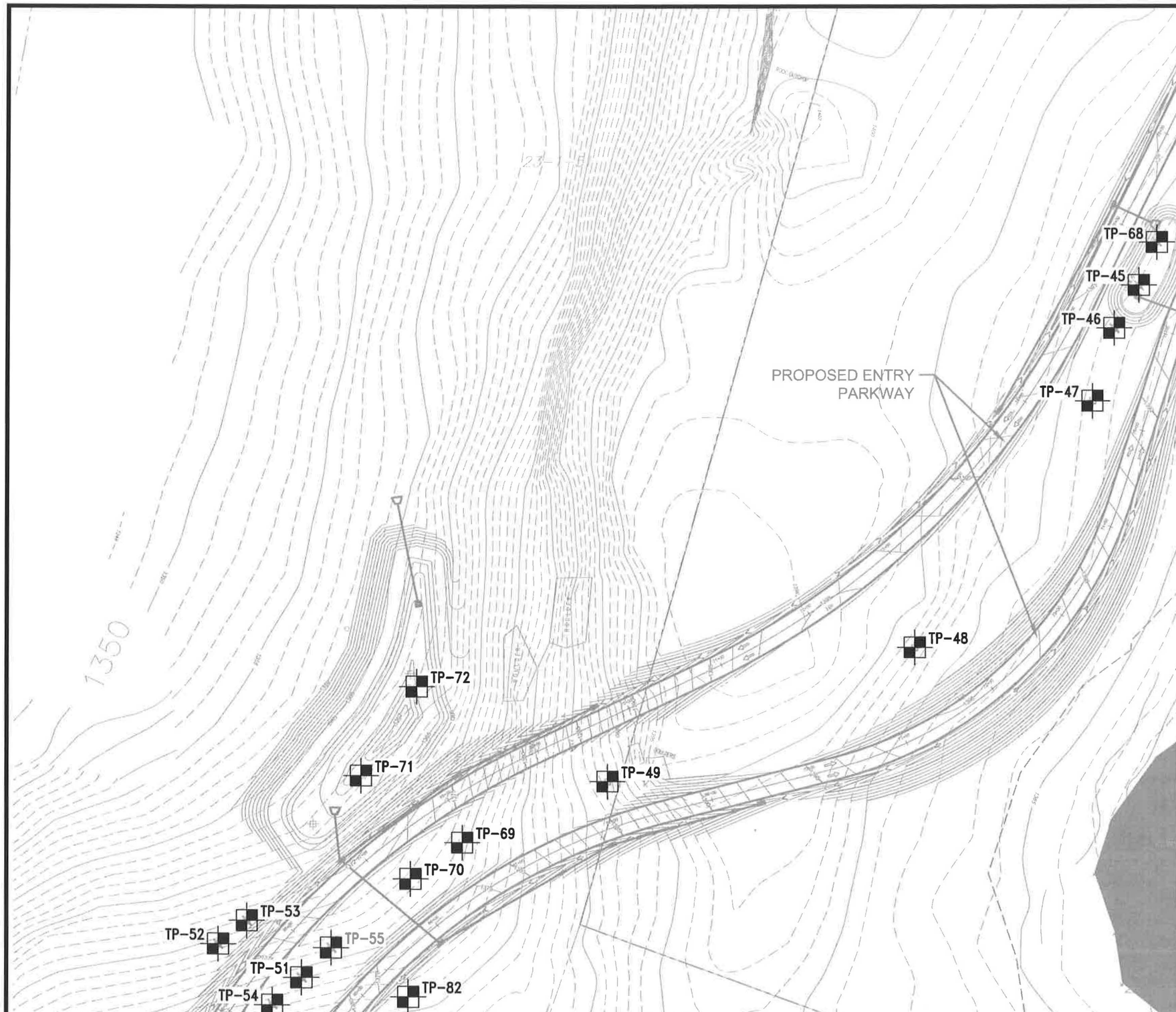
2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 6" dated 10-8-12 (revised 12-19-12), scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 2-25-13	SCALE 1"=120'	PLATE 2-6



KEY:

TP-45 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 7" dated 10-8-12 (revised 12-19-12), scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 12-18-12	SCALE 1"=100'	PLATE 2-7

KEY:

TP-50 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 8" dated 10-8-12, scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
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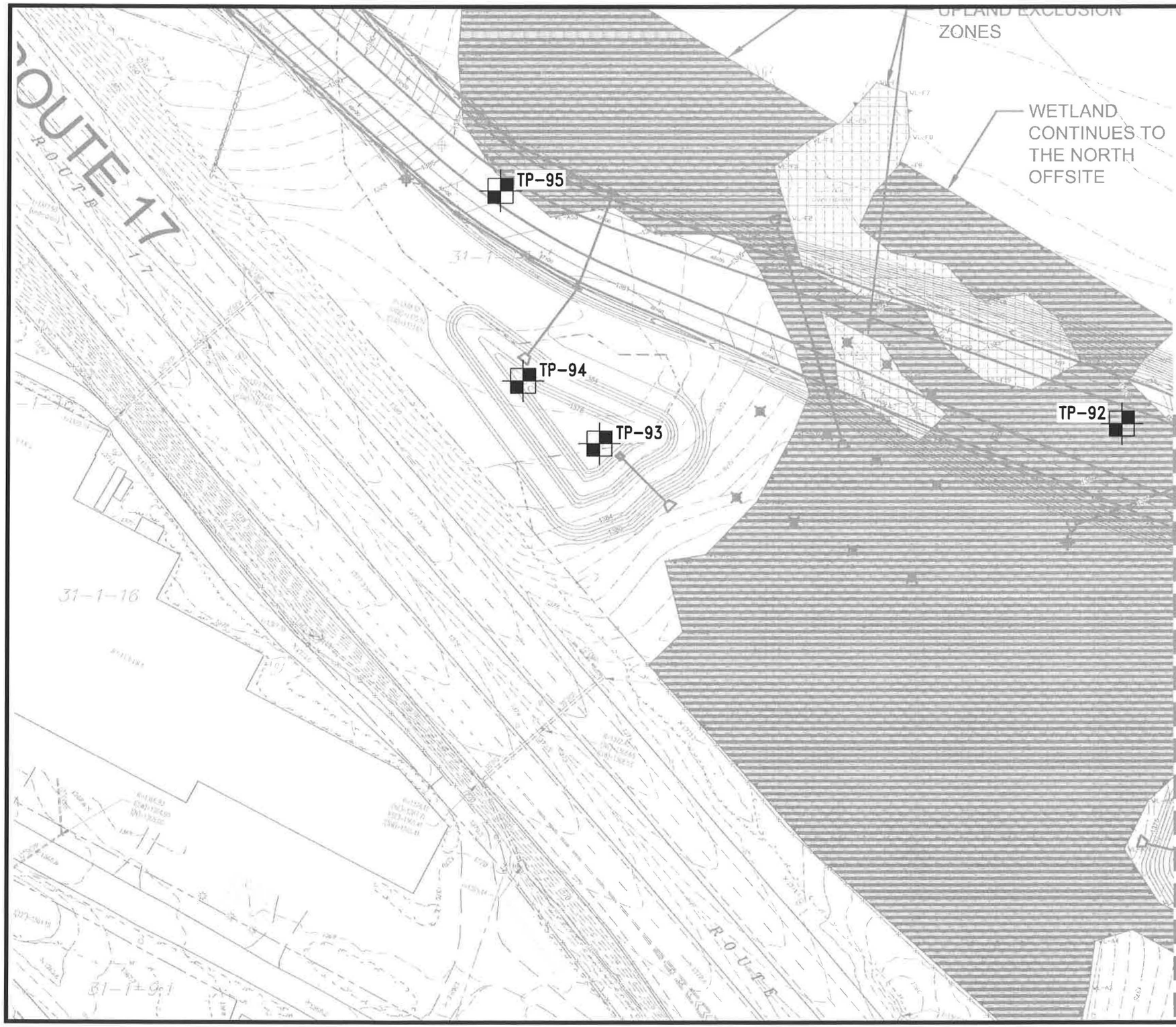
JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 12-18-12	SCALE 1"=120'	PLATE 2-8



KEY:

TP-92 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

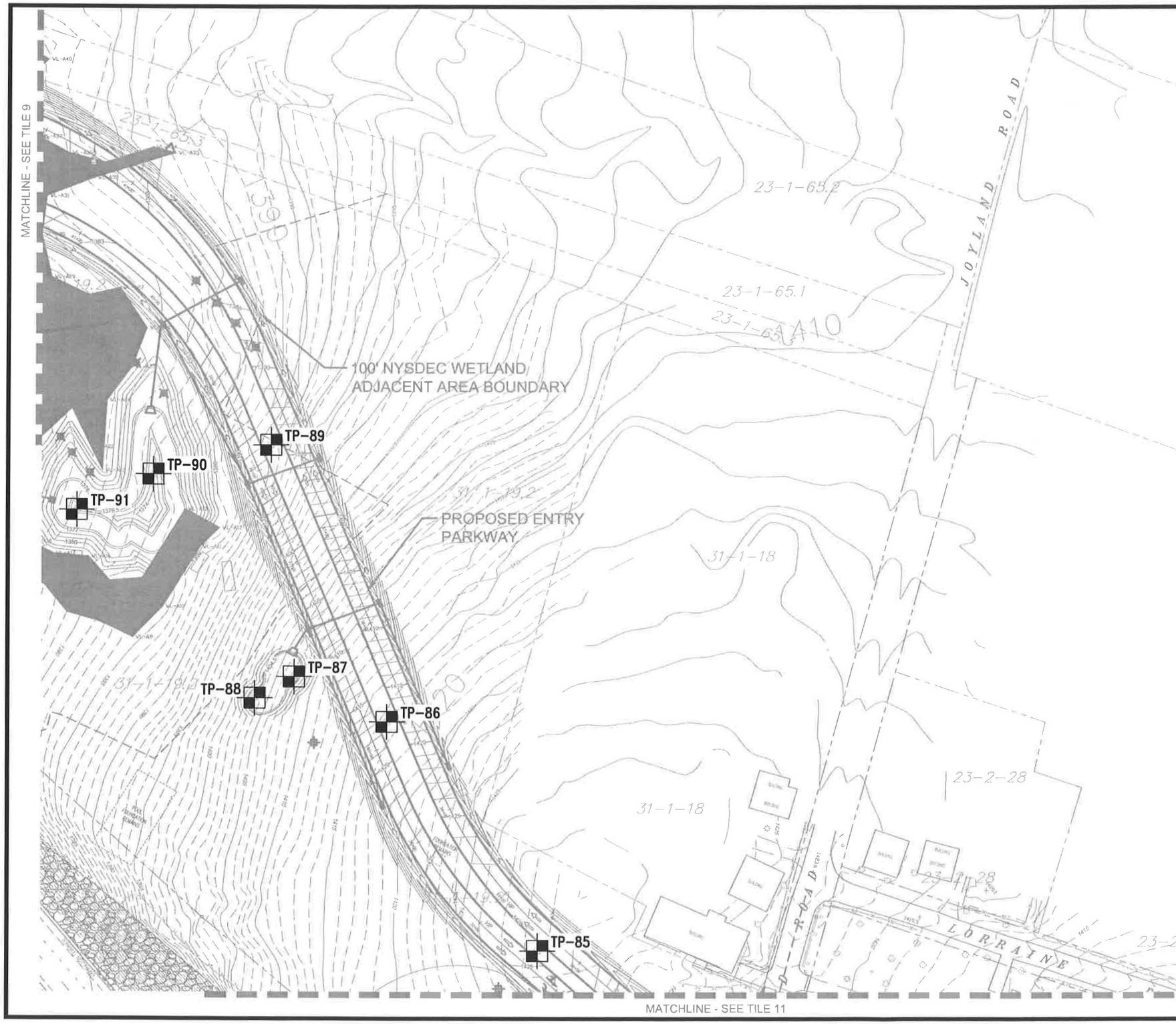
2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 8" dated 10-8-12 (revised 12-19-12), scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 2-25-13	SCALE 1"=100'	PLATE 2-9



KEY:

TP-85 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 10" dated 10-8-12 (revised 12-19-12), scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

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Geotechnical Engineers
& Environmental Consultants
117 Canal Road
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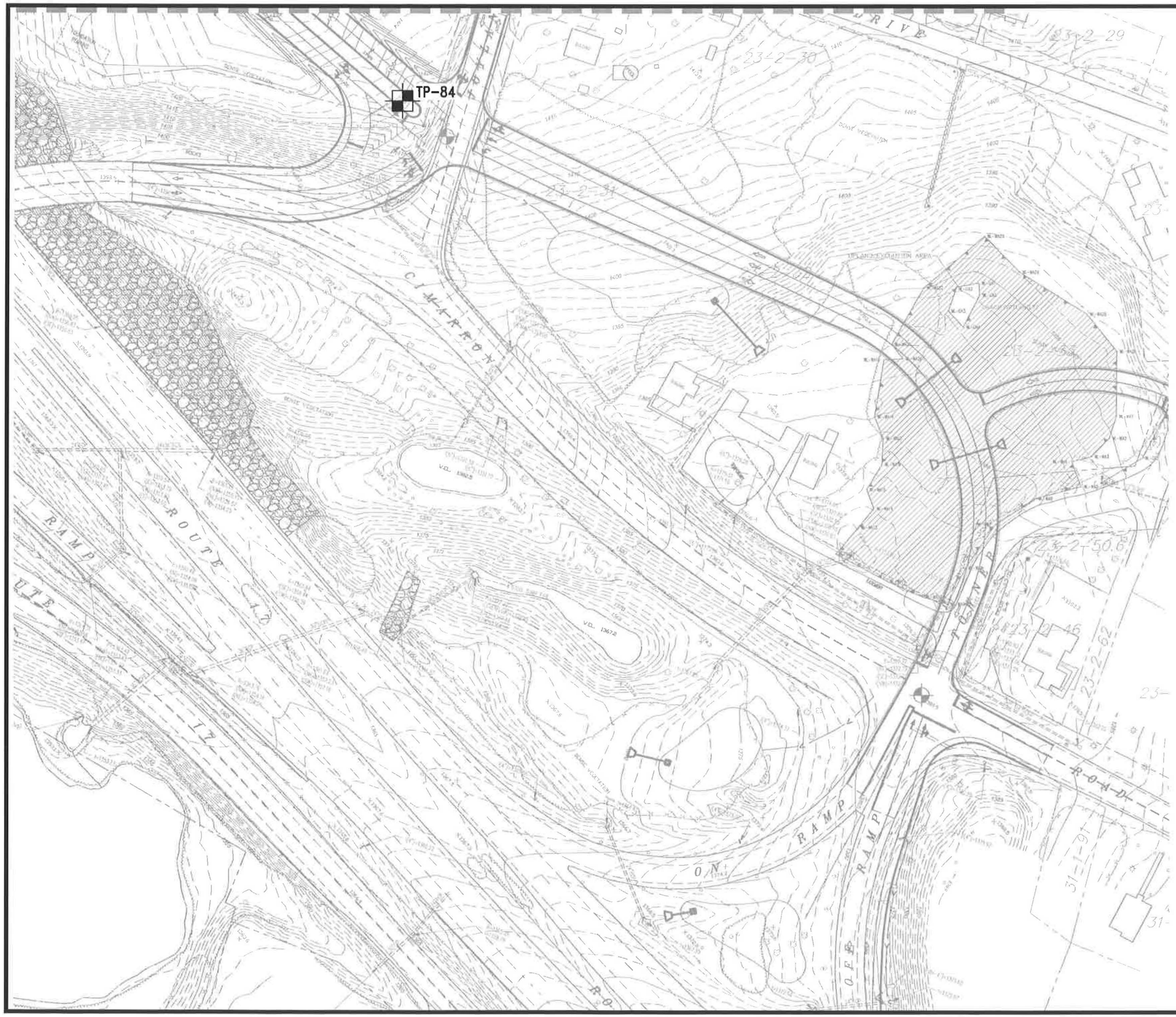
(732) 356-3400

JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 2-25-13	SCALE 1"=100'	PLATE 2-10



KEY:

TP-84 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, P.C. Report No. 8979-004*1D and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by AKRF Eng., entitled "Geotechnical Soil Investigation Plan-Map 11" dated 10-8-12 (revised 12-19-12), scale 1"=40'.

PLOT PLAN

PROPOSED ROADWAY
THOMPSON, NEW YORK
CONCORD RESORTS DEVELOPMENT

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers
& Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	8979-004*1D	FILE NO.	25558	
DR. BY VJD	CHK. BY JHB	DATE 2-25-13	SCALE 1"=100'	PLATE 2-11

LOG OF TEST PIT

TEST PIT NO: 1

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,366 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1 S2	21.4	ML	Red-brown silt, some fine to coarse sand, trace fine gravel (moist)(stiff)	
5	S3		SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(dense)	5
10				Test pit completed @ 10' Mottling observed @ 2'-6" *Groundwater not encountered Infiltration test performed @ 2' Measured Infiltration Rate = 2-1/4 in/h	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-1

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 2

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,368 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(medium dense to dense)	
5	S2	18.9			5
	S3		SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
10					10
				Test pit completed @ 9' Mottling observed @ 4'-6" *Groundwater not encountered Infiltration test performed @ 4' Measured Infiltration Rate = 14 in/hr	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-2

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 3

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,364 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1	25.3	SM	Red-brown fine to coarse sand, and silt, little fine gravel (moist)(medium dense)	
5	S2		SM	Brown fine to coarse sand, some silt, little to some fine to coarse gravel, occasional cobbles (moist)(dense to very dense)	5
10				Test pit completed @ 8' Mottling observed @ 3' *Groundwater not encountered Infiltration test performed @ 1' Measured Infiltration Rate = 2-1/4 in/h	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-3

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 4

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,366 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1	19.2	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	5
10				Test pit completed @ 10' Mottling observed @ 1' *Groundwater not encountered Infiltration test initiated @ 2'-6" Presoak did not drain	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-4

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 5

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,350 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1	19.1	ML	Gray silt, and fine to medium sand (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, and clayey silt, some fine to coarse gravel (moist)(medium dense to dense)	
5					5
	S3			- backhoe refusal encountered @ 8' atop boulder	
10					10
				Test pit completed @ 8' Mottling observed @ 1' *Moderate to heavy groundwater seepage from 6'-6" to 8' Infiltration test initiated @ 2' Presoak did not drain	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-5

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 6

COMPLETION DATE: 10/10/12 SURFACE ELEVATION: +1,350 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/10/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, little fine to coarse gravel (moist)(dense)	
5	S2		SM	Red-brown fine to medium sand, and clayey silt, occasional cobbles (moist to wet)(dense) - backhoe refusal encountered @ 9' atop boulder	5
10				Test pit completed @ 9' Mottling observed @ 1' *Groundwater seepage encountered from 1' to 4' Infiltration test initiated @ 2' Presoak did not drain	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-6

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 7

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,350 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1			FILL - Brown fine to coarse sand, intermixed with roots and topsoil	
	S2	7.7	SM	Red-brown fine to coarse sand, some silt, and fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	
5					5
10				Test pit completed @ 9' *Rapid groundwater seepage @ 2' Infiltration test not attempted due to shallow groundwater seepage	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-7

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 8

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,349 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1			FILL - Gray-brown fine to medium sand, trace silt	
				FILL - Brown silty sand, with roots (original topsoil)	
			SM	Red-brown fine to coarse sand, some to and silt, little fine gravel, occasional cobbles (moist)(dense to very dense)	
5	S2	9.2			5
10				Test pit completed @ 9'-6" *Rapid groundwater seepage encountered @ 2' Infiltration test not attempted due to shallow groundwater seepage	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-8

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 9

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,348 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1			FILL - Light brown fine to medium sand, trace silt	
				FILL - Brown silty sand, with roots (original topsoil)	
				Red-brown fine to coarse sand, and silt, little fine gravel, occasional cobbles (moist)(very dense)	
5			SM		5
	S2	8.7			
10					10
				Test pit completed @ 9' *Rapid groundwater seepage encountered @ 2' atop original topsoil layer Infiltration test not attempted due to shallow groundwater seepage	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-9

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 10

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,350 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				14" Topsoil	
	S1	5.3	SM	Gray fine to coarse sand, some silt, some fine to coarse gravel (moist)(very dense)	
5				Fractured sandstone bedrock - backhoe refusal encountered @ 8'-6" atop sandstone bedrock	5
10				Test pit completed @ 8'-6" Mottling observed @ 4' *Groundwater not encountered Infiltration test performed @ 3'-6" Measured Infiltration Rate = 2-1/2 in/h	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-10

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LOG OF TEST PIT

TEST PIT NO: 11

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,350 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/15/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1 S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(dense to very dense)	
5					5
10				Test pit completed @ 8'-6" Mottling observed @ 4' *Groundwater not encountered Infiltration test performed @ 3'-3" Measured Infiltration Rate = 14 in/hr	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-11

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LOG OF TEST PIT

TEST PIT NO: 12

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,348.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1		SM	Red-brown fine to medium sand, little silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobles (moist)(dense to very dense)	
5					5
	S3				
10					10
				Test pit completed @ 9' Mottling observed @ 2'-6" *Slight perched groundwater seepage encountered @ 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-12

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LOG OF TEST PIT

TEST PIT NO: 13

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,348.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1		SM	Brown fine to medium sand, little silt, trace fine gravel (moist)(medium dense)	
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
5					5
	S2			- backhoe refusal encountered @ 7' atop sandstone bedrock	
				Test pit completed @ 7'	
10				Mottling observed @ 3'-6"	10
				*Slight groundwater seepage encountered @ 6'-6"	
				Infiltration test performed @ 3'	
				Measured Infiltration Rate = 4-1/4 in/h	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-13

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LOG OF TEST PIT

TEST PIT NO: 14

COMPLETION DATE: 10/11/12 SURFACE ELEVATION: +1,348 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/11/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1		SM	Red-brown fine to medium sand, little silt, trace fine gravel (moist)(medium dense)	
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
5				- backhoe refusal encountered @ 6'-6" atop sandstone bedrock	5
10				Test pit completed @ 6'-6" Mottling observed @ 3' *Groundwater not encountered Infiltration test performed @ 2' Measured Infiltration Rate = 12 in/hr	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-14

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LOG OF TEST PIT

TEST PIT NO: 15

COMPLETION DATE: 10/12/12 SURFACE ELEVATION: +1,441 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/12/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			ML	Red-brown silt, some fine to coarse sand, trace fine gravel (moist)(stiff)	
	S1		SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel (moist)(medium dense)	
				Fractured sandstone bedrock	
5					5
	S2			- backhoe refusal encountered @ 9' atop sandstone bedrock	
10				Test pit completed @ 9' *Groundwater not encountered Infiltration test performed @ 2'-6" Observed Infiltration Rate = 17.5 in/hr **Percolation test performed @ 5'-6" Percolation Rate = 28 min/inch **Percolation test run as approved by AKRF because infiltration sleeve could not be seated in fractured rock	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-15

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 16

COMPLETION DATE: 10/12/12 SURFACE ELEVATION: +1,441.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/12/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, trace fine to coarse gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, little silt, some to and fine to coarse gravel (moist)(very dense)	
5					5
				- backhoe refusal encountered @ 9' atop sandstone bedrock	
10				Test pit completed @ 9' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-16

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 17

COMPLETION DATE: 10/12/12 SURFACE ELEVATION: +1,443 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/12/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1	7.7	SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense to very dense)	
5	S2				5
10				Test pit completed @ 9' Mottling observed @ 4' *Groundwater not encountered Infiltration test performed @ 2' Measured infiltration rate = 10-1/2 in/hr Infiltration test initiated @ 5'-6" Presoak did not drain	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-17

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 18

COMPLETION DATE: 10/12/12 SURFACE ELEVATION: +1,445 ft (±) WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D READING DATE: 10/12/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		ML	Red-brown clayey silt, and fine to coarse sand, little fine gravel (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(very dense)	
5				- grading with cobbles @ 7'-6"	5
10				Test pit completed @ 9' Slight groundwater seepage encountered @ 2'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-18

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 19

COMPLETION DATE: 10/12/12 SURFACE ELEVATION: +1,444 ft (±) WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D READING DATE: 10/12/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		ML	Red-brown clayey silt, little fine to coarse sand, trace fine to coarse gravel (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, some fine to coarse gravel (moist)(very dense)	
5					5
	S3				
10					10
				Test pit completed @ 10' Moderate groundwater seepage encountered @ 2'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-19

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 20

COMPLETION DATE:
JOB NUMBER: 8979-004*1D

SURFACE ELEVATION: +1,443.5 ft (±)

WATER LEVEL:
READING DATE:

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
5				Test pit eliminated by AKRF due to standing water	5
10					10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 21

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,444 ft (±) WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D READING DATE: 10/14/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(dense)	
5	S2 S3		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (wet)(very dense)	5
10				Test pit completed @ 9' Mottling observed @ 1'-6" Moderate groundwater seepage encountered @ 2'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 22

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,445 ft (±) WATER LEVEL: 2.5'

JOB NUMBER: 8979-004*1D READING DATE: 10/14/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (wet)(dense)	
5					5
	S3		SM	Red-brown fine to medium sand, some clayey silt, some fine to coarse gravel (wet)(medium dense)	
10					10
				Test pit completed @ 9' Slight groundwaer seepage encountered @ 2'-6" Rapid groundwater seepage encountered @ 8'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-22

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 23

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,447 ft (±) WATER LEVEL: 2.5'

JOB NUMBER: 8979-004*1D READING DATE: 10/14/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				FILL - Red-brown fine to medium sand, and silt	
	S1		SM	Red-brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	5
10				Test pit completed @ 9' Moderate groundwaer seepage encountered @ 2'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-23

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 24

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,446 ft (±) WATER LEVEL: 2.5'

JOB NUMBER: 8979-004*1D READING DATE: 10/14/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, some fine to coarse gravel (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	5
10				Test pit completed @ 9' Mottling observed @ 2' Moderate groundwater seepage encountered @ 4'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 25

COMPLETION DATE: 10/14/12 SURFACE ELEVATION: +1,445 ft (±) WATER LEVEL: 3'

JOB NUMBER: 8979-004*1D READING DATE: 10/14/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				9" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	5
10				Test pit completed @ 9' Mottling observed @ 1'-6" Slight groundwater seepage encountered @ 3'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 26

COMPLETION DATE: 10/15/12 SURFACE ELEVATION: +1,447 ft (±) WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D READING DATE: 10/15/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			10" Topsoil	
	S2		SM	Red-brown fine to coarse sand, some to and silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense)	
	S3				
5					5
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, numerous cobbles (moist)(very dense)	
	S4				
10					10
				Test pit completed @ 9'	
				Mottling observed @ 1'-6"	
				Slight groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 27

COMPLETION DATE: 10/16/12 SURFACE ELEVATION: +1,425 ft (±) WATER LEVEL: 5'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/16/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to dense)	
5	S3				5
			SM	Red-brown fine to coarse sand, some silt, and fine to coarse gravel, frequent cobbles and boulders (moist to wet)(very dense)	
10					10
				Test pit completed @ 10' Mottling observed @ 3' Slight groundwater seepage encountered @ 5'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 28

COMPLETION DATE: 10/16/12 SURFACE ELEVATION: +1,410 ft (±) WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/16/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt, some fine to coarse gravel (moist to wet)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, frequent cobbles (moist)(dense)	
5					5
10					10
				Test pit completed @ 10' Slight groundwater seepage encountered @ 1'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 29

COMPLETION DATE: 10/16/12 SURFACE ELEVATION: +1,392.5 ft (±) WATER LEVEL: 2'-0"

JOB NUMBER: 8979-004*1D READING DATE: 10/16/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	
	S2				
5	S3				5
	S4		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist to wet)(dense)	
	S5		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (wet)(dense)	
10					10
				Test pit completed @ 10' Slight groundwater seepage encountered @ 2'-0"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-29

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 30

COMPLETION DATE: 10/16/12 SURFACE ELEVATION: +1,382 ft (±) WATER LEVEL: 2'-0"

JOB NUMBER: 8979-004*1D READING DATE: 10/16/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, some to and silt, trace fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense)	
5					5
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (wet)(dense)	
10				Test pit completed @ 10' Mottling observed @ 1'-6" Slight groundwater seepage encountered @ 2'-6'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 31

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,380.5 ft (±) WATER LEVEL: 7'-0"

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			FILL - Intermixed silty sand, and topsoil	
	S2				
			SM	Red-brown fine to medium sand, little to some silt, little fine gravel (moist)(medium dense)	
	S3				
	S4				
5					5
				- grading with occasional cobbles @ 6'-6"	
	S5				
10					10
				Test pit completed @ 10'	
				Mottling observed @ 1'-6"	
				Rapid groundwater seepage encountered @ 7'-0'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 32

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,381 ft (±) WATER LEVEL: 5'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to dense)	
5					5
	S2				
10					10
				Test pit completed @ 10' Mottling observed @ 1'-8" Moderate groundwater seepage encountered @ 5'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 33

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,380 ft (±) WATER LEVEL: 5'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1			Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (wet)(dense)	
	S2				
5			SM		5
10					10
				Test pit completed @ 10'	
				Mottling observed @ 1'-6"	
				Slight groundwater seepage encountered @ 5'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 34

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,382 ft (±) WATER LEVEL: 3'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		ML	Red-brown clayey silt, some fine to medium sand (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to dense)	
5	S3				5
10					10
				Test pit completed @ 10' Slight groundwater seepage encountered @ 3'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 35

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,426 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to medium sand, some to and silt, little fine to coarse gravel (moist)(medium dense)	
	S2	11.0	SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense)	
5					5
10					10
				Test pit completed @ 10' Mottling encountered @ 3'-6" *Groundwater not encountered Two infiltration tests performed @ 2'-6" Measured infiltration rates = 8 in/hr and 14 in/hr	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-35

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LOG OF TEST PIT

TEST PIT NO: 36

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,431 ft (±) WATER LEVEL: 8'

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1		SM	Red-brown fine to medium sand, some silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, little to some silt, little fine to coarse gravel (moist)(medium dense)	
5					5
	S3				
10				Test pit completed @ 9'-6" Mottling encountered @ 2'-6" Moderate groundwater seepage encountered @ 8'-0" Infiltration test initiated @ 5' Presoak did not drain	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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LOG OF TEST PIT

TEST PIT NO: 37

COMPLETION DATE: 10/17/12 SURFACE ELEVATION: +1,382 ft (±) WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D READING DATE: 10/17/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(dense)	5
	S3				
10				Test pit completed @ 10' Moderate groundwater seepage encountered @ 2' Infiltration test initiated @ 6' Presoak did not drain	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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LOG OF TEST PIT

TEST PIT NO: 38

COMPLETION DATE: 10/18/12 SURFACE ELEVATION: +1,380 ft (±) WATER LEVEL: 6'-0"

JOB NUMBER: 8979-004*1D READING DATE: 10/18/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				11" Topsoil	
	S1			Red-brown fine to medium sand, some silt, some fine to coarse gravel (moist)(medium dense)	
	S2		SM		
5					5
				Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
			SM		
10					10
				Test pit completed @ 10' Mottling observed @ 1'-6" Slight groundwater seepage encountered @ 6'-0"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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LOG OF TEST PIT

TEST PIT NO: 39

COMPLETION DATE: 10/18/12 SURFACE ELEVATION: +1,379 ft (±) WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/18/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			8" Topsoil	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to dense)	
5					5
10					10
				Test pit completed @ 10' Slight groundwater seepage encountered @ 1'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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LOG OF TEST PIT

TEST PIT NO: 40

COMPLETION DATE: 10/18/12 SURFACE ELEVATION: 1,377 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 10/18/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Gray-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	
5					5
	S3				
10					10
				Test pit completed @ 10'	
				Mottling observed @ 2'-6"	
				*Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-40

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 41

COMPLETION DATE: 10/18/12 SURFACE ELEVATION: +1,389 ft (±) WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D READING DATE: 10/18/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		ML	Red-brown silt, and fine to coarse sand, trace fine to coarse gravel (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5					5
10					10
				Test pit completed @ 10' Mottling observed @ 2'-6" Moderate groundwater seepage encountered @ 5'-0"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-41

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 42

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,389 ft (±) WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (wet)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	
5	S3				5
10					10
				Test pit completed @ 10' Mottling observed @ 1'-0" Groundwater seepage encountered @ 5'-0"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-42

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 43

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,386 ft (±) WATER LEVEL: 7'

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (wet)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5					5
10				Test pit completed @ 9' Mottling observed @ 2' Groundwater seepage encountered @ 7'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-43

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 44

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,386 ft (±) WATER LEVEL: 2'-3"

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	
5					5
	S2				
10					10
				Test pit completed @ 10' Moderate groundwater seepage encountered @ 2'-3"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12 Sheet: 1 of 1 PLATE: 3-44

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 45

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,389 ft (±) WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	
5					5
10					10
				Test pit completed @ 10' Moderate groundwater seepage encountered @ 2'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 46

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,389 ft (±) WATER LEVEL: 3'-6"

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
			SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S1			Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(dense)	
	S2				
5			SM		5
10	S3				10
				Test pit completed @ 10'	
				Mottling observed @ 1'-6"	
				Moderate groundwater seepage encountered @ 3'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 47

COMPLETION DATE: 10/22/12 SURFACE ELEVATION: +1,389 ft (±) WATER LEVEL: 8'

JOB NUMBER: 8979-004*1D READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (wet)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	5
10					10
				Test pit completed @ 10'-6" Mottling observed @ 1'-6" Rapid groundwater seepage encountered @ 8'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 48

COMPLETION DATE: 10/22/12 | SURFACE ELEVATION: +1,393 ft (±) | WATER LEVEL: 5'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 10/22/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				3" Topsoil	
			ML	Red-brown silt, and fine to medium sand, trace fine gravel (moist)(stiff)	
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5					5
				Fractured sandstone bedrock	
				- refusal @ 9' atop relatively sound sandstone bedrock	
10					10
				Test pit completed @ 9'	
				Mottling observed @ 3'-6"	
				Rapid groundwater seepage encountered @ 5'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 49

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,387.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S1				
	S2		SM	Red-brown fine to coarse sand, some silt, little fine gravel (moist)(dense)	
	S3	11.5			
				Fractured sandstone bedrock	
5					5
				- backhoe refusal encountered @ 7' atop sandstone bedrock	
10				Test pit completed @ 7'	10
				*Groundwater not encountered	
				Infiltration test performed @ 3'	
				Measured infiltration rate = 10 in/hr	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 50

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,374 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
			SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S1 S2	11.9	SM	Gray fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	
5					5
				Fractured sandstone bedrock - backhoe refusal @ 6'-6" atop sandstone bedrock	
10				Test pit completed @ 6'-6" Mottling observed @ 2' *Groundwater not encountered Infiltration test performed @ 4' Measured infiltrate rate = 10 in/hr	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 51

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,376 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, some silt (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse grave, occasional cobbles (moist)(dense)	5
10				Fractured sandstone bedrock	10
15				Test pit completed @ 11' *Groundwater not encountered Infiltration test performed @ 8'-6" Measured infiltration rate = 23 in/hr	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 52

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,371 ft (±) WATER LEVEL: 4'-6"

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	
5					5
10				Test pit completed @ 9' Mottling observed @ 3'-9" Moderate groundwater seepage encountered @ 4'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 53

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,369 ft (±) WATER LEVEL: 4'-3"

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	5
10				Test pit completed @ 8' Mottling observed @ 2'-6" Moderate groundwater seepage encountered @ 4'-3"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 54

COMPLETION DATE: 11/01/12 SURFACE ELEVATION: +1,378 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/01/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, some silt (moist)(medium dense)	
	S2	12.7	SM	Red-brown fine to coarse sand, and silt, little fine gravel, occasional cobbles and boulders	
5					5
10	S3			Fractured sandstone bedrock	10
				Test pit completed @ 10'-6" *Groundwater not encountered Infiltration test performed @ 2'-6" Measured infiltration rate = 23 in/hr	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 55

COMPLETION DATE: 11/05/12 SURFACE ELEVATION: +1,381 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(very dense)	
5					5
	S3			Fractured sandstone bedrock	
10					10
				- backhoe refusal encountered @ 12'-6" atop sandstone bedrock	
				Test pit completed @ 12'-6" *Groundwater not encountered Percolation test performed in fractured rock @ 10' Measured percolation rate = 11 min/in	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 56

COMPLETION DATE: 11/02/12 SURFACE ELEVATION: +1,383 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, some silt, little fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(dense)	
5				Fractured sandstone bedrock - backhoe refusal encountered @ 7' atop sandstone bedrock	5
10				Test pit completed @ 7' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 57

COMPLETION DATE: 11/02/12 SURFACE ELEVATION: +1,393 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5				Fractured sandstone bedrock - backhoe refusal encountered @ 5'-6" atop sandstone bedrock	5
10				Test pit completed @ 5'-6" *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 58

COMPLETION DATE: 11/02/12 | SURFACE ELEVATION: +1,390.5 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-004*1D | READING DATE: 11/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
			SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5					5
10				Test pit completed @ 8' Moderate groundwater seepage encountered @ 3'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 59

COMPLETION DATE: 11/02/12 SURFACE ELEVATION: +1,394 ft (±) WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D READING DATE: 11/02/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
			SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	
5					5
				Fractured sandstone bedrock	
10				Test pit completed @ 9'-6" Moderate groundwater seepage encountered @ 1'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

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LOG OF TEST PIT

TEST PIT NO: 60

COMPLETION DATE: 11/06/12 SURFACE ELEVATION: +1,395.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense to very dense)	
5					5
	S3	7.0			
10					10
15				Test pit completed @ 13' Mottling observed @ 2'-6" *Groundwater not encountered Infiltration test performed @ 10'-6" Measured infiltration rate = 8 in/hr	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 61

COMPLETION DATE: 11/06/12 SURFACE ELEVATION: +1,395.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Yellow-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(very dense)	
5					5
10	S3	7.4			10
15				Test pit completed @ 14' *Groundwater not encountered Infiltration test performed @ 13'-0", Measured infiltation rate = 6 in/hr	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 62

COMPLETION DATE: 11/05/12 SURFACE ELEVATION: +1,392.5 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 11/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to medium sand, some to and silt (moist)(medium dense)	
	S2		SM	Gray-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense to dense)	
5					5
10				Test pit completed @ 8'-6" *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 63

COMPLETION DATE: 11/05/12 SURFACE ELEVATION: +1,388 ft (±) WATER LEVEL: 4'

JOB NUMBER: 8979-004*1D READING DATE: 11/05/12

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
			SM	Gray fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	
5					5
				Fractured sandstone bedrock	
10				Test pit completed @ 6' Slight groundwater seepage encountered @ 4'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 11/12

Sheet: 1 of 1 PLATE: 3-63

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 64

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,377.5 ft (±) | WATER LEVEL: 1.5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	
5					5
	S3				
10					10
				Test pit completed @ 10' Mottling observed form 1'-6" to 10' Slight groundwater seepage encountered from 1'-6" to 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-64

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 65

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,373 ft (±) | WATER LEVEL: 1.5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
			SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
				Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	
	S1				
5			SM		5
	S2				
10					10
				Test pit completed @ 10'	
				Mottling observed form 1'-6" to 10'	
				Slight groundwater seepage encountered from 1'-6" to 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-65

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 66

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,370 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense to dense)	
5					5
10				Test pit completed @ 10' Mottling observed form 2'-6" to 7' Slight groundwater seepage encountered @ 3'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-66

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 67

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,386 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense)	
5					5
10					10
				Test pit completed @ 10' Mottling observed form 1'-6" to 10' Slight groundwater seepage encountered @ 1'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-67

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 68

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,389 ft (±) | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist to wet)(medium dense)	
5					5
10				Test pit completed @ 10' Mottling observed form 1'-6" to 10' Slight groundwater seepage encountered @ 1'-6"	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-68

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 69

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,374 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				9" Topsoil	
	S1		SM	Brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense) - backhoe refusal encountered on boulders @ 7'	5
10				Test pit completed @ 7' *Groundwater not encountered Infiltration test performed @ 4'-6" Measured Infiltration Rate = 6-1/2 in/hr	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-69

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 70

COMPLETION DATE: 1/21/13 | SURFACE ELEVATION: +1,372.5 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/21/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
			SM	Red-brown fine to medium sand, and silt, little fine to coarse gravel (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense)	5
10				Highly fractured shale bedrock	10
15				Test pit completed @ 11' *Groundwater not encountered Percolation test performed @ 9' Measured Percolation Rate = 50 min/inch	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-70

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 71

COMPLETION DATE: 1/22/13 | SURFACE ELEVATION: +1,364 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/22/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			2" Topsoil	
			SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel (moist)(medium dense)	
5					5
	S3				
				Highly fractured shale bedrock	
10					10
				Test pit completed @ 10' Mottling observed from 2'-6" to 4' Moderate groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-71

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 72

COMPLETION DATE: 1/22/13 | SURFACE ELEVATION: +1,363.5 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/22/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel, occasional cobbles (moist to wet)(dense)	
5					5
				- backhoe refusal atop shale bedrock @ 8'-6"	
10					10
				Test pit completed @ 8'-6" Mottling observed @ 3' Moderate groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-72

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 73

COMPLETION DATE: 1/22/13 | SURFACE ELEVATION: +1,386 ft (±) | WATER LEVEL: 4'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 1/22/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
	S2				
5					5
				- backhoe refusal encountered @ 10' atop shale bedrock	
10				Test pit completed @ 10' Mottling observed from 2'-6" to 10' Moderate groundwater seepage encountered @ 4'-6" Infiltration test performed @ 3' Measured Infiltration Rate = 5-3/4 in/hr	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-73

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 74

COMPLETION DATE: 1/22/13 | SURFACE ELEVATION: +1,389.5 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/22/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5					5
10					10
				Test pit completed @ 10'-6" Mottling observed @ 2'-6" Moderate groundwater seepage encountered @ 5' Infiltraton test performed @ 3'-6" Presoak did not drain	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-74

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 75

COMPLETION DATE: 1/22/13 | SURFACE ELEVATION: +1,384 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-004*1D | READING DATE: 1/22/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist to wet)(medium dense to dense)	
5					5
				Highly fractured shale bedrock	
10					10
				Test pit completed @ 10' Mottling observed @ 2'-6" Moderate groundwater seepage encountered @ 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-75

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 76

COMPLETION DATE: 1/23/13 | SURFACE ELEVATION: +1,383.5 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/23/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5					5
10	S3				10
				Test pit completed @ 11' Mottling observed @ 3' Moderate groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-76

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 77

COMPLETION DATE: 1/23/13 | SURFACE ELEVATION: +1,389.5 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-004*1D | READING DATE: 1/23/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to coarse sand, and silt (moist)(medium dense)	
	S2		SM	Gray fine to coarse sand, some silt, trace fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5					5
10					10
				Test pit completed @ 10'-6" Mottling observed @ 3' Moderate groundwater seepage encountered @ 1'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-77

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 78

COMPLETION DATE: 1/24/13 | SURFACE ELEVATION: +1,396 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/24/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		ML	Brown clayey silt, some fine to coarse sand, little fine gravel (moist)(stiff)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	5
10				Test pit completed @ 10' Mottling observed @ 2'-6" *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-78

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 79

COMPLETION DATE: 1/24/13 | SURFACE ELEVATION: +1,386 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D | READING DATE: 1/24/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				9" Topsoil	
			ML	Brown clayey silt, some fine to coarse sand, little fine to coarse gravel (moist)(stiff)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense)	5
10				Test pit completed @ 10' Mottling observed from 2' to 10' Slight groundwater seepage encountered @ 2'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-79

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 80

COMPLETION DATE: 1/24/13 | SURFACE ELEVATION: +1,386 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D | READING DATE: 1/24/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
			ML	Brown clayey silt, little fine to coarse sand, little fine to coarse gravel (moist)(stiff)	
5			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense)	5
10				Test pit completed @ 10' Mottling observed from 2' to 10' Slight groundwater seepage encountered @ 2'	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-80

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 81

COMPLETION DATE: 1/24/13 | SURFACE ELEVATION: +1,372.5 ft (±) | WATER LEVEL: 2'

JOB NUMBER: 8979-004*1D | READING DATE: 1/24/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				2" Topsoil	
	S1		ML	Brown clayey silt, and fine to medium sand, little fine to coarse gravel (moist)(stiff)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5					5
	S3				
10					10
				Test pit completed @ 10' Mottling observed from 2' to 10' Slight groundwater seepage encountered @ 2'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-81

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 82

COMPLETION DATE: 1/24/13 | SURFACE ELEVATION: +1,379 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/24/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
5			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	5
10	S2				10
15				Test pit completed @ 11' Mottling observed @ 10' *Groundwater not encountered Infiltration test performed @ 4'-6" Measured Infiltration Rate = 9 in/hr Infiltration test performed @ 10' Measured infiltration rate = 9 in/hr	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 83

COMPLETION DATE: 1/25/13 | SURFACE ELEVATION: +1,385 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/25/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
5	S2		SM	Brown fine to coarse sand, little silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(dense) - backhoe refusal atop nested boulders @ 8'	5
10				Test pit completed @ 8' *Groundwater not encountered Percolation test performed @ 5'-6" Measured Percolation Rate = 45 min/in	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-83

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 84

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: +1,420.5 ft (±) | WATER LEVEL: 4'

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1			FILL - Brown fine to medium sand, some silt, trace fine gravel, with roots and wood fragments	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense)	
	S3				
5					5
10					10
				Test pit completed @ 10' Mottling observed from 2'-6" to 5' Perched groundwater seepage encountered @ 4'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

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MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 85

COMPLETION DATE: 1/28/13 | SURFACE ELEVATION: +1,429 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/28/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1			Red-brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)	
	S2		SM		
5					5
	S3		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	
10					10
				Test pit completed @ 10' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-85

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LOG OF TEST PIT

TEST PIT NO: 86

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: +1,416 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense to very dense)	5
10				Test pit completed @ 10' Mottling observed @ 3' *Groundwater not encountered	10
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-86

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 87

COMPLETION DATE: 1/28/13 | SURFACE ELEVATION: +1,407.5 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/28/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(dense)	
5					5
				Highly fractured sandstone bedrock	
10					10
				Test pit completed @ 10' Mottling observed @ 4'-6" *Groundwater not encountered Permeability test initiated @ 3' Presoak did not drain	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-87

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 88

COMPLETION DATE: 1/28/13 SURFACE ELEVATION: +1,403 ft (±) WATER LEVEL: *

JOB NUMBER: 8979-004*1D READING DATE: 1/28/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
	S1		SM	Red-brown fine to medium sand, some silt, little fine to coarse gravel (moist)(medium dense)(possible fill)	
5	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	5
10					10
				Test pit completed @ 10'-6" *Groundwater not encountered Permeability test initiated @ 2' Presoak did not drain	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-88

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 89

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: +1,390.5 ft (±) | WATER LEVEL: 5'

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, some fine gravel (moist)(medium dense)	
	S2		SM	Brown fine to coarse sand, some silt, trace fine to coarse gravel, occasional cobbles (moist)(medium dense to dense)	
5					5
	S3				
10					10
				Test pit completed @ 10'-6" Mottling observed @ 1'-6" Moderate groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-89

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 90

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: +1,383 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt, trace fine gravel (moist)(loose)	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5	S3				5
10					10
				Test pit completed @ 10'-6" Moderate groundwater seepage encountered @ 5'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-90

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 91

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: +1,378 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				12" Topsoil	
	S1			Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense)	
	S2				
5			SM		5
	S3				
10					10
				Test pit completed @ 10'-6" Mottling observed from 1' to 10'-6" Moderate groundwater seepage encountered @ 1'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-91

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 92

COMPLETION DATE: 1/29/13 | SURFACE ELEVATION: N/A | WATER LEVEL: 1'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 1/29/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				7" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (wet)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (wet)(dense)	
5					5
	S3				
10					10
				Test pit completed @ 11' Mottling observed from 1'-6" to 11' Moderate groundwater seepage encountered @ 1'-6"	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-92

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 93

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,382.5 ft (±) | WATER LEVEL: 8'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	
5	S3				5
10	S4		SP/SM	Red-brown fine to coarse sand, little silt, some fine to coarse gravel, occasional cobbles (moist to wet)(medium dense)	10
15				Test pit completed @ 11' Mottling observed from 5'-6" to 11' Moderate groundwater seepage encountered @ 8'-6"	15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-93

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF TEST PIT

TEST PIT NO: 94

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,383.5 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles (moist)(medium dense)	
5	S3		SM	- grading with numerous cobbles @ 8'	5
10					10
				Test pit completed @ 10'-6" Mottling observed @ 5' Rapid groundwater seepage encountered @ 6'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-94

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 95

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,383.5 ft (±) | WATER LEVEL: 4'

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				8" Topsoil	
	S1		SM	Gray-brown fine to medium sand, some silt (moist)(medium dense)	
5			SM	Gray-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to dense)	5
10	S2				10
				Test pit completed @ 11' Mottling observed @ 1' Moderate groundwater seepage encountered @ 4'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-95

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 96

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,390.5 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, little fine to coarse gravel, occasional cobbles (moist to wet)(medium dense to dense)	
5	S3				5
10					10
				Test pit completed @ 10'-6" Groundwater seepage encountered @ 1'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

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MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 97

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,388 ft (±) | WATER LEVEL: 3'

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to medium sand, and silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to dense)	
5					5
10					10
				Test pit completed @ 10' Mottling observed from 1'-6" to 10' Moderate groundwater seepage encountered @ 3'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-97

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 98

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,380 ft (±) | WATER LEVEL: 1'

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				6" Topsoil	
	S1		SM	Red-brown fine to medium sand, some silt (moist)(medium dense)	
	S2		SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to dense)	
5					5
10					10
				Test pit completed @ 10'-6" Mottling observed from 1' Rapid groundwater seepage encountered @ 1'	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-98

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF TEST PIT

TEST PIT NO: 99

COMPLETION DATE: 1/30/13 | SURFACE ELEVATION: 1,376 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 1/30/13

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH
				4" Topsoil	
	S1		SM	Red-brown fine to coarse gravel, little to some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(medium dense to dense)	
5					5
10	S2				10
				Test pit completed @ 11' Mottling observed from 6" to 11' *Groundwater not encountered	
15					15

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 3-99

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. 101

COMPLETION DATE: 10/31/12 | SURFACE ELEVATION: +1,454 ft (±) | WATER LEVEL: 6'-2"

JOB NUMBER: 8979-004*1D | READING DATE: 10/31/12

DEPTH (ft.)	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
					6" Asphalt	
					FILL - Red-brown fine to medium sand, some silt, some fine to coarse gravel	
	S1	10		ML	Red-brown clayey silt, little fine to medium sand (moist)(stiff)	
	S2	50/3"		SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist to wet)(dense to very dense)	
5	S3	49				5
10	S4	106				10
15	S5	51				15
					Boring completed @ 16' Groundwater encountered @ 6'-2"	
20						20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 4-101

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. 102

COMPLETION DATE: 10/31/12 | SURFACE ELEVATION: +1,452 ft (±) | WATER LEVEL: 14'-6"

JOB NUMBER: 8979-004*1D | READING DATE: 10/31/12

DEPTH (ft.)	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
					3" Asphalt over mixed stone and asphalt (chip seal)	
					FILL - Red-brown fine to coarse sand, some silt, some fine to coarse gravel	
	S1	27			Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(medium dense to very dense)	
	S2	40				
5						5
	S3	84				
				SM		
10	S4	98				10
15	S5	39				15
					Boring completed @ 16'	
					Groundwater encountered @ 14'-6"	
20						20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 4-102

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. 103

COMPLETION DATE: 10/31/12 | SURFACE ELEVATION: +1,438 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-004*1D | READING DATE: 10/31/12

DEPTH (ft.)	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
					5" Asphalt	
	S1	21		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist)(medium dense to very dense)	
	S2	60/6"				
5	S3	108				5
10	S4	67				10
15	S5	50/4"				15
					Boring completed @ 14'-10" *Groundwater not encountered	
20						20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 4-103

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. 104

COMPLETION DATE: 10/31/12 | SURFACE ELEVATION: +1,418 ft (±) | WATER LEVEL: 4'

JOB NUMBER: 8979-004*1D | READING DATE: 10/31/12

DEPTH (ft.)	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
					3" Asphalt	
					FILL - Red-brown fine to coarse sand, little silt, some fine to coarse gravel	
	S1	29			Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist to wet)(medium dense to very dense)	
	S2	57				
5						5
	S3	91				
				SM		
10	S4	50				10
					- sampler refusal @ 14'-1" atop possible sandstone bedrock	
	S5	50/1"				
15						15
					Boring completed @ 14'-1"	
					Groundwater encountered @ 4'	
20						20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 4-104

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. 105

COMPLETION DATE: 10/31/12 | SURFACE ELEVATION: +1,498 ft (±) | WATER LEVEL: 8'-3"

JOB NUMBER: 8979-004*1D | READING DATE: 10/31/12

DEPTH (ft.)	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	SYMBOL	DESCRIPTION	DEPTH (ft.)
					3" Asphalt	
					FILL - Dark brown fine to medium sand, some silt, some fine to coarse gravel	
	S1	42		SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist to wet)(dense to very dense)	
	S2	70				
5						5
	S3	94				
10	S4	66			- driller notes boulder from 10'-6" to 13'	10
15	S5	59				15
					Boring completed @ 16'	
					Groundwater encountered @ 8'-3"	
20						20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: jhb/mh 2/13

Sheet: 1 of 1 PLATE: 4-105

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. S-3

COMPLETION DATE: 2/27/12 | SURFACE ELEVATION: +1,452 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 2/27/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						8" Topsoil	
	S1	5			ML	Red-brown silt, and fine to coarse sand, trace fine gravel (moist)(medium to hard)	
	S2	32	8.7				
5	S3	52			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist)(very dense) - driller notes boulder @ 7'-6"	5
10	S4	52					10
15	S5	98/10"					15
20						Boring completed @ 16'-4" *Groundwater not encountered	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-106

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. S-9

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,350 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
	S1	24				FILL - Red-brown fine to coarse sand, and silt, some fine to coarse gravel	
	S2	46			SM	Red-brown fine to coarse sand, some silt, some fine to coarse gravel (moist)(medium dense to dense)	
5	S3	28					5
	S4	50/1"					
	S5	61			SM	Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel, occasional cobbles and boulders (wet)(dense to very dense)	
10	S6	47					10
	S7	86					
	S8	50/2"					
15							15
20						Boring completed @ 14'-8" *Groundwater encountered @ 6'	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-107

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. S-10

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,357 ft (±) | WATER LEVEL: 5'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						4" Topsoil	
	S1	9				FILL - Brown fine to coarse sand, some silt, little fine gravel	
	S2	41				Red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(dense to very dense)	
5	S3	86					5
	S4	59					
					SM		
	S5	81					
10	S6	86					10
	S7	122					
15	S8	80					15
20						Boring completed @ 15'-10" Groundwater encountered @ 5'-6"	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-108

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-11

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,363 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						6" Topsoil and pine needles	
	S1	10			SM	Red-brown fine to coarse sand, and silt, some fine to coarse gravel (moist to wet)(medium dense to very dense)	
	S2	26					
5	S3	47	39.0				5
	S4	35			SM	Red-brown fine to coarse sand, little silt, trace fine gravel (wet)(dense)	
	S5	90			SM	Red-brown fine to coarse sand, little to some silt, little fine to coarse gravel, occasional cobbles and boulders (wet)(very dense)	
10	S6	130					10
	S7	96					
15	S8	100/5"					15
20	S9	100/4"				- driller noted cobbles @ 21'-6"	20
25						Boring completed @ 22' Groundwater encountered @ 6'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-109

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-12

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: 6'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						2" Topsoil and pine needles	
	S1	4			SM	Brown to dark brown fine to coarse sand, little silt, trace fine to coarse gravel (moist)(loose to very dense)	
	S2	50/4"				- driller notes cobbles @ 3'	
5	S3	56	39.0		SM	Red-brown fine to coarse sand, and silt, trace fine gravel (wet)(very dense)	5
	S4	66					
	S5	158/10"			SM	Gray and red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional to frequent cobbles and boulders (moist)(very dense)	
10	S6	100/4"					10
	S7	100/4"					
15							15
20	S8	100/1"					20
25						Boring completed @ 20'-1" Groundwater encountered @ 6'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-110

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-13

COMPLETION DATE: 3/15/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: 12'

JOB NUMBER: 8979-001*1D | READING DATE: 3/15/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						4" Topsoil	
	S1	4			SM	Red-brown fine to coarse sand, some silt, trace fine gravel (moist)(loose)	
	S2	70			ML	Red-brown clayey silt, and fine to medium sand, trace fine to coarse gravel (wet)(hard)	
5	S3	55				Red-brown fine to coarse sand, some to and silt, some fine to coarse gravel (moist to wet)(very dense)	5
	S4	56					
	S5	69					
10	S6	75			SM		10
	S7	104					
15	S8	100/3"				- grading with frequent cobbles and boulders	15
20							20
25						Boring completed @ 20' Groundwater encountered @ 12'	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-111

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-14

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,352 ft (±) | WATER LEVEL: *

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Topsoil	
	S1	28				FILL - Fine to coarse gravel, and fine to coarse sand, trace silt	
	S2	66				Red-brown fine to coarse sand, some silt, little fine gravel (moist)(very dense)	
5	S3	59	25.7				5
	S4	159/11"			SM		
	S5	81					
10	S6	112					10
	S7	100/4"					
15	S8	50/0"					15
	CORE RUN NO. 1			6 2 3 3 3		NQ ROCK CORE RUN NO. 1: 15' to 20' REC = 97% RQD = 77% Red-brown good quality, closely jointed siltstone, grading to sandstone @ 16'	
20							20
25						Boring completed @ 20' *Groundwater not encountered	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-112

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

LOG OF BORING

BORING NO. S-15

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,355 ft (±) | WATER LEVEL:

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Topsoil	
	S1	11				FILL - Brown-dark gray fine to coarse sand, some silt, little fine gravel	
	S2	59				Gray to red-brown fine to coarse sand, some silt, some fine to coarse gravel, occasional cobbles and boulders (moist)(very dense)	
5	S3	83					5
	S4	100/5"			SM		
	S5	100/5"					
10	S6	75/2"				- driller notes cobbles @ 10'-6"	10
	S7	100/5"				- possible bedrock @ 14'-5"	
15							15
20						Boring completed @ 14'-5"	20
25							25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-113

MELICK-TULLY AND ASSOCIATES, P.C.
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LOG OF BORING

BORING NO. S-16

COMPLETION DATE: 3/16/12 | SURFACE ELEVATION: +1,344 ft (±) | WATER LEVEL: 7'-6"

JOB NUMBER: 8979-001*1D | READING DATE: 3/16/12

DEPTH	SAMPLES	N-VALUE	MOISTURE CONTENT (%)	CORING TIMES (MIN./FT.)	SYMBOL	DESCRIPTION	DEPTH
						3" Gravel pavement	
	S1	41			SM	Red-brown fine to coarse sand, little to some silt, some fine to coarse gravel, occasional cobbles and boulders (moist to wet)(medium dense to very dense)	
	S2	78					
5	S3	37					5
	S4	32	10				
	S5	40					
10							10
	S6	192/11"					
	S7	28					
15	S8	66					15
20	CORE RUN NO. 1			6 3 3 4 4		NQ ROCK CORE RUN NO. 1: 20' to 25' REC = 90% RQD = 83% Light green-gray good quality, medium jointed, coarse grained sandstone, and conglomerate	20
25						Boring completed @ 25' Groundwater encountered @ 7'-6"	25
30							30

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH
2. INDICATES THE NUMBER OF BLOWS TO ADVANCE A 2" OD SAMPLER A DISTANCE OF 12 INCHES USING A 140 POUND WEIGHT FALLING 30 INCHES

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: kt/mh 3/12

Sheet: 1 of 1 PLATE: 4-114

MELICK-TULLY AND ASSOCIATES, P.C.
Geotechnical Engineers and Environmental Consultants

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
			SP	Poorly-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS	Liquid limit LESS than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS	Liquid limit GREATER than 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

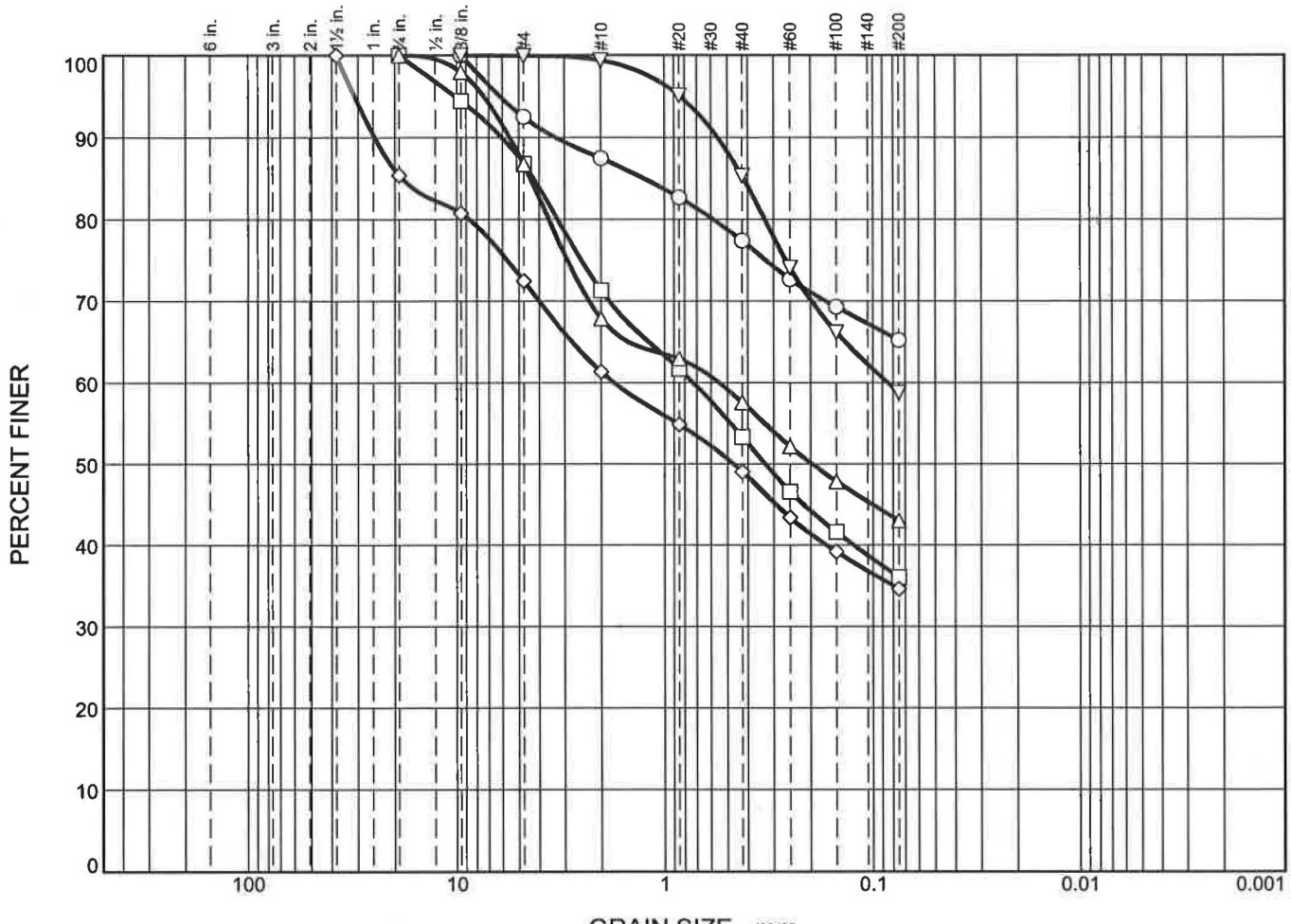
GRADATION*		COMPACTNESS* sand and/or gravel		CONSISTENCY* clay and/or silt	
% Finer by Weight		Relative Density		Range of Shearing Strength in Pounds per Square Foot	
Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

**Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.*

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	7.5	5.0	10.1	12.2	65.2
□	0.0	0.0	13.2	15.5	18.0	17.3	36.0
△	0.0	0.0	13.3	18.8	10.3	14.6	43.0
◇	0.0	14.6	12.9	11.2	12.3	14.4	34.6
▽	0.0	0.0	0.1	0.5	14.1	26.5	58.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-1	S-1	2	Silt, some fine to coarse Sand, trace fine Gravel. (MC=21.4%)	ML
□	TP-2	S-2	4	Fine to coarse Sand, and Silt, little fine Gravel. (MC=18.9%)	SM
△	TP-3	S-1	2	Fine to coarse Sand, and Silt, little fine Gravel. (MC=25.3%)	SM
◇	TP-4	S-1	2	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=19.2%)	SM
▽	TP-5	S-1	1	Silt, and fine to medium Sand. (MC=19.1%)	ML

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

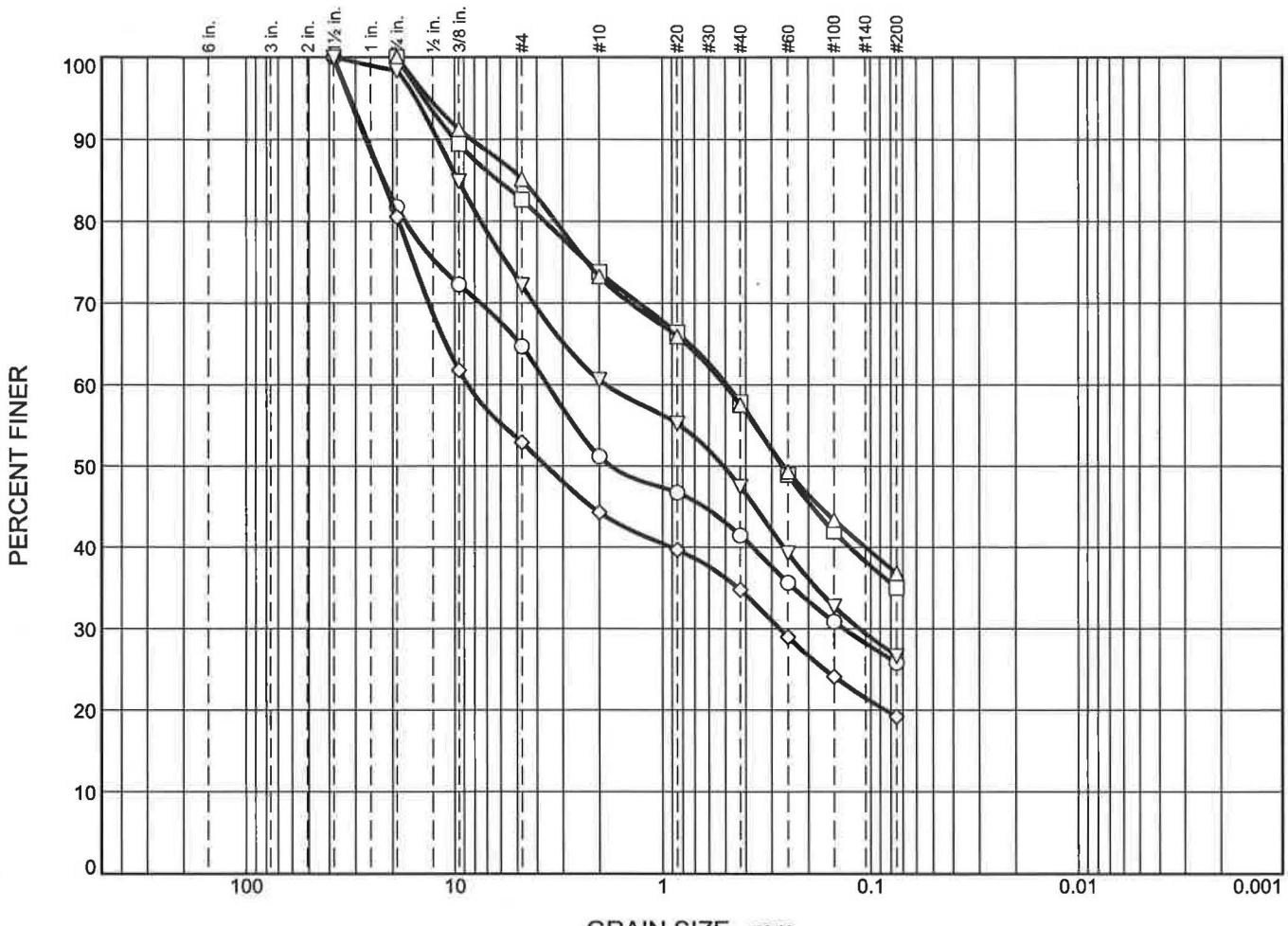
Client: Concord Resort Development

Project: Proposed Roadway, Thompson, NY

Project No.: 8979-004

Plate 6A

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	18.2	17.1	13.5	9.7	15.7	25.8
□	0.0	0.0	17.4	8.8	15.9	22.9	35.0
△	0.0	0.0	14.8	11.9	15.7	20.8	36.8
◇	0.0	19.4	27.7	8.6	9.5	15.6	19.2
▽	0.0	1.7	26.1	11.6	13.1	20.9	26.6

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-7	S-2	4	Fine to coarse Sand, and f-c Gravel, some Silt. (MC=7.7%)	SM
□	TP-8	S-2	6	Fine to coarse Sand, and Silt, little fine Gravel. (MC=9.2%)	SM
△	TP-9	S-2	8	Fine to coarse Sand, and Silt, little fine Gravel. (MC=8.7%)	SM
◇	TP-10	S-1	2.5	Fine to coarse Gravel, some f-c Sand, little Silt. (MC=5.3%)	GM
▽	TP-17	S-1	2	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=7.7%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

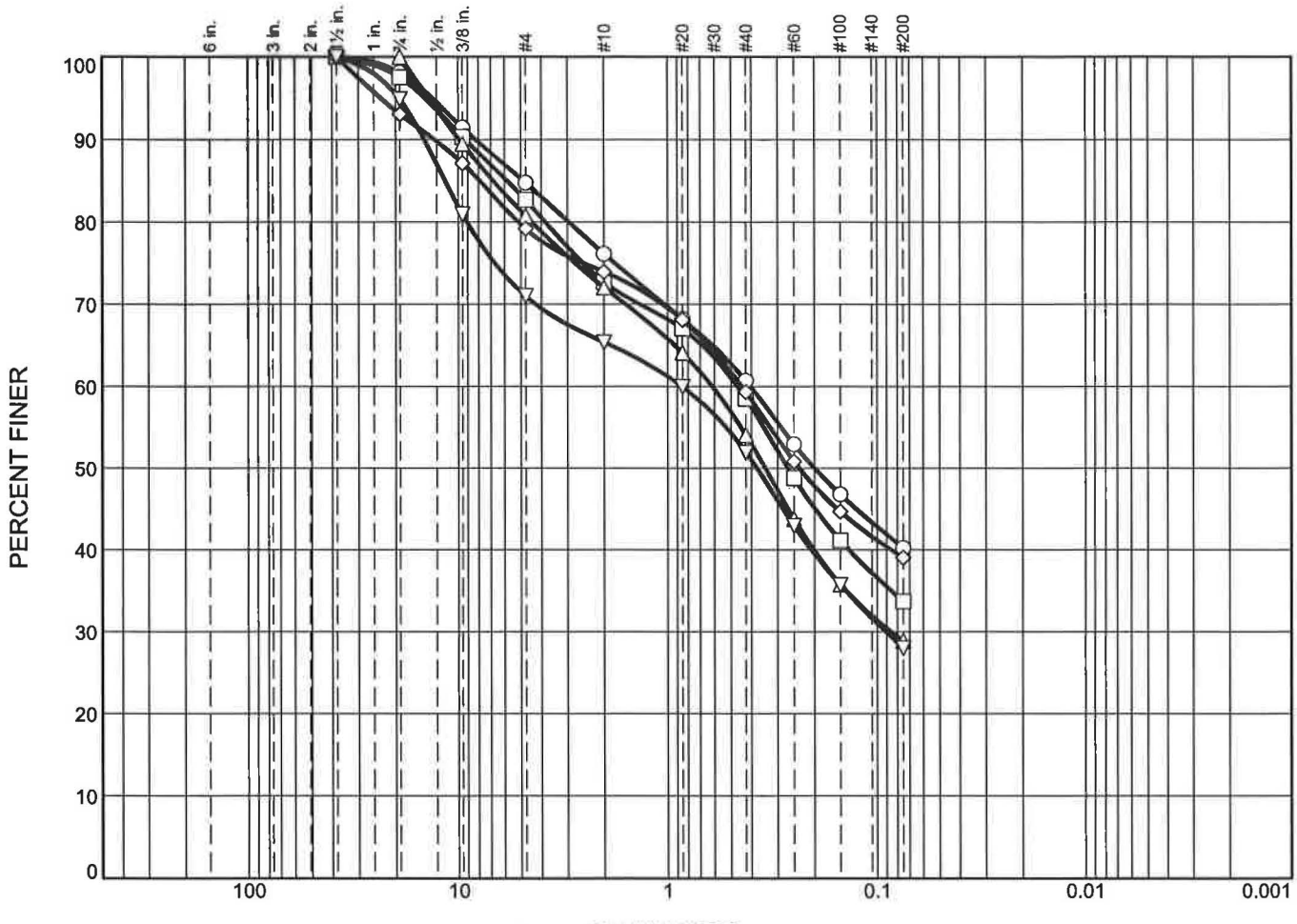
Client: Concord Resort Development

Project: Proposed Roadway, Thompson, NY

Project No.: 8979-004

Plate 6B

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	1.9	13.3	8.7	15.4	20.5	40.2
□	0.0	2.5	14.8	10.0	14.2	24.8	33.7
△	0.0	0.0	19.3	8.6	18.0	25.2	28.9
◇	0.0	6.9	13.9	5.2	14.7	20.3	39.0
▽	0.0	5.1	23.9	5.6	13.5	23.9	28.0

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-30	Bulk	2.5	Fine to coarse Sand, and Silt, little f-c Gravel.	SM
□	TP-35	S-2	3	Fine to coarse Sand, some Silt, little f-c Gravel. (MC=11.0%)	SM
△	TP-49	S-3	3.5	Fine to coarse Sand, some Silt, little fine Gravel. (MC=11.5%)	SM
◇	TP-49	Bulk	3.5	Fine to coarse Sand, and Silt, some f-c Gravel.	SM
▽	TP-50	S-2	2.5	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=11.9%)	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

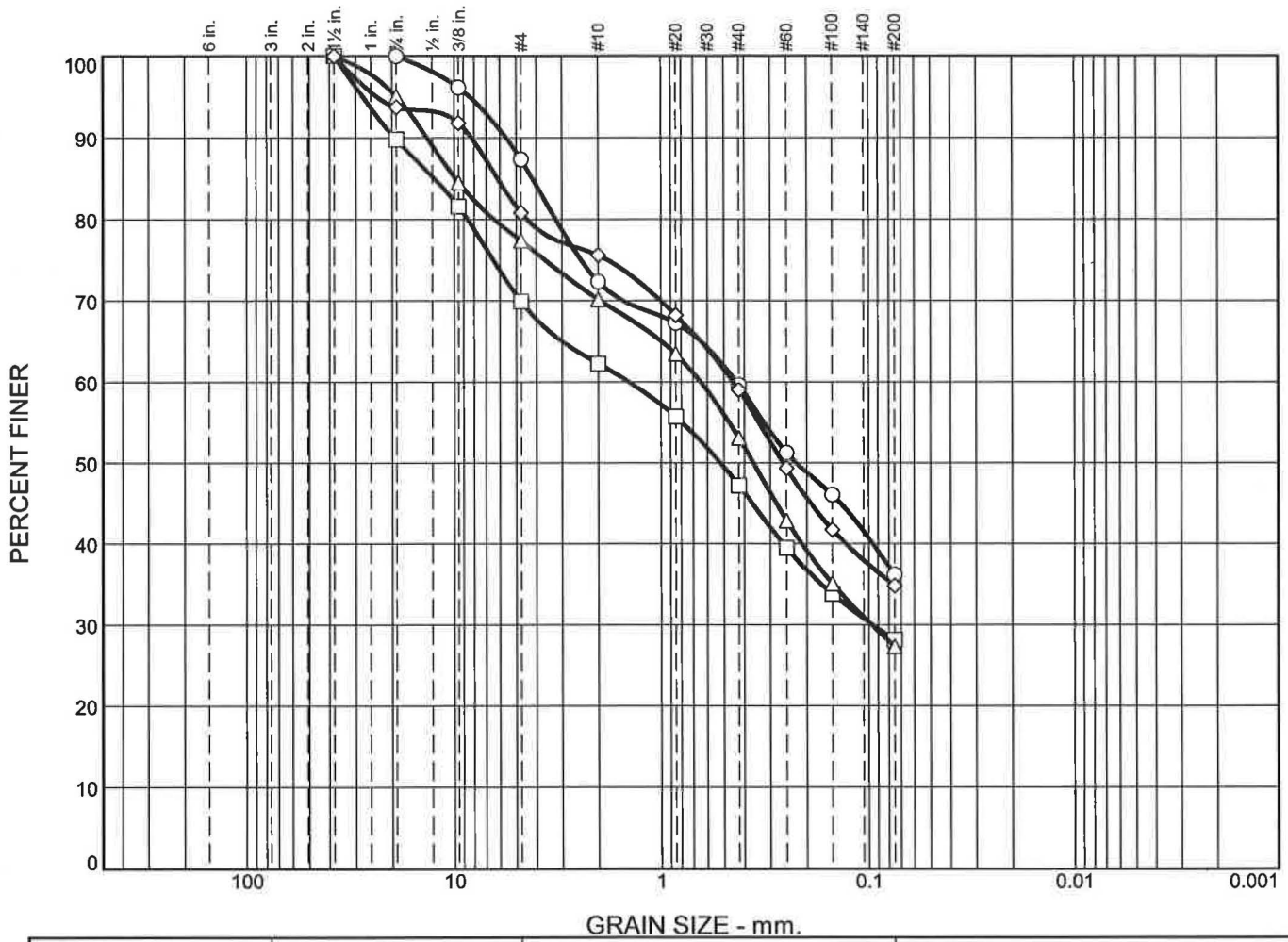
Client: Concord Resort Development

Project: Proposed Roadway, Thompson, NY

Project No.: 8979-004

Plate 6C

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
○	0.0	0.0	12.7	15.0	12.7	23.4	36.2
□	0.0	10.2	19.9	7.6	15.1	19.1	28.1
△	0.0	4.9	17.7	7.2	17.1	25.8	27.3
◇	0.0	6.3	12.9	5.2	16.6	24.2	34.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-54	S-2	4	Fine to coarse Sand, and Silt, little fine Gravel. (MC=12.7%)	SM
□	TP-60	S-3	8	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=7.0%)	SM
△	TP-61	S-3	10.5	Fine to coarse Sand, some Silt, some f-c Gravel. (MC=7.4%)	SM
◇	TP-86	S-2	2.0	Fine to coarse Sand, and Silt, little f-c Gravel.	SM

Melick-Tully & Associates, P.C.

South Bound Brook, NJ

Client: Concord Resort Development

Project: Proposed Roadway, Thompson, NY

Project No.: 8979-004

Plate 6D

SUMMARY OF INFILTRATION TEST RESULTS
Thompson, New York
EPT Concord Resort Development

Test Pit	Approximate Surface Elevation (ft)	Approximate Test Depth (ft)	Observed Infiltration Rate (in/hr)
1	1,366	2	2.25
2	1,368	4	14
3	1,364	1	2.25
4	1,366	2.5	*(1)*
5	1,350	2	*(1)*
6	1,350	2	*(1)*
10	1,350	3.5	2.5
11	1,350	3.25	14
13	1,348.5	3	4.25
14	1,348	2	12
15	1,441	2.5	17.5
15	1,441	5.5	28 *(2)*
17	1,443	2	10.5
17	1,443	5.5	*(1)*
35	1,426	2.5	8
35	1,426	2.5	14
36	1,431	5	*(1)*
37	1,382	6	*(1)*
49	1,387.5	3	10
50	1,374	4	10
51	1,376	8.5	23
54	1,378	2.5	23
55	1,381	10	11 *(2)*
60	1,395.5	10.5	8
61	1,395.5	13	6
69	1,374	4.5	6.5
70	1,372.5	9	50 *(2)*
73	1,386	3	5.75
74	1,389.5	3.5	*(1)*
82	1,379	4.5	9
82	1,379	10	9
83	1,385	5.5	45 *(2)*
87	1,407.5	3	*(1)*
88	1,403	2	*(1)*

Notes:

(1) *Presoak did not drain after 24 hours*
(2) *Percolation test run as approved by AKRF, results are minutes/inches*

APPENDIX

APPENDIX

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from plans prepared by AKRF Engineering entitled "Geotechnical Soil Evaluation" dated October 8, 2012 and/or revised December 19, 2012. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us by the site engineer. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of AKRF for specific application to the design of the proposed project. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from 14 widely-spaced test borings and 99 test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil and foundation engineering report was prepared for the project by Melick-Tully and Associates, P.C. for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that Melick-Tully and Associates, P.C. be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

APPENDIX D
PUMP SYSTEM CALCULATIONS

APPENDIX D - 1

SANITARY SEWER PUMP SYSTEM CALCULATIONS
EPT CONCORD RESORT PUMP STATION #1

Sanitary Flow

Type of Use	Average Sanitary Flow (gpd)		Flow (gpd)
Casino Resort 'A' + Golf + Casino Resort 'B' + Entertainment Village + Recreation	398,514		398,514
Peak Hour Flow = 398514	x 4 (peak factor) x 1/24 hr/day x 1/60 min/hr =	**1107.0 gpm**	

Wet Well

Depth (ft)	21
Diameter (ft)	12
Bottom Area (sf)	113.1
V = volume available per foot depth (gal/ft)	846
Invert out at PS #1	1343.50
Pump off elevation	1331.70
Pump on elevation	1333.10
Volume of Pump Cycle (gal)	1184.54

8" Diameter Pipe (PS #1)

Fittings	Number of Fittings	Equivalent Length (8 in. Dia) FT
90° Bend - 8"	2	40.40
Tee - 8"	1	43.00
45° Bend	1	11.80
Coupling (Expansion Joint)	3	10.50
Length of straight run		6.00
Total Equivalent Pipe =		**111.70 LF**

10" Diameter Force Main Pipe

Fittings	Number of Fittings	Equivalent Length (10 in. Dia) FT
Check Valve	1	65.00
Gate Valve	2	10.60
45° Bend	1	11.80
22.5° Bend	1	6.00
Length of straight run		833.00
Total Equivalent Pipe =		**926.40 LF**

Total Pipe Length = 1038.10 LF

System Curve

Flow (gpm)	Static Head (FT)	8 -inch Pipe			10 -inch Pipe			
		Friction loss (FT/100FT) for 8" pipe	EQ Pipe Length / 100 LF of Pipe	Head Loss (FT)	Friction loss (FT/100FT) for 10" pipe	EQ Pipe Length / 100 LF of Pipe	Head Loss (FT)	Total Dynamic Head(FT)
75	22.93	0.01	1.12	0.01	0.00	9.26	0.04	22.98
100	22.93	0.02	1.12	0.02	0.01	9.26	0.06	23.02
125	22.93	0.03	1.12	0.03	0.01	9.26	0.09	23.06
150	22.93	0.04	1.12	0.05	0.01	9.26	0.13	23.11
200	22.93	0.07	1.12	0.08	0.02	9.26	0.23	23.24
250	22.93	0.11	1.12	0.12	0.04	9.26	0.34	23.39
500	22.93	0.40	1.12	0.44	0.13	9.26	1.24	24.61
750	22.93	0.84	1.12	0.94	0.28	9.26	2.62	26.49
1000	22.93	1.43	1.12	1.59	0.48	9.26	4.47	28.99
1250	22.93	2.16	1.12	2.41	0.73	9.26	6.75	32.09
1500	22.93	3.02	1.12	3.38	1.02	9.26	9.46	35.77
1750	22.93	4.02	1.12	4.49	1.36	9.26	12.59	40.01
2000	22.93	5.15	1.12	5.76	1.74	9.26	16.12	44.81
2250	22.93	6.41	1.12	7.16	2.16	9.26	20.05	50.14
2500	22.93	7.79	1.12	8.70	2.63	9.26	24.37	56.00
2750	22.93	9.29	1.12	10.38	3.14	9.26	29.07	62.39
3000	22.93	10.92	1.12	12.20	3.69	9.26	34.16	69.28

1. CRITERIA - 1988 NYS DEC WASTEWATER GUIDELINES AND THE TEN STATE STANDARDS
2. VELOCITY HEAD IS NEGLIGIBLE
3. TOTAL DYNAMIC HEAD = STATIC HEAD + HEAD LOSSES (8" AND 10" PIPE) + MISC. CONNECTION LOSSES
4. STATIC HEAD WAS CALCULATED AS DIFFERENCE FROM PRESSURE RELIEF MH 107 (Inv el. 1354.63) AND PUMP STATION #1 (Pump Off el. 1331.70)

APPENDIX D - 2

SANITARY SEWER PUMP SYSTEM CALCULATIONS
EPT CONCORD RESORT PUMP STATION #2

Sanitary Flow

Type of Use	Average Sanitary Flow (gpd)			Flow (gpd)
Buildout - Casino Resort 'A' + Casino Resort 'B'	144,914			144,914
144914	x 4 (peak factor) x 1/12 hr/day x 1/60 min/hr =		**805.1 gpm**	
Buildout - Casino Resort 'A' + Golf + Casino Resort 'B' + Recreation	402,529			402,529
402529	x 4 (peak factor) x 1/24 hr/day x 1/60 min/hr =		**1118.1 gpm**	
Peak Hour Flow =			**1923.2 gpm**	

Wet Well

Depth (ft)	23
Dimensions (ft)	10 x 12
Bottom Area (sf)	120.0
V = volume available per foot depth (gal/ft)	898
Invert out at PS #2	1336.45
Pump off elevation	1323.50
Pump on elevation	1325.27
Volume of Pump Cycle (gal)	1588.93

8" Diameter Pipe (PS #2)

Fittings	Number of Fittings	Equivalent Length (8 in. Dia) FT
90° Bend - 8"	2	40.40
Tee - 8"	1	43.00
45° Bend	1	11.80
Coupling (Expansion Joint)	3	10.50
Length of straight run		6.00
	Total Equivalent Pipe =	**111.70 LF**

12" Diameter Force Main Pipe

Fittings	Number of Fittings	Equivalent Length (12 in. Dia) FT
Check Valve	1	77.00
Gate Valve	16	102.40
45° Bend	12	169.20
22.5° Bend	8	88.00
Length of straight run		2410.00
	Total Equivalent Pipe =	**2667.20 LF**

Total Pipe Length = 2778.90 LF

System Curve

Flow (gpm)	Static Head (FT)	8 -inch Pipe			12 -inch Pipe			
		Friction loss (FT/100FT) for 10" pipe	EQ Pipe Length / 100 LF of Pipe	Head Loss (FT)	Friction loss (FT/100FT) for 12" pipe	EQ Pipe Length / 100 LF of Pipe	Head Loss (FT)	Total Dynamic Head(FT)
250	43.94	0.11	1.12	0.12	0.02	26.67	0.41	44.47
500	43.94	0.40	1.12	0.44	0.05	26.67	1.47	45.85
750	43.94	0.84	1.12	0.94	0.12	26.67	3.11	47.98
1000	43.94	1.43	1.12	1.59	0.20	26.67	5.29	50.83
1250	43.94	2.16	1.12	2.41	0.30	26.67	8.00	54.35
1500	43.94	3.02	1.12	3.38	0.42	26.67	11.22	58.54
1750	43.94	4.02	1.12	4.49	0.56	26.67	14.93	63.36
2000	43.94	5.15	1.12	5.76	0.72	26.67	19.11	68.81
2250	43.94	6.41	1.12	7.16	0.89	26.67	23.77	74.87
2500	43.94	7.79	1.12	8.70	1.08	26.67	28.90	81.54
2750	43.94	9.29	1.12	10.38	1.29	26.67	34.47	88.80
3000	43.94	10.92	1.12	12.20	1.52	26.67	40.50	96.64
3250	43.94	12.66	1.12	14.15	1.76	26.67	46.97	105.06
3500	43.94	14.53	1.12	16.23	2.02	26.67	53.88	114.05
3750	43.94	16.51	1.12	18.44	2.30	26.67	61.23	123.61
4000	43.94	18.60	1.12	20.78	2.59	26.67	69.00	133.72
4250	43.94	20.81	1.12	23.25	2.89	26.67	77.20	144.39

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2. VELOCITY HEAD IS NEGLIGIBLE
3. TOTAL DYNAMIC HEAD = STATIC HEAD + HEAD LOSSES (8" AND 10" PIPE) + MISC. CONNECTION LOSSES
4. STATIC HEAD WAS CALCULATED AS DIFFERENCE FROM PRESSURE RELIEF MH 114 (Inv el. 1367.44) AND PUMP STATION #2 (Pump Off el. 1323.50)

APPENDIX E

SANITARY SEWER FLOW MAP

PROJECT SITE BOUNDARY

APPENDIX BOUNDARY

0 1000 2000 FEET
SCALE

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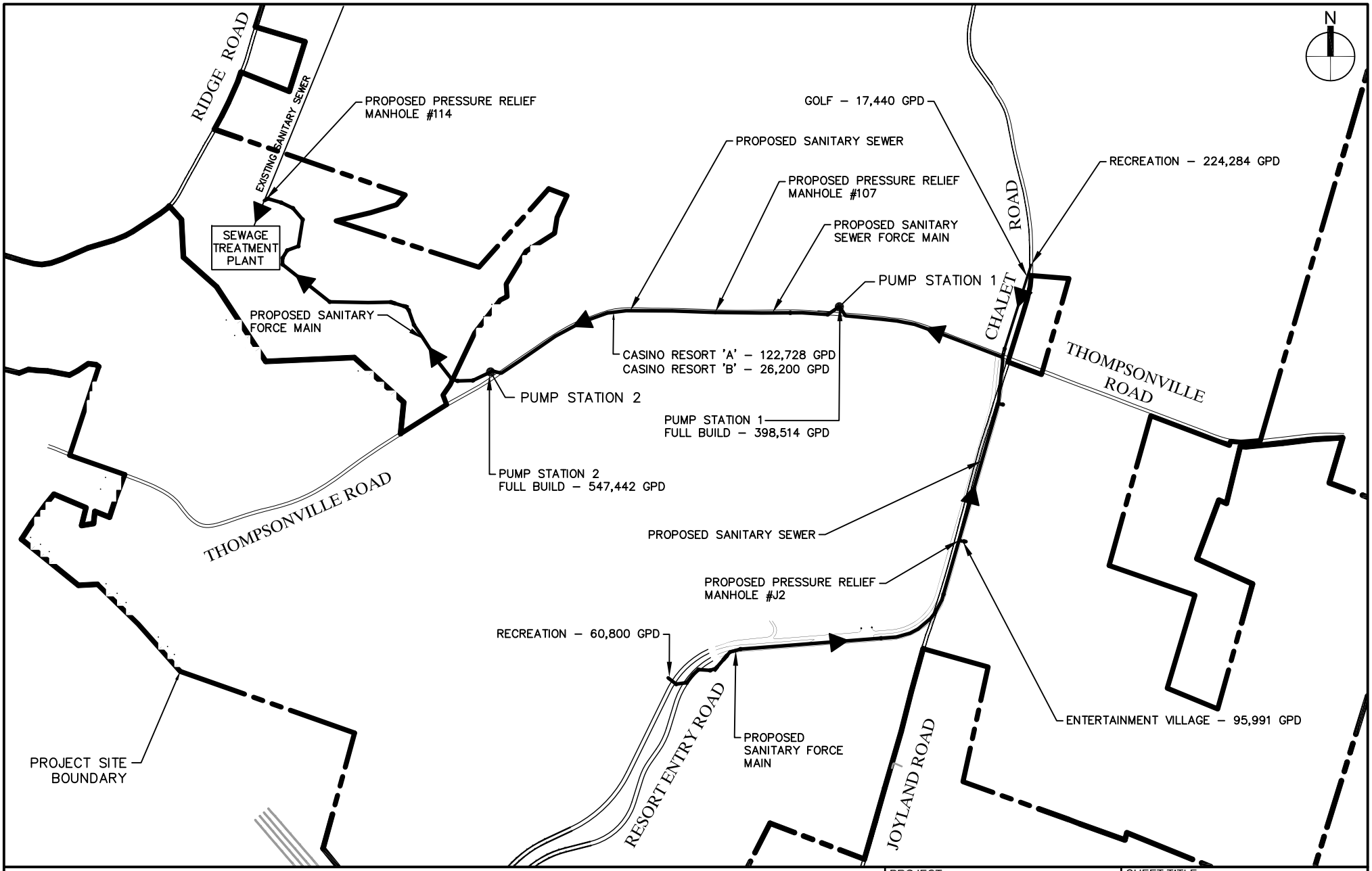
PROJECT		SHEET TITLE
EPT CONCORD RESORT SULLIVAN COUNTY THOMPSON, NEW YORK		SANITARY SEWER FLOW KEY PLAN
DRAWN BY MG	CHECKED BY JC	APPENDIX E-1
SCALE AS SHOWN	DATE 02/26/2014	



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PROJECT		SHEET TITLE
EPT CONCORD RESORT SULLIVAN COUNTY THOMPSON, NEW YORK		SANITARY SEWER FLOW MAP
DRAWN BY MH	CHECKED BY JC	APPENDIX E-2
SCALE N.T.S.	DATE 02/26/2014	