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CLIENT:	BHT Properties Group 5555 Anglers Drive Fort Lauderdale, FL 33312	PROJECT: PROJ. No.: DATE:	BBIS Auto Auction Monticello, N.Y. 19414 January 16, 2020

GEOTECHNICAL INVESTIGATION REPORT FOR PAVEMENT

1. PROJECT DESCRIPTION

This geotechnical investigation was performed to evaluate the existing soil conditions for the construction of vehicle parking/storage lots and associated roadways on an approximately 160.88-acre site, situated north of NY Route 17B and west of Kaufman Road, in the Town of Thompson, about one mile northwest from the Village of Monticello, Sullivan County, New York. The site is roughly square, with principal dimensions of about 2700 by 2600 feet. Most of the site is heavily-wooded. Stone walls in many areas and a few minor drainage ditches indicate past clearing for agriculture, but the site does not appear to have been otherwise developed; there are an abandoned farmhouse and a couple sheds adjacent to the existing site entrance on Route 17B, west from center of the south side of the site, but no old structures were noted in the proposed auto storage and traffic areas.

A topographic map of the site was provided, showing the proposed layout of the facility. Elevations were not given for the topographic contours, but were established by tying-in to topographic data on file for the Route 17B Hotel site which adjoins the southeast corner of the project. Site elevations range from about 1290 to 1390 feet above sea level, with existing elevations in the proposed facility mostly between 1330 and 1360 feet, exclusive of the stormwater control areas. A significant wetland area crosses the middle of the site from east to west, below elevations of about 1360 feet (east) to 1330 feet (west;) it is typically about 25 to 150 feet wide, but widens into a roughly circular area about five hundred feet across, near the middle of the site. Smaller mapped wetland areas are situated near the northwest corner of the site ($\pm$1290-1300 feet elevation,) center of the north side ($\pm$1310 to 1320 feet,) center of the south side ($\pm$1315-1325 feet) and south from center on the east side ($\pm$1350 to 1365 feet.)

The proposed facility will have its entrance from Kaufman Road near the middle of the east side of the property, just south of the center wetland. Load-out and drop-off areas for vehicles ($\pm$1.75

and ±1.30 acres) and the facility office building (±9750 square feet) will be sited near the entrance, where existing elevations are about 1360 to 1385 feet. The south vehicle storage area will extend west and south from here, covering approximately 43 acres. The north storage area, of about 24 acres, will be west and northwest from the office, and will connect to the south area via two wetland crossings, one at an existing farm crossing near west-center, and the other near the center of the site at a narrow point in the wetland. Stormwater control areas are proposed along the south and west sides of the facility; evaluation for these practices was not included in this investigation.

The USDA Soil Survey indicates that the native soils in the project area consist of mostly of types that form over deposits of glacial till, and sometimes over shallow bedrock. The soils encountered in the test pits were generally consistent with the typical Soil Survey descriptions, and some shallow rock was encountered, mostly in the north half of the project area.

The Soil Survey indicates somewhat different soil types north and south of the central wetland. In the north vehicle storage area, most of the topsoil is identified as Arnot-Oquaga Complex, which typically has bedrock at 21 to 40 inches depth; the till normally consists of equal parts silt, sand and gravel; and cobbles and boulders may be common. In the lower-lying parts of the north parking area, the topsoil is shown as Scriba and Morris Loams (Rubbly,) Wellsboro Gravelly Loam, 'Wellsboro and Wurtsboro Soils, Extremely Stony,' and Palms Muck. These soils all typically form in areas of relatively deep bedrock (greater than six feet depth,) and generally have textures of gravelly silty sand (Wurtsboro,) gravelly sandy silt or silty clay (Wellsboro,) gravelly sandy silt (Scriba) and gravelly silty clay (Morris.) All of these soil types normally contain cobbles and boulders. The survey shows a zone of Palms Muck extending from the wetland into the south edge of the north parking area; this soil type typically consists of about two feet of peat over sandy clay.

In the portion of the facility south of the wetlands, the Soil Survey indicates Wellsboro Gravelly Loam; Wellsboro and Wurtsboro Soils, Extremely Stony; and Oquaga Very Channery Silt Loam as the predominate soil types. Oquaga soil typically forms in cobbly glacial till, with bedrock at thirty to forty inches depth, and often has abundant boulders. The survey also shows areas of Morris Loam, Raynham Silt Loam and Lackawanna Channery Loam in the southeast part of the project. The Lackawanna unit is similar to the Oquaga soil, but is relatively deep over bedrock. Raynham Silt Loam typically forms over deep deposits of silt or clayey silt.

2. SOIL INVESTIGATION AND TEST RESULTS

On Thursday, January 2, 2020, test pits were excavated at seven locations across the site, at the locations shown on the attached drawing. The test pits were excavated by Liberty Concrete and Construction, using a Komatsu PC-120 excavator. The subsurface investigation was witnessed by Wyeth Patton and was supervised by Kevin Patton, P.E., who also witnessed some of the test pits.

Test pit observations are summarized briefly below and are described in detail in the logs. Representative samples were tested for moisture content, gradation and Atterberg Limits, as discussed later in this report.

Test Pit	TP1	TP2	TP3	TP4	TP5	TP6	TP7
Location	NW	N	Center	E	SW	S	SE
Topsoil Thickness	20″	18″	24″	24″	36″	24″	24″
Soil	Sandy silt	Sandy till	Sandy to bouldery till	Sandy till	Silty till	Sandy till	Sandy silt
Rock Depth	2-3 ft	5 ft	>14 ft	9 ft	>10 ft	>9 ft	>4 ft
Water seepage			5′, 12-13′				At surface

2.1. Laboratory Test Results for Selected Samples

Representative samples of soil were selected for testing of moisture content, gradation and Atterberg Limits. The soils were also classified by the visual/manual method, ASTM D2488, and the results are incorporated into the test pit logs. Results are summarized below; refer to the attached lab reports for additional information.

The moisture content tests mostly indicated moist to very moist soil conditions. A few samples had high moisture contents; TP4 at two feet depth was at 31.9%, TP6 at two feet was 31.4%, and TP7 at 4 feet was 41.4%. These moisture contents are on the high side even for soil in the looser frost-affected zone, and were associated with soft conditions.

The particle size and Atterberg Limits tests were performed on samples of typical soils from the site, which are predominately glacial till with a gravelly sand and silt, to silty sand and gravel texture. The shallow soil is typically finer (sandy silt,) but similar fine-grained soils are also found at depth in some areas. Cobbles and boulders are usually present and are abundant in some areas. The fine portion of the soil typically had a slightly plastic, silty consistency.

Summary of Laboratory Results

Natural Moisture Content, Percent		
Location	Depth	% m
TP1	2 ft	19.3
TP2	3 ft	13.6
TP3	2 ft	22.6
TP3	5 ft	7.3
TP3	14 ft	9.4
TP4	2 ft	31.9
TP4	9 ft	7.8
TP6	2 ft	31.4
TP6	8 ft	16.9
TP7	4 ft	41.4

Particle Size Analysis			
Location		TP3	TP4
Depth		5 feet	9 feet
Sieve Size	mm	Percent Passing by Weight	
3″	75.0	100	100
¾″	19.0	88	98
#4	4.75	63	79
#10	2.00	51	71
#40	0.425	35	57
#200	0.075	21.6	38.6
USCS Soil Class		SM	SM
AASHTO M145 Rating		A-1-b	A-4
AASHTO Group Index		0	0
M145 General Rating as Subgrade		Excellent to Good	Fair to Poor

Atterberg Limits	
Location	TP6
Depth	8 feet
Liquid Limit	21
Plastic Limit	17
Plasticity Index	4
USCS Class of Fine Fraction	ML

2.2. Summary of Subsurface Conditions

2.2.1 Office, Drop Zone and Load-out Area

Test Pit 4 was excavated in this area, and encountered two feet of topsoil and nine feet of silty sandy till, with bedrock at nine feet. The road cut on Kaufman Road just south of the proposed entrance appears to be in soil.

2.2.2 North Parking Area

Test Pits 1 and 2 were excavated in this area, with rock encountered at depths of about two to five feet. Rock is likely to be shallow throughout this section. It is gray sandstone, rippable near the surface but quickly becoming hard. Blasting should be considered if excavation to more than a few feet below top-of-rock is planned. The rock can be crushed to make high-quality fill material for road base. At Test Pit 2, approximately 3.5 feet of good to very good fill material was present above bedrock, under eighteen inches of topsoil and loam. At Test Pit 1, the shallow overburden all consisted of topsoil and loam. Some minor over-excavation may be required during stripping in the south center part of this area, near the central wetlands, to remove wet, clayey soils.

2.2.3. South Parking Area

Test Pits 3, 5, 6 and 7 were excavated in the larger proposed South Parking Area. They all encountered deep soil, however TP7 stopped at four feet, due to excessive surface water inflow. The others went to depths of fourteen, ten and nine feet, respectively, without encountering bedrock. Topsoil and loam were typically two feet thick; the deeper soils varied in quality from fair to very good for use as borrow fill. In the shallow TP7 and in TP5, the soil was sandy silt and gravelly sandy silt; in TP3 and TP6, it was sand and gravel with little silt. Cobbles and boulders became more abundant at depths greater than about seven feet, but were also encountered at other depths, and were abundant on the surface in some areas.

2.3. Site-Borrow Fill Materials

The soils encountered in the test pits were of fair to good quality for use as general fill, but it may be somewhat difficult to recover this material for use. The topsoil and shallow loamy subsoil, along with stumps and surface boulders, will typically require stripping to at least 18 to 24 inches. The underlying soil varies in quality, and in the deeper soils boulders are sometimes abundant. Boulders and large cobbles will need to be excluded from all fill materials, except where used for mass embankment fills. Bedrock is shallow in some areas, further limiting the thickness of the suitable borrow layer.

Most borrow soil will require some drying prior to compaction. If significant excavation is performed, it may generate a large quantity of cobbles and boulders, which could be crushed and used on site as high-quality fill. Boulders seemed to be more abundant at depth and on the surface than they are in the upper few feet of the soil.

Photo 1. Facing west into the site, approximately at the proposed entrance on Kaufman Road.

Photo 2. Typical conditions in a wooded part of the site, with a shallow drainage swale running toward the camera from the right rear.

Photo 3. Boulders covering most of the surface, in and near part of the central wetland.

Photo 4. Wetland stream in the east-center part of the site, typical of much of the narrow wetland areas.

Photo 5. Shallow bedrock, shown here in Test Pit 1. Greenish-gray sandstone in nearly flat beds.

Photo 6. Typical site-borrow soil, as encountered in Test Pit 3. Glacial till composed of sand with some gravel, little silt, few cobbles and boulders.

3. PAVEMENT RECOMMENDATIONS

3.1. Pavement Sections

The following sections are recommended for construction of durable pavements at this site. It is expected that hot-mix asphalt pavement will be used in the entrance and office area, and that non-bonded pavement types will be used in the vehicle storage areas. A light-duty asphalt pavement section is also provided as an alternate for use in the storage areas.

Recommended Heavy Duty Pavement Section (Soil Subgrade)	
Asphalt Top Course	1.5″
Asphalt Binder Course	3.0″
Item 4 Base Course	12.0″
Geosynthetic Reinforcement Layer over prepared subgrade. TenCate Mirafi 600X woven geotextile or similar.	

Recommended Heavy Duty Pavement Section (Bedrock Subgrade)	
Asphalt Top Course	1.5″
Asphalt Binder Course	2.5″
Item 4 Base Course	6.0″

Recommended Light Duty Asphalt Pavement Section	
Asphalt Top Course	1.0″
Asphalt Binder Course	2.5″
Item 4 Base Course	10.0″
Use geosynthetic Reinforcement Layer over prepared soil subgrade, TenCate Mirafi 600X woven geotextile or similar. Base course thickness may be reduced to six inches when over bedrock.	

Recommended Light Duty Pavement Section (Soil Subgrade)	
Unbonded Surface Course	4.0″
Item 4 Base Course	12.0″
Geosynthetic Reinforcement Layer over prepared subgrade. TenCate Mirafi 600X woven geotextile or similar.	

Recommended Light Duty Pavement Section (Rock Subgrade)	
Unbonded Surface Course	4.0″
Item 4 Base Course	6.0″

Recommended Parking Pad Surfacing	
Unbonded Surface Course	3.0″
Item 4 Base Course	6.0″
Geosynthetic Reinforcement Layer over prepared subgrade. TenCate Mirafi 600X woven geotextile or similar.	

Asphalt top course for heavy-duty pavement should be NYSDOT Type 6F top, or SuperPave 9.5mm or 12.5mm top; for light-duty asphalt pavement, use Type 7F top, or 6.3mm or 9.5mm top

course. The binder course should consist of NYSDOT Type 3 Binder, or SuperPave 19mm intermediate course mix. "Item 4" should comply with the requirements of NYSDOT Specification 733-04, Subbase Course, Type 1, 2 or 4, for gradation and durability (soundness loss.) Recycled concrete pavement is acceptable for use as Item 4.

The Unbonded Surface Course on roadways may consist of "Asphalt Millings Surfacing" or "Gravel Surfacing." In vehicle parking areas, it may consist of "Asphalt Millings Surfacing," "Gravel Surfacing" or "Millings-Stone Blend."

Asphalt Millings Surfacing	
Component	Proportion
Asphalt Millings	1 to 2 parts
Gravel Surfacing	1 to 2 parts

Gravel Surfacing	
Sieve Size	Percent Passing
1″	100
¾″	85-100
#4	45-70
#40	15-35
#200	8-15
Liquid Limit	40 max
Plasticity Index	2 to 9
Soundness Loss, MgSO4 4 cycles*	20% maximum

*Applies to the fraction larger than the ¼-inch sieve.

Millings-Stone Blend (for parking areas)	
Component	Proportion
Asphalt Millings	1 to 2 parts
Crushed Stone or Gravel	1 to 2 parts

Asphalt Millings (for blending)	
Sieve Size	Percent Passing
2″	100
1″	90-100
¼″	0-15
Asphalt Millings for use in blending shall consist of pulverized hot-mix asphalt, free from oil, topsoil, wastes or other deleterious materials.	

Crushed Stone or Gravel (for blending)	
Sieve Size	Percent Passing
¾″	100
¼″	0-15

"Gravel Surfacing" shall consist of a well-graded blend of sand and gravel sizes, with sufficient plastic (clayey) fines to act as a binder and to protect against erosion. It may be processed natural sand and gravel, or may be a blended crushed stone product. The gravel shall be resistant to wear and to breakdown by freeze-thaw action. Angular to subangular particles are preferred, and materials containing predominately rounded or subrounded gravel should be avoided.

Crushed stone or gravel shall consist of hard, durable particles, substantially free from silt and clay. The particles should be predominately angular to subangular.

3.2. Construction Procedures

Acceptable performance and durability of the pavement, both during and after construction, requires the use of proper construction procedures, in addition to proper subgrade preparation and design of drainage. Drainage is key to good long-term performance, and should be designed to maintain drained conditions (i.e. not saturated) to a depth of at least eighteen inches below finished pavement in light-duty areas, and to twenty-four inches in heavy-duty areas. Large parking areas should be pitched to drain, and roads should be provided with drainage swales, and with underdrains where groundwater seepage is present, with additional controls as needed .

The following methods should be employed for construction of the previously-recommended pavement sections at this site.

Base Preparation

1. Remove topsoil and soft, loamy subsoil from road areas, to the top of firm soil. This requirement applies to fill areas as well as to cuts.
2. Compact the surface of the subgrade soil with the excavator bucket or with a soil roller, to consolidate any soil loosened by excavation. If the subgrade is wet and/or soft, operate the roller in static (non-vibratory) mode and allow the soil to 'rest' between passes.
3. Correct any soft or unstable areas of the subgrade. Remove the soft soil and replace it with select site-borrow soil, conditioned to an acceptable moisture content and thoroughly compacted in lifts. Contact the Engineer prior to repairing large areas (more than 500 square feet, and/or 18 inches in depth.)
4. In rock cut areas, remove the rock to provide a generally level and uniform bearing surface with elevations no higher than the design bottom elevation of the base course (Item 4) layer. Spread a leveling course of Item 4 and/or small broken rock over the surface and compact with several passes of the vibratory roller. Rake out and recompact any boulder nests or other open-graded areas.
5. In fill/embankment areas, place site-borrow soil in lifts not exceeding 12 inches each in compacted thickness. Break up any large cohesive pieces prior to compaction, and exclude

any rocks that are larger than two-thirds the lift thickness. Condition the fill material to a moisture content within ±2% of optimum, i.e. dry enough that it will not pump, weave or crack during compaction, but not so dry that the soil clods are hard. Compact each lift with at least six one-way passes of a minimum 7-ton nominal size vibratory roller, with a dynamic compaction force of at least 450 lbs per inch of roller width. Any lift exhibiting excessive deflection shall be corrected prior to placing the next lift.

6. In cut areas, remove all boulders that protrude above the design subgrade elevation and fill the voids with thoroughly compacted site borrow soil. All protruding roots more than one inch in diameter shall be cut flush with the surface of the excavation. Remove all organic soil and debris.
7. Install the geosynthetic reinforcement layer over the prepared subgrade soil (bottom of cut or top of embankment fill.) Install the material flat and free from wrinkles. Fill any low spots in the subgrade so that the geosynthetic does not 'tent' over them. Lap all seams at least 12 inches. This geosynthetic reinforcement is designed to maintain stable subgrade conditions and is not intended to allow placement of Item 4 over a soft or yielding subgrade; geosynthetics may be used to compensate for soft conditions as directed by the Engineer on a case-by-case basis.
8. Place Item 4 over the geosynthetic layer. Do not allow vehicles to drive on the exposed geosynthetic. Use track-mounted equipment to spread the Item 4, and avoid making sharp turns or pivots on the surface.
9. Thoroughly compact the Item 4 with maximum compacted lift thicknesses of 12 inches, at a moisture content not more than 2% below optimum. If additional water is required, add it prior to compaction. Compact with at least six one-way passes of the 7-ton soil roller, operating in vibratory mode.
10. Fine-grade the Item 4 and perform final compaction as required. The subbase shall not weave or exhibit other signs of instability under the roller.
11. Construction traffic on the compacted Item 4, especially semi-trailers and other heavy vehicles, should be minimized prior to paving of the asphalt binder layer, where applicable, and these vehicles should be excluded from areas of unbonded pavement.

Hot-mix Asphalt Paving

1. Proof-roll the Item 4 to verify that it will not rut or pump during paving. Drive a loaded tri-axle dump truck slowly over the Item 4 and mark any areas that rut or that deflect excessively; correct these areas prior to paving. Minor deflections under the tire loads, which rebound immediately and do not result in rutting or cracking, are typically acceptable.
2. Pave the asphalt binder layer. Place and compact the asphalt per the requirements of NYSDOT Standard Specifications, Section 402, using the 70-Series compaction method. When using this method, a qualified inspector tests pavement temperature and density throughout paving, and adjusts the roller pattern as needed for best results. Pay special attention to construction and compaction of longitudinal pavement joints.

3. Prior to paving the top course, the surface of the binder course shall be thoroughly cleaned and inspected. Any areas exhibiting excessive distress (cracking, etc.) shall be repaired prior to paving the top course.
4. Apply tack coat to the surface of the binder course prior to paving the top course. Tack coat shall be applied regardless of the condition of the pavement or the sequencing of the paving.
5. Pave the top course per the requirements of NYSDOT Specification Section 402, 70-Series method, as described above.

Unbonded Pavement Construction

1. When the surfacing material is made by blending different products, they shall be blended prior to placement. This may be done by building a stockpile with layers of the materials in proper proportion.
2. Prepare the 'Item 4' base course as described above.
3. Place the surfacing material by initially spreading with the dump trucks, dumping as the move. In areas there the subgrade is sensitive, spread the surfacing material with a bulldozer and exclude dump truck traffic.
4. Blade the material into a windrow, to provide final blending and to even out the distribution of the fill. This should be done with a road grader for best efficiency and performance.
5. Add water during the windrowing operation, if needed. "Asphalt Millings Surfacing" and "Gravel Surfacing" shall be compacted in a moist condition. "Millings-Stone Blend" should be in a moist to slightly wet condition (i.e. with free moisture on the particle surfaces) during compaction.
6. Grade the surfacing material back into a uniform layer, taking care to avoid segregation at the edges. The edge material should be cut into the next windrow, when possible. Maintain the proper crown and slope.
7. Thoroughly compact the surfacing material, using a seven-ton soil roller. Two vibratory passes and two static passes should be sufficient, when the surfacing material is at the proper moisture content.
8. Perform fine-grading as needed and recompact the surface.

3.3. Maintenance of Unbonded Pavement

Road surfaces may require periodic dust control in unbonded pavement areas. Liquid calcium chloride solution, lightly sprayed on the surface, or calcium chloride chips blended into the surfacing, are frequently used for this purpose, and there are scores of other products that are marketed for this purpose. Any application of dust suppressing agents must be made in compliance with federal, state and local laws, and must be described in the project SWPPP (Stormwater Pollution Prevention Plan.)

Roadway and parking area surfaces should be bladed and re-graded wherever washboarding or puddles develop. Potholes should be repaired by trimming back to sound material and filling with the matching surfacing material, thoroughly compacted. When sections need resurfacing, scarify the road surface and apply a thin lift of matching surfacing material; the scarified depth plus the lift thickness should be at least twice the nominal maximum particle size of the surfacing material. The loose material should be windrowed, with water added as needed, then spread and compacted.

5. NOTES AND LIMITATIONS

Please see the attached pages for additional information. Subsurface conditions encountered during construction shall be compared to the test pit logs and this report; any significant variations from anticipated conditions must be evaluated for their effect on the pavement design.

This geotechnical investigation was conducted to evaluate the engineering properties of the soils at the site, to aid in the design of the proposed work. The investigation did not include evaluation of the potential effects of the proposed construction on other properties, nor did it include inspection of, or sampling for, items of environmental concern, such as the presence of soil contaminants or of regulated wetlands, and did not include review of local zoning regulations, codes, floodplain boundaries or similar matters, unless specifically referenced in the report. This investigation was conducted solely for the use of the Client and the Client's Project Designers; this report should not be used by others, nor for any use other than its stated purpose, without contacting the Engineer. Any such use is solely at the user's risk.

Prepared by Kevin L. Patton, P.E.

Attachments:

SITE PLAN WITH TEST PIT LOCATIONS
TEST PIT LOGS
LABORATORY TEST REPORTS
USDA SOIL SURVEY DATA

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Soil Technical Notes:

Soil Classifications, Descriptions and Properties

The USCS (Unified Soil Classification System) was used to classify the soils in this report. The USCS is described in ASTM D2487 (laboratory test method) and D2488 (visual-manual method.) The USCS classification gives a 'Group Symbol' and 'Group Name' based on particle size distribution (gradation,) clay properties (Atterberg Limits) and basic composition (mineral or organic.)

USCS Soil Classes

Soils with less than 5% passing the #200 sieve:

GW, GP, SW, SP – Well-graded gravel, Poorly-graded gravel, Well-graded sand, Poorly-graded sand.

Soils with 12% to 50% passing the #200 sieve:

GC, GM, GC-GM, SC, SM, SC-SM – Clayey gravel, Silty gravel, Silty clayey gravel, Clayey sand, Silty sand, Silty clayey sand.

Soils with 5% to 12% passing the #200 sieve use a dual symbol, such as SW-SC (Clayey well-graded sand.)

Soils with more than 50% passing the #200 sieve:

CL-ML, ML, CL, MH, CH, OL, OH – Silty clay, Silt, Lean clay, Elastic silt, Fat clay, Organic silt, Organic clay.

Highly organic soils:

PT – Peat.

The soil group name is modified with the term 'with sand' or 'with gravel' if the soil contains more than 15% of these materials; clays and silts with 30% or more plus-#200 material are described as 'sandy' or 'gravelly' (whichever is predominate.) Examples – GM, Silty gravel with sand; CL, Gravelly lean clay.

Particle size

>12" (300mm)	Boulders
12" to 3" (300-75mm)	Cobbles
3" to #4 (75-4.75mm)	Gravel
#4 to #200 (4.75-0.075mm)	Sand
<#200 (0.075mm)	Silt & Clay

Organic Soils

Highly organic soils such as peat are visually classified. Partly organic soils, with a mix of organic and mineral matter, are classified visually and by Atterberg Limits tests.

Moisture Content

Moisture is visually estimated and samples are usually tested. Soil moisture capacity varies with texture.

Typical examples:
GW, moist at 3%, saturated at 9%
SP, moist at 6%, saturated at 20%.
CL, moist at 12%, saturated at 33%.

Fine- and Coarse-grained Soils

The USCS classification applies to the material smaller than the 3-inch sieve.

'Fine-Grained Soils' (silts and clays) have more than 50% passing the #200 sieve and are classified by their Atterberg Limits.

'Coarse-Grained Soils' (sands and gravels) have less than 50% passing the #200 sieve. When more than 50% of the plus-200 material is retained on the #4 sieve the general soil type is gravel, and if more than 50% is finer than the #4 sieve, it is sand.

Clean coarse-grained soils are classified as well-graded (Classes GW, SW) or poorly-graded (GP, SP.) Well-graded soils have a wider range of sizes and are typically more stable. Poorly-graded soils are usually more permeable.

Atterberg Limits

Test is performed on the clay, silt and fine sand fraction of the soil:
Liquid Limit (LL) – moisture content (%) at which soil becomes very soft.
Plastic Limit (PL) – moisture content at which soil crumbles.
Plasticity Index (PI) = LL minus PL

Higher PI values may indicate reduced permeability and increased drying shrinkage.

LL > 50 indicates soil with a higher potential to shrink and swell due to changing moisture content.

Silts have lower PI values, and behave like very fine sand; most silts also contain some clay. Behavior of clays is partly controlled by electrochemical forces and varies among the several clay minerals.

Color

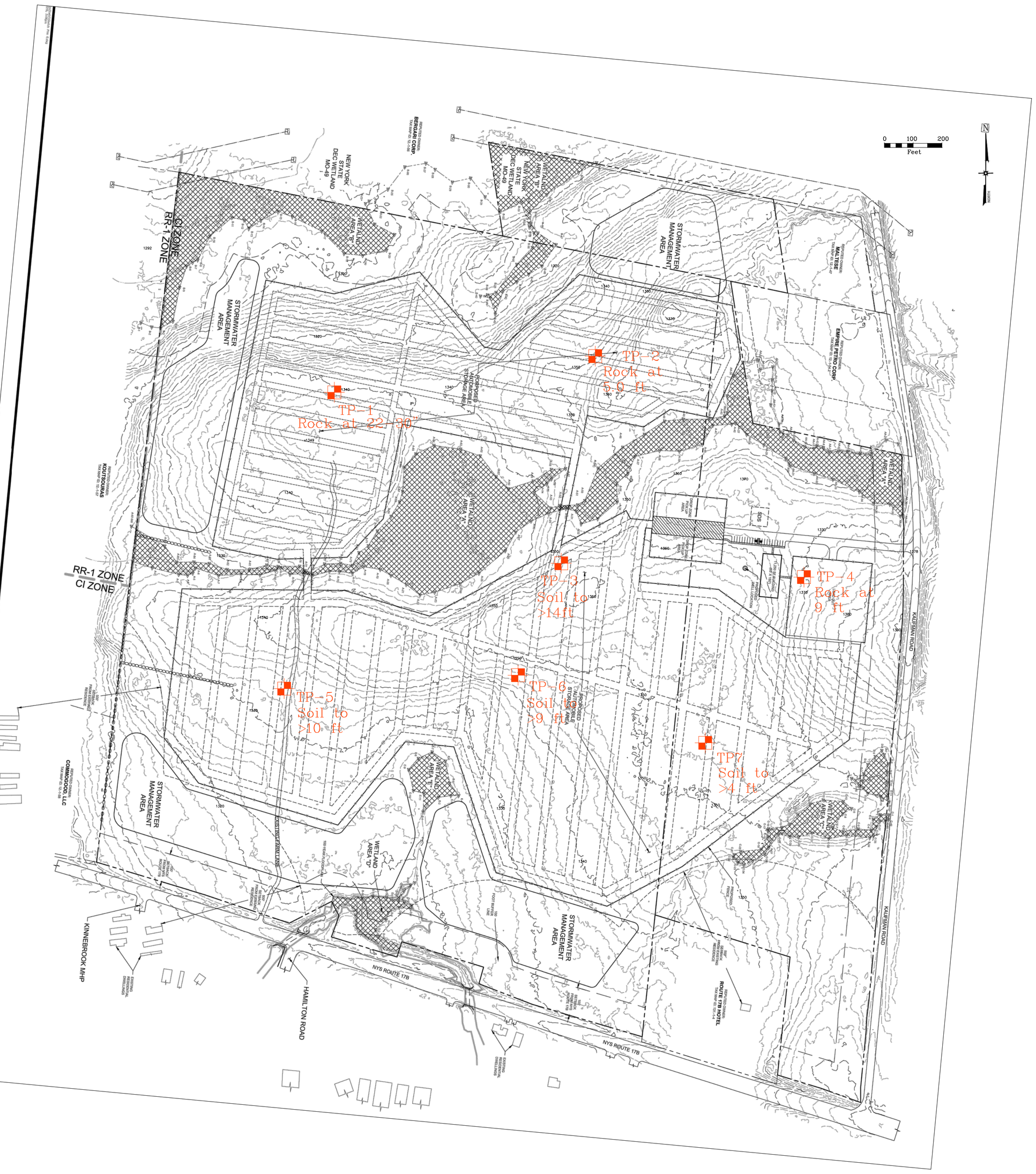
Soil color sometimes indicates groundwater conditions, with subdued colors below the water table and mottled (mixed) colors in the zone of seasonal water table fluctuation. Color changes tend to be more prominent in fine-grained soils.

Relative Quantities

Estimated percentages in descriptions:
<5% - Trace
5-10% - Traces
10-25% - Little
25-35% - Some
'And' - Approx. equal amounts
'Few' - <10% (cobbles and boulders)

USDA Soil Classification

USDA classifications are based on the relative amounts of sand, silt and clay in the soil fraction passing the #10 (2mm) sieve. 'Gravelly' indicates more than 15% of #10 to 3" size. 'Channery' indicates 15 to 35% thin flat pieces up to 6" long.



B-101

SCALE 1" = 200 ft

REV.	DATE	BY
0	1/16/2020	KLP

BBIS AUTO AUCTION

TOWN OF THOMPSON, SULLIVAN COUNTY, N.Y.

TEST PIT LOCATIONS

APPROXIMATE TEST PIT LOCATIONS
JANUARY 2, 2020

SHOWN ON A PARTIAL COPY OF
'SKETCH PLAN,' SK-6, BY
ENGINEERING & SURVEYING PROPERTIES, OF
MONTGOMERY, N.Y., DATED DEC. 13, 2019.

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CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	North Section, near center of west half	**TEST PIT NUMBER**	**TP1**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1341		
INSPECTOR:	Kevin Patton PE, Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-6"	ML	Topsoil. Silt with little sand, traces gravel. Dark brown, Very moist.	
6" to ±20"	ML	Silt with little sand, traces gravel. Brown. Very moist.	
12-22"	Top of Rock	Top of bedrock at 12 to 22 inches depth. Greenish gray sandstone, in approximately horizontal beds about one to two inches thick. The rock was easy to rip at the surface, but started to become hard after about twelve inches.	
30"	Top of Rock	Offset 40 feet west. Soils were similar. The top of rock was at 30 inches depth.	

KEVIN L. PATTON, P.E.
36 PATTON ROAD
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PATTONGEOTECH.COM 845 275-7732

CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	North Section, near center of east half	**TEST PIT NUMBER**	**TP2**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1349		
INSPECTOR:	Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-6"	OL, ML	Black to brown topsoil. Sandy silt with organics.	
6-18"	ML	Orange brown sandy silt	
18"-4 ft	SM	Light grey till. Sand with little gravel, little silt.	
4-5 ft	SM	Dark grey till. Sand with some gravel, little silt.	
5 ft		Top of bedrock.	

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DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	South Section, near center of north side	**TEST PIT NUMBER**	**TP3**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1355		
INSPECTOR:	Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-12"	OL, ML	Black topsoil. Sandy silt with organics.	
12-24"	SM	Layer of reddish brown silty sand	
2-9 ft	SM	Dark reddish brown sand and gravel with little silt.	
9-14 ft	GM	Same, but with many cobbles and boulders.	
		Water seepage at 5', 12-13'	

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DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	South Section, east side, in Load-out Area	**TEST PIT NUMBER**	**TP4**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1370		
INSPECTOR:	Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-2 ft	OL, ML	Black and brown mottled topsoil. Sandy silt with organics.	
2-9 ft	SM	Reddish brown till. Sand with some silt, little gravel. Some cobbles.	
9 ft		Top of bedrock	

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PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	South Section, near center of west part	**TEST PIT NUMBER**	**TP5**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1333		
INSPECTOR:	Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-6"	ML	Topsoil. Brown sandy silt.	
6" - 3 ft	ML	Mottled reddish brown and brown silt with little sand, traces gravel, some cobbles	
3 - 10 ft	ML	Dark reddish brown silt with little sand, little gravel. Some boulders at 7 feet.	

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PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	South Section, near center.	**TEST PIT NUMBER**	**TP6**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1355		
INSPECTOR:	Wyeth Patton	WATER DEPTH:			

Depth	USCS Class	Description	Notes
0-6"	ML	Brown topsoil. Sandy silt.	
6-12"	SM	Grey silty sand. Wet	
12-24"	SM	Orange brown mottled sand and silt with traces gravel.	
2 - 9 ft	SM	Hard reddish brown till. Sand with some gravel, little silt. Few cobbles and boulders.	

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DATE:	1/2/2020	Project No.:	19414
WEATHER:	Partly cloudy, 35-50F		

TEST PIT LOG

EXCAVATING COMPANY:	Liberty Concrete & Construction	LOCATION:	South Section, southeast part.	**TEST PIT NUMBER**	**TP7**
OPERATOR:	Mr. Werlau				
EQUIPMENT:	Komatsu PC-120	ELEVATION:	1353		
INSPECTOR:	Wyeth Patton	WATER DEPTH:	Surface ponding		

Depth	USCS Class	Description	Notes
0-12"	OL	Topsoil. Black organic silt.	
12"-4 ft	ML	Brown sandy silt. Wet.	
		Surface water flowing into the hole from the north side prevented deeper excavation.	

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CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
PROJECT No.:	19414	SAMPLE LOT No.:	200102-1
DATE SAMPLED:	1/2/2020	DATE TESTED:	1/6/2020
SAMPLED BY:	Wyeth Patton	TESTED BY:	Wyeth Patton

MOISTURE CONTENT OF SOIL

TEST METHOD: ASTM D2216

Test Pit No.	DEPTH,FT.	% MOISTURE
TP1	2	19.3
TP2	3	13.6
TP3	2	22.6
TP3	5	7.3
TP3	14	9.4
TP4	2	31.9
TP4	9	7.8
TP6	2	31.4
TP6	8	16.9
TP7	4	41.4

Moisture content is expressed as a percent of the dry mass of the soil.

Reviewed by: *Kevin Patton*

Form NMC

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CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
PROJECT No.:	19414	SAMPLE LOT No.:	200102-1
DATE SAMPLED:	1/2/2020	DATE TESTED:	1/6/2020
SAMPLED BY:	Wyeth Patton	TESTED BY:	Wyeth Patton

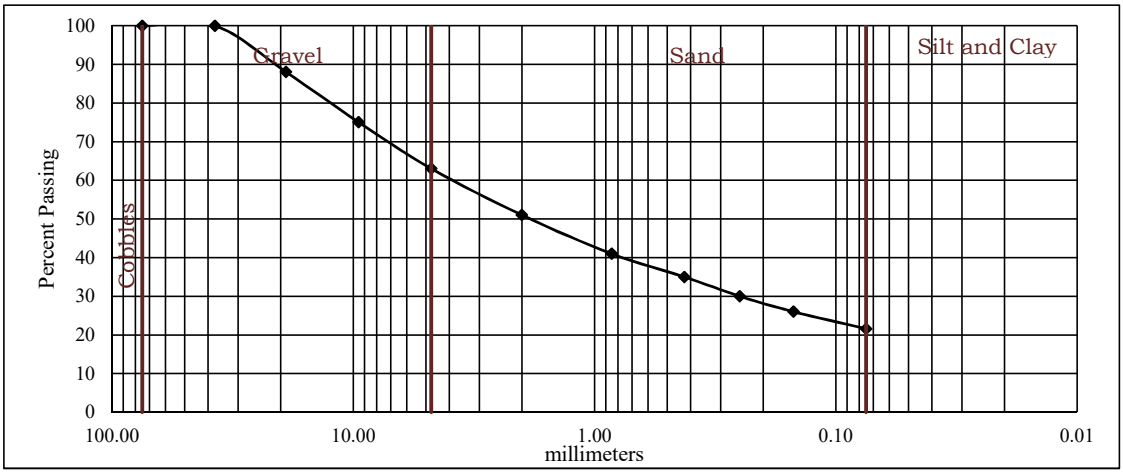
GRADATION ANALYSIS TEST REPORT

TEST METHOD(s): ASTM D422, D1140, AASHTO T311

Sample Location	TP3
Depth	5 feet

Sieve Size		Percent Retained	Percent Passing	Specification
inches	mm			
3"	75.0	0	100	
1 1/2"	37.5	0	100	
3/4"	19.0	12	88	
3/8"	9.5	13	75	
#4	4.8	12	63	
#10	2.00	12	51	
#20	0.850	10	41	
#40	0.425	6	35	
#60	0.250	5	30	
#100	0.150	4	26	
#200	0.075	4	21.6	
Pan		21.6	---	
Total		100	---	

Percent passing #200 by wash-sieve method.



Particle type size ranges are per USCS Classification.

D60 (millimeters)	3.8	Uniformity Coefficient (Cu)	Not determined
D30	0.23	Coefficient of Curvature (Cc)	Not determined
D10 (Effective Size)	<0.075	USCS Class*	SM, Silty Sand with Gravel
*For soils with more than 5% passing #200 sieve, Atterberg Limits were determined by:			Estimated (ASTM D2488)

Reviewed by: *Kevin Patton*

Form GRW

KEVIN L. PATTON, P.E.
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CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
PROJECT No.:	19414	SAMPLE LOT No.:	200102-1
DATE SAMPLED:	1/2/2020	DATE TESTED:	1/6/2020
SAMPLED BY:	Wyeth Patton	TESTED BY:	Wyeth Patton

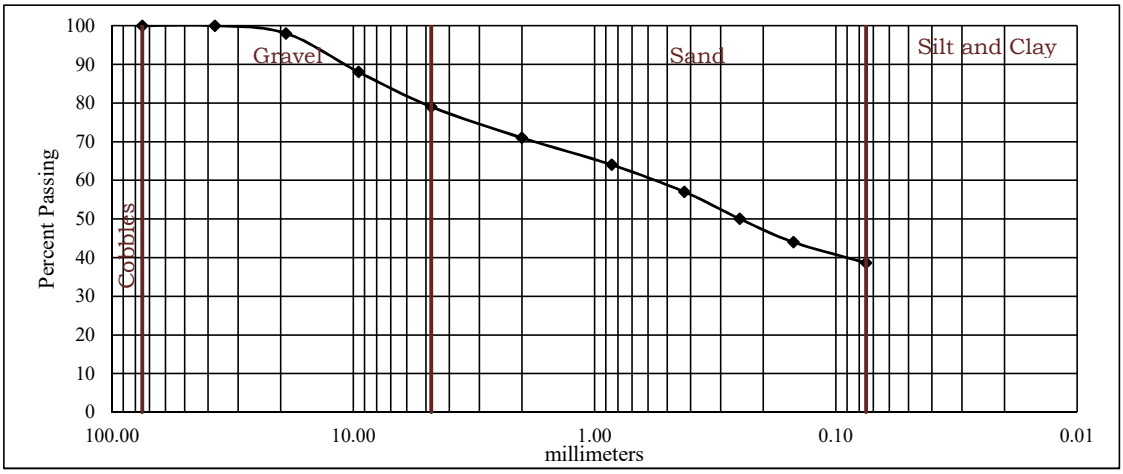
GRADATION ANALYSIS TEST REPORT

TEST METHOD(s): ASTM D422, D1140, AASHTO T311

Sample Location	TP4
Depth	9 feet

Sieve Size		Percent Retained	Percent Passing	Specification
inches	mm			
3"	75.0	0	100	
1 1/2"	37.5	0	100	
3/4"	19.0	2	98	
3/8"	9.5	10	88	
#4	4.8	9	79	
#10	2.00	8	71	
#20	0.850	7	64	
#40	0.425	7	57	
#60	0.250	7	50	
#100	0.150	6	44	
#200	0.075	5	38.6	
Pan		38.6	---	
Total		100	---	

Percent passing #200 by wash-sieve method.



Particle type size ranges are per USCS Classification.

D60 (millimeters)	0.56	Uniformity Coefficient (Cu)	Not determined
D30	<0.075	Coefficient of Curvature (Cc)	Not determined
D10 (Effective Size)	<0.075	USCS Class*	SM, Silty Sand with Gravel
*For soils with more than 5% passing #200 sieve, Atterberg Limits were determined by:			Estimated (ASTM D2488)

Reviewed by: *Kevin Patton*

Form GRW

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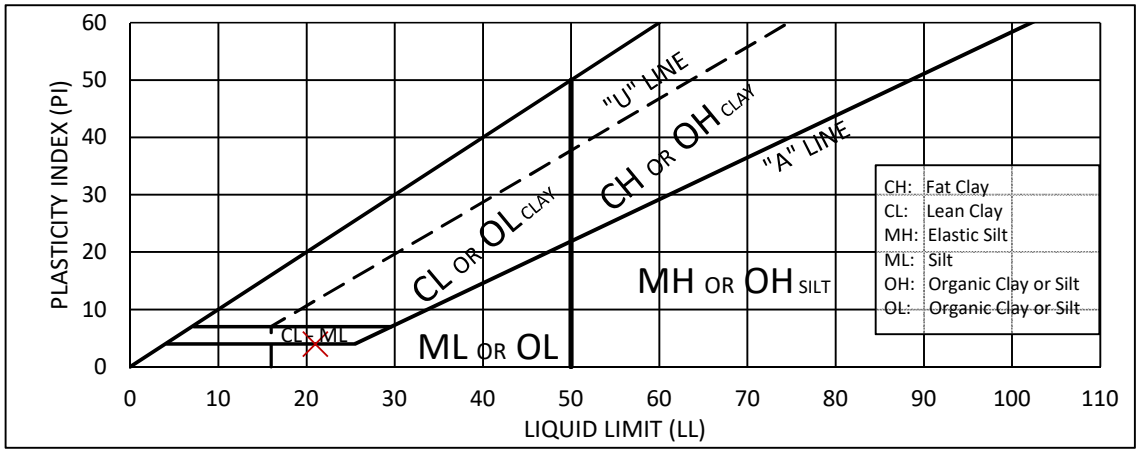
CLIENT:	BHT Properties Group		
PROJECT:	BBIS Auto Auction, Monticello, N.Y.		
PROJECT No.:	19414	SAMPLE LOT No.:	200102-1
DATE SAMPLED:	1/2/2020	DATE TESTED:	1/6/2020
SAMPLED BY:	Wyeth Patton	TESTED BY:	Wyeth Patton

ATTERBERG LIMITS TEST

TEST METHODS: ASTM D4318/ AASHTO T89, T90

Sample Location	TP6
Depth	8 feet
Percent Passing #40	60
Liquid Limit (LL)	**21**
Plastic Limit (PL)	**17**
Plasticity Index (PI)	**4**
USCS Class of -#40	ML



LL, PL and PI values are percent moisture of the soil by dry mass.

Test is performed on the 'matrix' fraction of the soil, finer than the #40 (0.425mm) sieve.

The Liquid Limit is the moisture content at which the matrix fraction of the soil changes from a stiff to a flowing consistency. The plastic limit is the moisture content at which it changes from cohesive to crumbly. The Plasticity Index is the Liquid Limit minus the Plastic Limit.

Reviewed by: *Kevin Patton*

Form ABL

Soil Map—Sullivan County, New York
(308 Route 17B)