MOUNTAIN VIEW LAKE DAM
NYS ID NO. 182-0276

DRAFT FEASIBILITY STUDY

March 2, 2018

Project Operated by:

Town of Bellmont
P.O Box 35
Brainardsville, NY 12915

Prepared by:

GOMEZ AND SULLIVAN ENGINEERS

288 Genesee Street
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1.0 Introduction

This report summarizes the studies performed at the Mountain View Lake Dam and the proposed alternatives evaluated for the dam remediation.

Elevations noted herein are in feet and referenced to the North American Vertical Datum of 1988 (NAVD88). For purposes of this report when referring to dam orientation, left and right signify directions when looking downstream

2.0 Purpose and Scope

The purpose of this study was to develop alternatives for the Mountain View Lake Dam Remediation Project. Specifically, the scope of work included the following:

- Reviewing available existing information;
- Performing a subsurface investigation and estimating geotechnical soil parameters;
- Performing hydrologic and hydraulic analyses;
- Developing two proposed alternatives for remediation of the Mountain View Lake Dam;
- Providing comment on the preferred alternative; and
- Preparing this report.

3.0 Report Limitations

The analyses and recommendations contained in this report are based on data and information made available at the time of this report and presented herein. This report has been prepared in accordance with generally accepted engineering practices. No other warranty, express or implicit, is made.

4.0 Existing Conditions

The Mountain View Lake Dam is located on the Salmon River in Bellmont, NY. It impounds Mountain View Lake and Indian Lake which are primarily used for recreation. The dam was constructed in the late 1800s and was rehabilitated in 1979, 1996, and 2010.

The dam is located approximately 250 feet downstream of the Old Mountain View Road bridge. The project site is bounded to the north and south by woody area, to the north by Old Mountain View Road and Mountain View Lake, and to the east by a residential neighborhood. Two existing abandoned bridge abutments are located downstream of the existing dam. The abutments are approximately 60 to 80 feet long and up to 6 feet wide. A 115kV National Grid transmission line spans across the bridge abutments downstream of the existing dam.

The existing dam consists of a timber-crib spillway that is approximately 57 feet wide and a concrete gate structure, that is approximately 18 feet wide. The spillway section is approximately 6.1 feet high, with a crest elevation of approximately El. 1484.7. Discharge through the gate structure is regulated by two 7.5-foot-wide by 6.0-foot-high sluice gates with manual operators. The gate inverts are at El. 1478.0 while the top of the gate structure is at El. 1490.1. The sluice gates are closed and it is unknown if they can be operated under current conditions. Sheet pile is located on the upstream side of the dam, extending from approximately El. 1478.0 to El. 1460.7.

The dam abutments consist of timber crib retaining walls retaining an earthen embankment. The timber crib is in significant disrepair; the retaining wall on downstream side of the left abutment has collapsed.

The Mountain View Lake Dam has a maximum structural height of approximately 14.1 feet and a maximum storage capacity of about 2970 acre-feet. Therefore, in accordance with the New York State Department of Environmental Conservation (NYSDEC) guidelines the dam is classified as a Large size structure.

Per NYSDEC guidelines, the Mountain View Lake Dam is classified as a Large Hazard Class “A” or Low Hazard dam. A low hazard dam indicates that a dam failure is unlikely to result in damage to life, property, or downstream utilities and will only impact isolated or abandoned town or country roads or buildings. A dam is classified “Large” if the height of the dam is equal to or greater than 40 feet, or the storage at normal water surface equal to or greater than 1,000 acre-feet.

Significant seepage has been reported below the gate structure and timber crib over-flow section. According to reports, the gate structure may be founded on timber foundation. The 1996 construction consisted of placing sheet piles along the upstream side of the dam to help alleviate seepage conditions below the dam and gate structures, however active seepage is still visible below the dam.

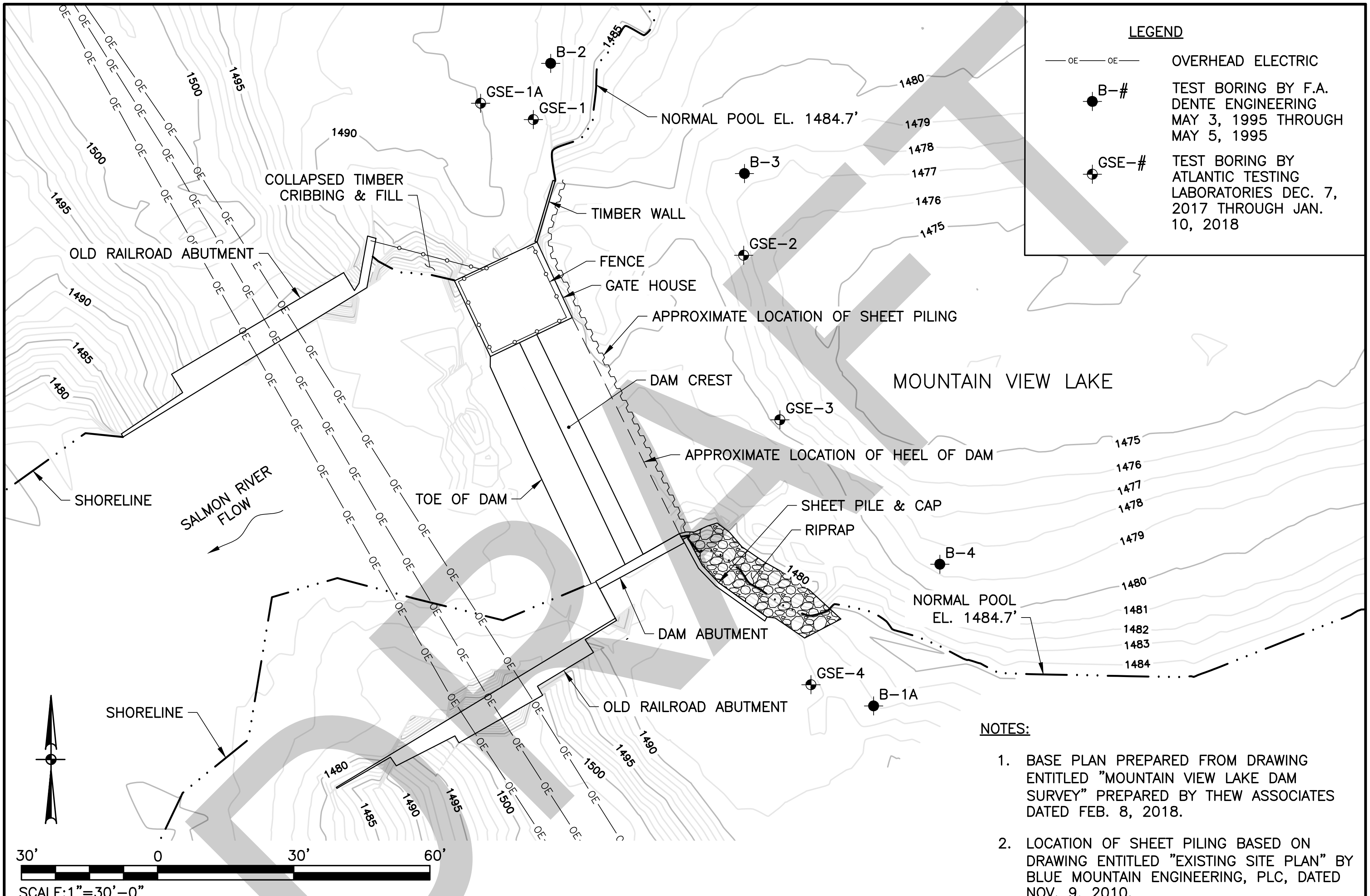
Existing site conditions are shown in **Figure 1**.

5.0 Pertinent Engineering Data

The pertinent engineering data presented in **Table 1** are based on data obtained from the hydrologic and hydraulic analysis presented in Section 10.0 and the recent survey performed by Thew Associates, PLLC on February 23, 2018.

Table 1 - Pertinent Engineering Data

Condition	Head Water Elevation (feet)	Storage Capacity (acre-feet)
Normal Pool (Spillway Crest)	El. 1484.7	1200.0
Spillway Design Flood (100-year) – gates closed	El. 1494.4	2968.6
Spillway Design Flood (100-year) – gates open	El. 1488.7	2660.5



NOTES:

1. BASE PLAN PREPARED FROM DRAWING ENTITLED "MOUNTAIN VIEW LAKE DAM SURVEY" PREPARED BY THEW ASSOCIATES DATED FEB. 8, 2018.
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FIGURE 1
EXISTING CONDITIONS

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM

6.0 Previous Reports and Existing Information

The following is a list of documents that Gomez and Sullivan collected and reviewed for the Mountain View Lake Dam:

- DRAFT Sediment Sampling Work Plan by EcoLogic dated June 16, 2016.
- DRAFT Technical Memorandum Assessment of Sediment Sources in the Mountain View Lake Watershed by EcoLogic dated August 8, 2014.
- Mountain View Dam Survey Drawings by Blue Mountain Engineering, PLLC dated November 9, 2010.
- Mountain View Dam Inspection by NYSDEC dated August 3, 2000.
- Reconstruction of Gates and Appurtenances, Contract Documents including drawings and specifications by Charles J. Barrow, P.C. dated 1997.
- Visual Inspection Report by NYSDEC dated June 24, 1997.
- Subsurface Investigation by F.A. Dente Engineering, P.C. dated May 15, 1995.
- Visual Inspection Report by NYSDEC dated September 16, 1993.
- Visual Dam Safety Inspection Report by NYSDEC dated August 20, 1987.
- Visual Inspection Report by NYSDEC dated July 21, 1983.
- DEC Response to Application #517-94-0091-78 – Mountain View Lake Dam (#NY-9) by NYSDEC dated January 29, 1979.
- Mountain View Dam Reconstruction Contract Documents by Tisdel Associates dated October 1978.
- Dam Inspection Report dated September 30, 1971.
- Dam Report by State of New York Conservation Commission, dated July 9, 1920.
- Article from Malone Telegram titled “Loss at Dam Not Extensive” dated July 28, 1919.

7.0 Design Criteria

The following codes and standards were referenced for the development of the design alternatives for Mountain View Lake Dam.

- NYSDEC Guidelines for Design of Dams, dated January 1989;

- United States Army Corps of Engineers EM 1110-2-220, Gravity Dam Design, dated June 30, 1995;
- United States Army Corps of Engineers HEC-RAS 5.0.3;
- United States Department of the Interior, Design of Small Dams, dated 1974; and
- United States Department of Agriculture, Urban Hydrology for Small Watersheds: TR-55, dated June 1986.

The NYSDEC Guidelines for the Design of Dams (Guidelines) specifies the following criteria for the design of new dams:

1. For a single, primary spillway, sufficient spillway capacity should be provided to safely pass the spillway design flood (SDF) of 150% of the 100-year flood for Large, Hazard Class A dams.
2. The primary spillway should have sufficient capacity to pass at least 75% of the storage between the design high water and spillway crest within 48 hours.
3. If a service spillway and auxiliary spillway are to be constructed in combination, the service spillway shall have sufficient capacity to pass the 10-year flood event. The service spillway and auxiliary spillway shall be designed to pass 150% of the 100-year flood event.
4. The auxiliary and service spillways shall have sufficient capacity to pass the 100% of the storage between design high water and the auxiliary spillway crest within 12 hours.
5. NYSDEC prohibits the construction of flashboards on new dams.
6. Low-level outlet works shall be constructed and shall have sufficient capacity to discharge 90% of the storage below the spillway crest within 14 days.

The following criteria is specified in the NYSDEC guidelines for existing dams:

1. All Hazard Class "A" dams shall have sufficient spillway capacity to pass the 100-year flood.
2. The service spillway shall have sufficient capacity to pass the 10-year flood.

The remediation design alternatives discussed in Section 12.0 were developed in accordance with the requirements described above.

8.0 Sediment Sampling

A sedimentation study was performed by Ecologic in 2013 as part of a dredging program of the Mountain View Lake. According to the report, 3 composite sediment samples were collected from Mountain View Lake using a petite ponar sampler. The following analytical tests were performed on the sediment samples per the NYSDEC requirements outlined in the Technical & Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material.

- Pesticides and PCBs in accordance with EPA 8081/8082
- PAHs in accordance with EPA 8270
- Metals in accordance with EPA 6010
- Mercury in accordance with EPA 7471

The results of the analytical testing from the Ecologic Work Plan are included in **Table 2** below. The test results indicate that the lake sediments are below the threshold for contamination per NYSDEC requirements.

Table 2 - Analytical Test Results from 2013 Ecologic Sediment Sampling Program

Parameter	Analytical Method	Site 1		Site 2		Site 3	
		Result[1]	Threshold Class	Result[1]	Threshold Class	Result[1]	Threshold Class
PCBs	EPA 8081/8082	ND	A	ND	A	ND	A
PAHs	EPA 8270	ND	A	ND	A	ND	A
Arsenic	EPA 6010	ND	A	ND	A	1.6	A
Barium	EPA 6010	15	--	14	--	26	--
Cadmium	EPA 6010	ND	A	ND	A	ND	A
Chromium	EPA 6010	5.6	A	4.3	A	5.5	A
Lead	EPA 6010	3.7	A	2.3	A	27	A
Selenium	EPA 6010	ND	--	ND	--	ND	--
Silver	EPA 6010	ND	A	ND	A	ND	A
Mercury	EPA 7471	ND	A	ND	A	ND	A

Abbreviations:

ND Non-detect. Analytes reported as less than the method detection limit.

-- No classification guidelines are available for compound.

Notes:

1. Results in mg/kg dry weight
2. Threshold Classes

Class A No Appreciable Contamination (No Toxicity to aquatic life)

Class B Moderate Contamination (Chronic Toxicity to aquatic life)

Class C High Contamination (Acute Toxicity to aquatic life)

Per the TOGS 5.1.9, sediment sampling is not required if the project involves less than 1,500 cubic yards of dredged material. Considering the project site and scope, minimal dredging is expected; no more than approximately 500 cubic yards of material will be removed from the Mountain View Lake during construction.

9.0 Subsurface Investigation

A previous subsurface exploration program was performed by F. A. Dente Engineering, P.C. in 1995. Four test borings were drilled as part of the previous subsurface exploration program at the Mountain View Lake Dam between May 3 and May 5, 1995. The previous test borings B-1 and B-4 were drilled on land and were drilled using a truck mounted rotary drill rig and hollow stem auger casing advanced to 27 feet below ground surface (bgs). Previous test borings B-2 and B-3 were drilled over water using a portable tripod drilling frame set up on a pontoon boat. Borings B-2 and B-3 were terminated at 27 and 23.3 feet bgs, respectively.

A recent subsurface exploration was performed between December 7, 2017 and January 10, 2018 to investigate the subsurface conditions at the Mountain View Lake Dam. The recent drilling program consisted of 5 test borings GSE-1 through GSE-4 and were drilled by Atlantic Testing Laboratories of Canton, New York. The recent test borings were drilled using drive and wash drilling techniques with 4-inch diameter casing.

Test boring locations are included in **Figure 1**.

Split spoon samples were collected continuously from ground surface to approximately 50 feet bgs except at test boring location GSE-1 which was drilled to approximately 12 feet bgs. Sampling was performed in general accordance with ASTM D-1586. Geotechnical laboratory tests were performed on select split spoon samples obtained from the recent test borings. Groundwater levels were measured at each test boring at the conclusion of drilling. In-situ permeability tests were performed at recent test boring locations GSE-1A and GSE-4 in accordance with the United States Department of the Navy, Naval Facilities Engineering Command (1982) (NAVFAC).

In general, the subsurface conditions encountered during the recent and previous test boring programs consisted of topsoil, fill, sand and silt, sand and gravel, sand, and silt & clay.

9.1 Topsoil

Topsoil was encountered at two of the recent test boring locations (GSE-1 and GSE-4). At the recent test boring locations, this layer ranged between 0.1 and 0.3 feet thick.

9.2 Fill

Fill was encountered at three of the recent test boring locations (GSE-1, GSE-2 and GSE-4). The fill layer generally ranged from 12 to 16 feet thick at the recent test boring locations where encountered. A one recent test boring location, GSE-1, the fill strata was not fully penetrated and is greater than 12 feet thick. The fill layer typically consisted of brown to dark gray, very loose to medium dense, fine to coarse SAND with varying amounts of fine to coarse GRAVEL, trace to little silt. Wood pieces were encountered within the fill strata at test boring location GSE-1. It is assumed the wood pieces are from a remnant of the old timber crib dam structure. SPT N-values in the fill layer ranged from 1 to 47 blows per foot (bpf) with an average of 14 bpf.

9.3 Silt and Sand

A silt and sand layer was encountered at all the recent test boring locations (excluding test boring location GSE-1). The silt and sand, where fully penetrated, ranged from approximately 4 to 29 feet thick. At test boring location GSE-4, the silt and sand layer was separated by an approximately 10 feet thick sand layer; the lower silt and sand layer was not fully penetrated as was greater than 4 feet thick. Where primarily cohesive, the silt and sand strata generally consisted of medium stiff to hard, SILT to Clayey SILT to CLAY & SILT with varying amounts of fine to coarse sand and gravel. Where primarily cohesionless, the silt and sand strata generally consisted of loose to dense fine to coarse SAND with varying amounts of silt and fine to coarse gravel. The SPT N-values in the silt and sand layer ranged from about 5 to 75 bpf with an average of about 28 bpf.

9.4 Sand and Gravel

Sand and gravel was encountered at three of the recent test boring locations (GSE-1A, GSE-2, and GSE-3). The sand and gravel strata ranged from approximately 7 to 11 feet thick where fully penetrated. The sand and gravel layer was not fully penetrated at test boring location GSE-1A and was greater than approximately 5 feet thick. At test boring locations GSE-2 the sand and gravel layer was split into an upper and lower layer by an approximately 11 feet thick silt and sand layer. At test boring location GSE-3, the sand and gravel layer was split into an upper and lower layer by and approximately 9 feet thick silt & clay layer. The sand and gravel layer typically consisted of very dense, brown, fine to coarse SAND with varying amounts of fine to coarse GRAVEL, trace to some silt. The SPT N-values in the sand and gravel layer ranged from approximately weight of hammer (WOH) to 78 bpf with an average of 28 bpf.

9.5 Sand

Sand was encountered at all the recent test boring locations except for GSE-1. The sand layer ranged from approximately 10 to 22 feet thick where fully penetrated and was greater than 20 feet thick where not fully penetrated. The sand layer generally consisted of medium dense to very dense, brown, fine to medium SAND, little to some silt, trace fine to coarse gravel. The SPT N-value in the sand layer ranged from 9 bpf to greater than 111 bpf with an average of 58 bpf.

9.6 Silt & Clay

A silt & clay layer was encountered at recent test boring location GSE-3 and was approximately 9 feet thick. The silt & clay layer generally consisted of hard, SILT & CLAY, little to some fine to medium sand, trace to little fine to coarse gravel. The SPT N-values in the silt & clay layer ranged from approximately 32 bpf to 99 bpf with an average of 67 bpf.

Based upon the subsurface investigation, laboratory testing, and established correlations between SPT N-values and soil parameters such as friction angle, presumptive allowable bearing capacity, cohesion, and permeability. **Table 3** presents soil parameters estimated for the soil conditions encountered at the site.

Table 3 - Summary of Estimated Soil Properties

Soil Strata	Allowable Bearing Capacity (psf)	Friction Angle (degrees)	Cohesion (psf)	Permeability (cm/sec)
Fill	500	26	0	NA
Sand and Gravel	6,000	29	0	3E-03
Silt and Sand	4,000	30	0	7E-04
Silt and Clay	4,000	30	0	7E-04
Sand	4,000	32	0	4E-03

The results from the recent subsurface investigation indicate that soil underlying the existing dam structure have relatively high permeabilities. This is generally an undesirable condition and may be a cause of the seepage observed below the existing spillway and gate structure.

A summary of the estimated soil parameters and construction recommendations is provided in the subsurface investigation report in **Appendix A**.

10.0 Hydrologic and Hydraulic Analysis

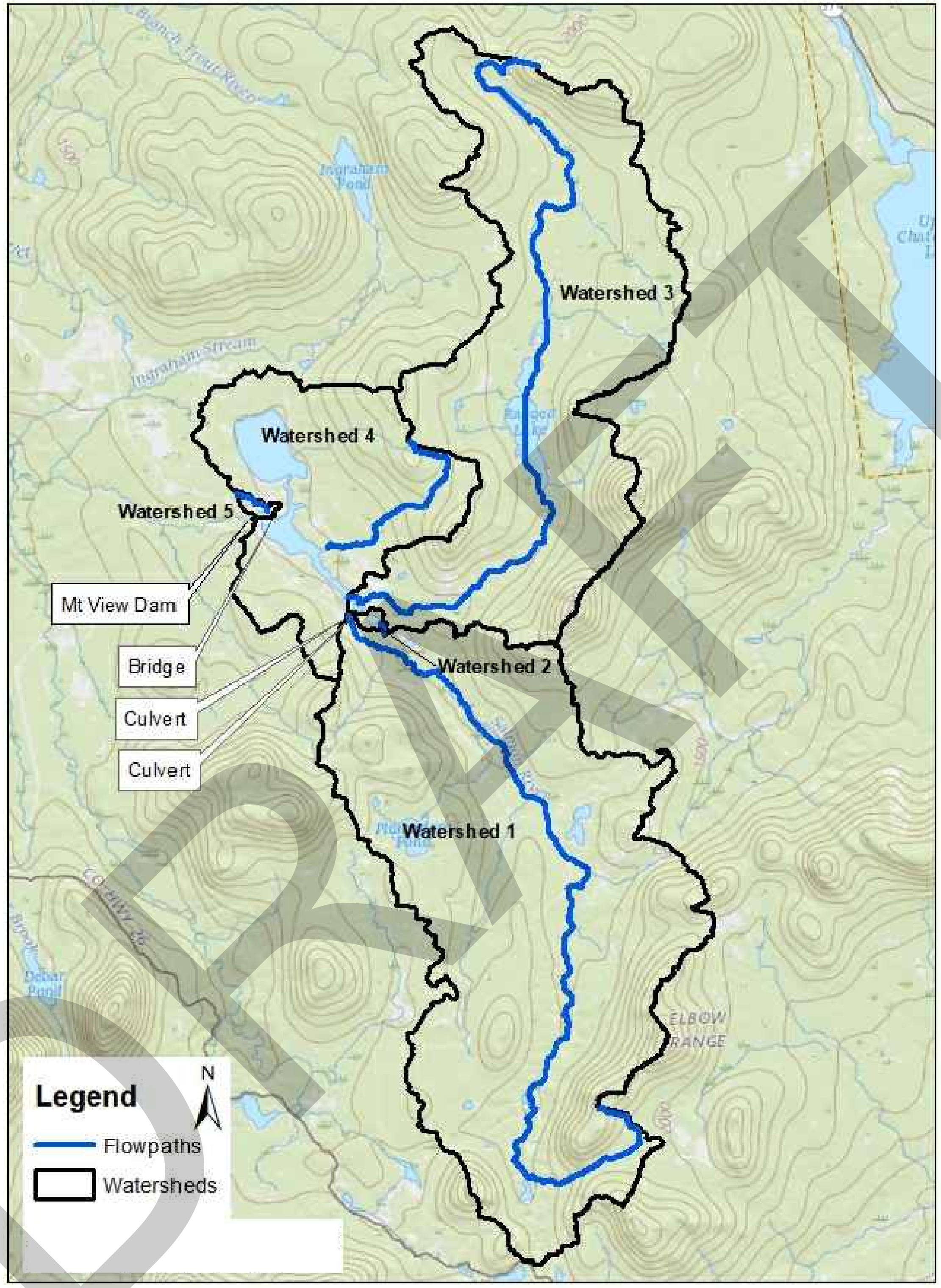
10.1 Hydrologic Assessment

To assess the spillway design flood (SDF), a hydrologic analysis was performed using a TR-55 calculation to determine the discharge associated with a range of flood return intervals.

The United States Department of Agriculture's Technical Release 55: Urban Hydrology for Small Watersheds (TR-55) was used in developing inflow hydrographs for a range of return intervals in the Mountain View Lake Dam watersheds. TR-55 utilizes unit hydrograph routing methodologies presented in The Soil Conservation Service Technical Release 20 (TR 2) (based on the procedure outlined in the *National Engineering Handbook*) along with calculations of the time of concentration and storm runoff. Runoff hydrographs were developed based on the 24-hour rainfall for the given return interval at the dam. National Oceanic and Atmospheric Administration (NOAA) Atlas 14 data have superseded the values provided in the TR-55 handbook as the precipitation values most appropriate for a hydrologic analysis. As such Atlas 14 provides the most up-to-date evaluation of rainfall frequency for the northeastern United States and, as such, was used in our analysis. A Type II rainfall distribution was used, based upon rainfall distributions provided in TR-55.

The watershed extents upstream of Mountain View Lake Dam were delineated utilizing a digital elevation model from National Map and GIS based tools and are shown in **Figure 2**. The upstream watersheds were identified based upon key points of interest within the watershed, primarily two culverts upstream of the reservoir, a bridge just upstream of Mountain View Lake Dam, and Mountain View Lake Dam. For each watershed, the time of concentration was computed based on the travel time along the longest flow path using calculations from TR-55 for sheet flow, shallow concentrated flow, and channelized flow, as applicable. Lengths and slopes were measured within each watershed. Roughness parameters and channel dimensions were determined from aerial photographs. Runoff curve numbers were computed for each watershed using soil data from the Natural Resources Conservation Commission (NRCS) and a combination of aerial photography and land use data from the National Land Cover Database (NLCD) to classify the land type. The soil is predominately SCS Group C, which is characteristic of soils with lower infiltration and higher runoff potential (TR-55). The land use is predominately deciduous forest. The total runoff for each subarea was multiplied by an adjustment factor, F, which was determined based upon the percentage of swamp and pond area within each watershed to account for flow attenuation.

Typically, an ungauged basin such as the one at Mountain View Lake Dam would use the TR-55 graphical method for determining the hydrographs for flood events. In this case, the tabular values



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GOMEZ AND SULLIVAN ENGINEERS Williamsville, NY • Utica, NY • Albany, NY • Henniker, NH www gomezandsullivan com	FIGURE 2 WATERSHED FOR MOUNTAIN VIEW AND INDIAN LAKE	TOWN OF BELLMONT, NY MOUNTAIN VIEW LAKE DAM

in TR-55 are not available at a long enough time of concentration for the watersheds. Thus, the USDA computer program WinTR-55 was used to calculate the runoff hydrographs and peak flows within each drainage area. For WinTR-55 calculations, the area was multiplied by F, as used in TR-55, to account for flow attenuation.

WinTR-55 required the area, curve number, and a time of concentration for each subarea. These values are presented in **Table 4**.

Table 4 - Summary of WinTR-55 Values

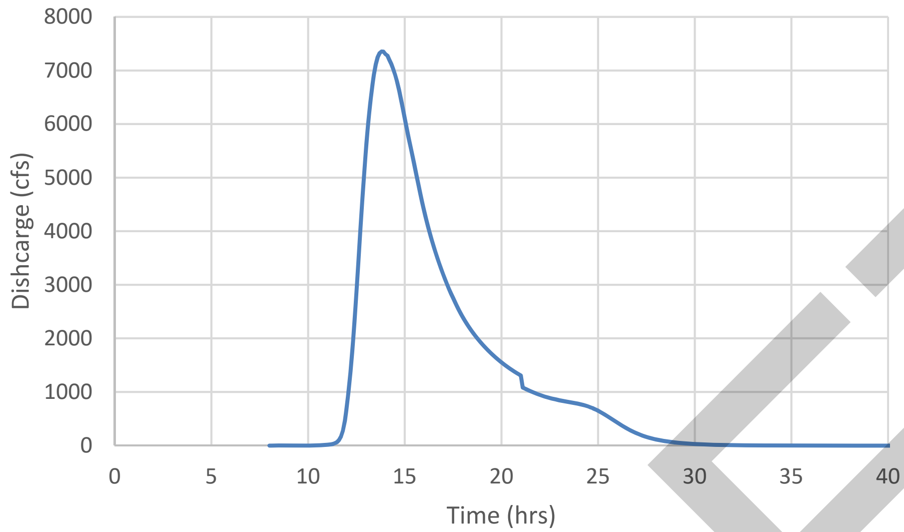
Watersheds	Tc	CN	Percent Wetland	Total Area (mi^2)	Adjusted Area (mi^2)
1	3.36	64	3.4%	22.10	16.45
2	0.42	68	0.0%	0.08	0.08
3	4.11	69	7.4%	16.32	11.75
4	2.01	68	0.5%	7.06	6.59
5	0.86	77	0.0%	0.09	0.09

Because all five subareas discharge directly into the reservoir, their individual hydrographs were summed to find the total discharge, based upon the assumption that travel time within the reservoir is negligible. due to the time of travel within a reservoir being negligible. The hydrograph was developed for the 2, 5, 10, and 100-year events in this manner. 150% of the 100-year event is typically determined by adjusting the peak 100-year event inflow. In this case, the entire hydrograph was adjusted for 150% of the 100-year event. A summary of the estimated peak inflows with respective return intervals is provided in **Table 5**. The 100-year hydrograph is shown in **Figure 3** below.

Table 5 - Summary of Peak Inflows with Return Intervals

Return Interval	Peak Inflow (cfs)
150% of 100 yr	11030
100 Year	7353
10 Year	3138
5 Year	1749
2 Year	1239

Figure 3 – 100-year hydrograph



The watersheds as identified in GIS were based on key points within the watershed indicating transitions between sheet, shallow, concentrated flow, and the point where the flowpaths enter the reservoir.

10.2 Hydraulic Assessment

The hydraulic assessment included developing a stage-storage curve, conducting reservoir routing, appropriately sizing the alternative spillways, and assessing the gate structure capacity.

10.2.1 Stage-Discharge Rating Curve

Mountain View Lake Dam consists of a 56.3-foot-long spillway, two sluice gates, and two non-overflow sections. The stage-discharge rating curve was developed for the project based on the hydraulic properties of these structures as outlined below.

The spillway is a 56.3-foot-long, timber crib structure with crest El. 1484.7. The spillway has a sloping upstream face, a three-foot breadth, and a vertical downstream face before sloping downward (drawing E-2). As such, discharge coefficients were based off a a trapezoidal weir with an upstream H:V of 1:2 and a downstream slope of 1:1 (Brater and King, 1976). The effective length of the spillway was adjusted for two abutments, based upon coefficients from Design of Small Dams.

The spillway is a 56.3 foot-long, timber crib structure with its crest at El. 1484.7. The spillway has a 1:2 (H:V) upstream face, a three-foot breadth, and a vertical downstream face before having a 1:1 (H:V) slope. Based on this configuration, discharge coefficients were based off a trapezoidal weir with an upstream H:V of 1:2 and a downstream slope of 1:1 (Brater and King, 1976). The effective length of the spillway was adjusted for two abutments, based upon coefficients from the United States Department of The Interior, Bureau of Reclamation's Design of Small Dams (Design of Small Dams).

The two sluice gates are 6 feet by 6 feet and serve as the entrance to 20-foot-long reinforced concrete tunnels. The discharge capacity of the sluice gates was established using a weir coefficient of 2.65. For lower headwater elevations, flow was calculated using the weir equation:

$$Q = CLH^{1.5}$$

Where Q=discharge (cfs)
C=weir coefficient
L=effective length (ft)
H= water surface elevation -sluice gate crest elevation (ft)

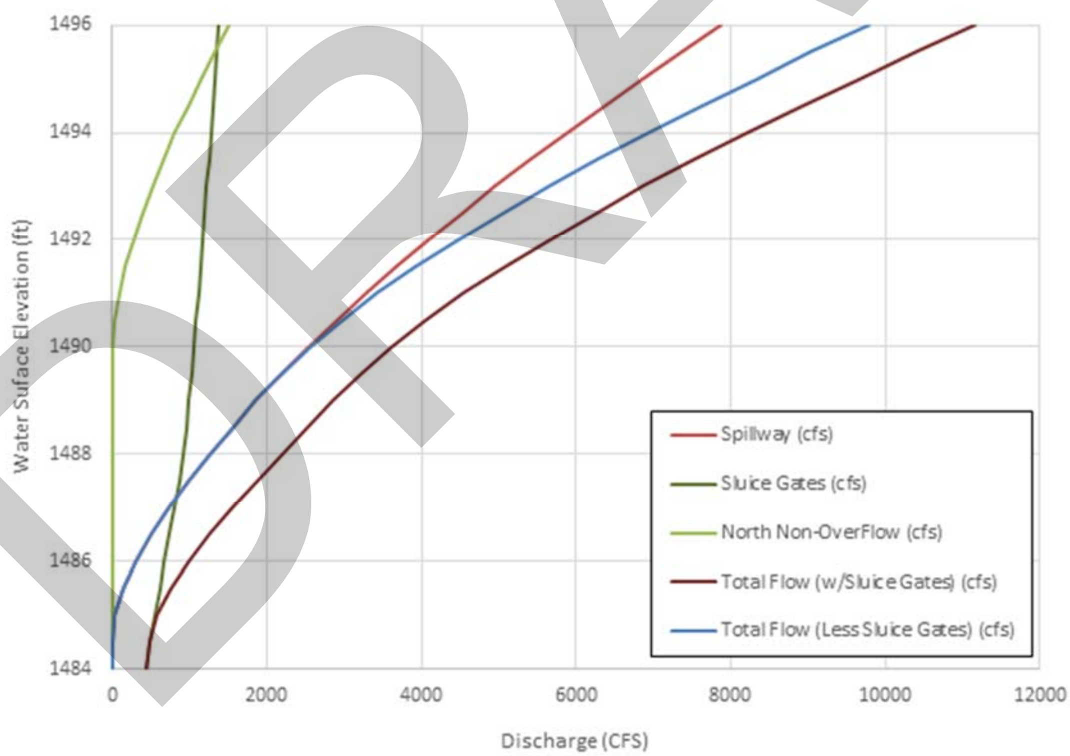
When the sluice gates were flowing full, the equation was adjusted to an orifice flow equation

$$Q = CA\sqrt{2g * H}$$

Where Q=discharge (cfs)
C=orifice coefficient=0.62 (Design of Small Dams)
A=cross sectional area (ft^2)
H=water surface elevation – orifice centerline elevation (ft)

The top of the 40-foot-long right abutment is at El. 1490.1. The top of the 8-foot-long left abutment is at El. 1489.0. Both non-overflow sections (abutments) were represented as broad crested weirs with a discharge coefficient of 2.65. The stage-discharge rating curve is shown in **Figure 4**.

Figure *4* - Stage-Discharge Rating Curve for Mountain View Lake Dam



10.2.2 Stage-Storage Curve

A stage-storage curve relationship was developed to assess the storage capacity of the reservoir, based upon bathymetry data provided by Thew Associates. To calculate the volume of each contour, the average end approach was used.

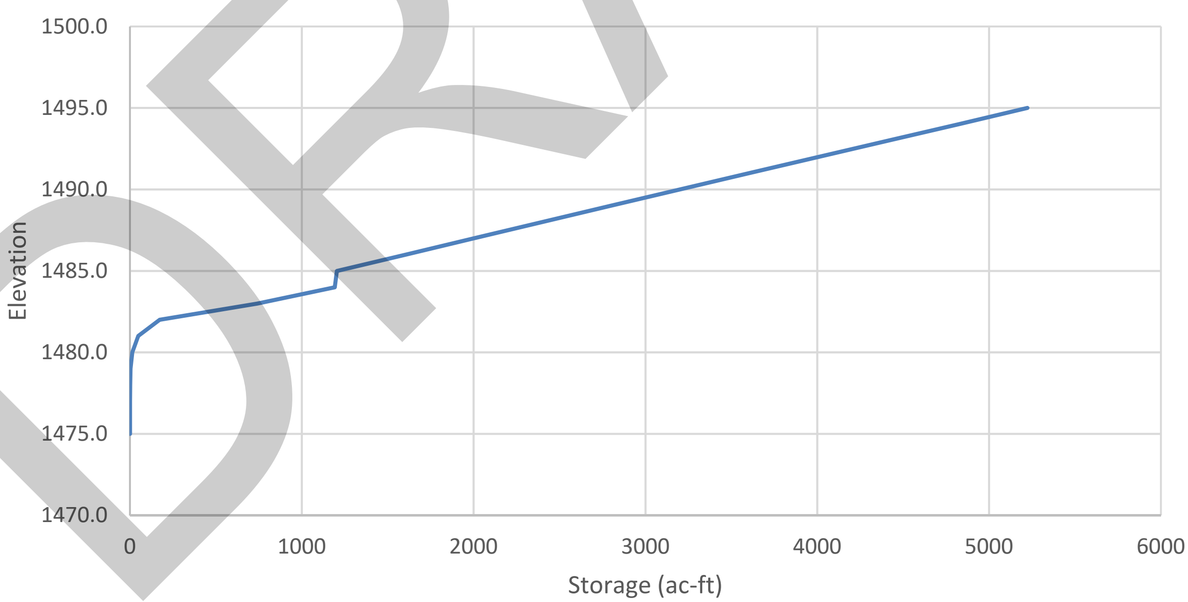
In addition to using the bathymetry data for Mountain View Lake, a digital elevation model (DEM) was used to determine the storage capacity of Indian Lake. Following analysis of aerial imagery and the data from the bathymetric survey of Mountain View Lake, it was determined that there was no hydraulic control between Indian Lake and Mountain View Lake. Thus, the storage capacity of Indian Lake was included in the stage-storage calculations.

Mountain View Lake bathymetric data had a high point of 1482 between Indian and Mountain View Lakes. This is below the normal pool elevation of 1484.7 ft. For the stage-storage of Indian Lake below the normal pool elevation, it was assumed that there was no decrease in contour area. Historic aerial imagery analysis showed minimal change in the upper portion of the lake thus validating the assumption.

The calculated storage capacity for normal pool, El. 1484.7, is 1200 ac-ft.

The stage-storage curve compared the storage capacity in ac-ft to the WSE of the reservoir is shown in **Figure 5**.

Figure 5 - Stage-storage curve for Mountain View and Indian Lakes



10.2.3 Reservoir Routing

To account for the capacity of the reservoir to store flood waters, reservoir routing was used to consider the impacts of reservoir storage on the hydrograph using the Modified Puls Method as outlined in Introduction to Hydrology (2003, Viessman & Lewis). Using the hydrograph developed from WinTR55 and the stage-storage curve, the attenuation of the hydrograph could be developed based upon a given rating curve.

Using the rating curve for the current Mountain View Lake Dam, the elevations for the 100-year event and the 150% of the 100-year event were determined for scenarios with both sluice gates in the open and closed positions. These values are presented in **Table 6.**

Table 6 - Spillway Capacity of Existing Dam Conditions

Condition	Scenario	WSE	Discharge Capacity (cfs)	Storage Capacity (ac-ft)
150% of 100Yr	Sluice Gates Open	1490.5	4089	3413.6
	Sluice Gates Closed	1491.3	3701	3708.8
100 Year Event	Sluice Gates Open	1488.7	2622	2660.5
	Sluice Gates Closed	1489.4	2145	2968.6

10.2.4 Drawdown Calculations

DEC requires that dams have a low-level outlet that can release 90% of the reservoir capacity from normal pool elevation in 14 days assuming no inflow. The normal pool elevation storage capacity is 1200 ac-ft. A 90% decrease, to 120 ac-ft, requires the reservoir be lowered to El. 1481.6.
To achieve this drawdown, there needs to be an average discharge rate of 55 cfs. Assuming a 4-foot by 4-foot sluice gate with a sill of El. 1478.0 and a coefficient of 0.7, the necessary flow could be passed.

11.0 Site Limitations

The dam is situated on property owned by the Town of Bellmont. The limits of the project site extend between approximately 40 feet upstream of the existing gate structure, 30 feet downstream of the dam toe, 32 feet north of the right abutment and 50 feet south of the left abutment.

The right dam abutment can be accessed from Beach Road and the National Grid Right of Way. Access to the left side of the dam is limited and restricted by two residential properties. Temporary construction access easements will likely be required with the current property owners at tax parcel 202.4-1-1 and 202.4-1-2. Additional permanent easements may be required from property owners at tax parcel 202.4-1-1 and 202.-1-27 depending upon the selected alternative as described in Section 12.0 Property limits and possible temporary easement requirements are shown on **Figure 6**.

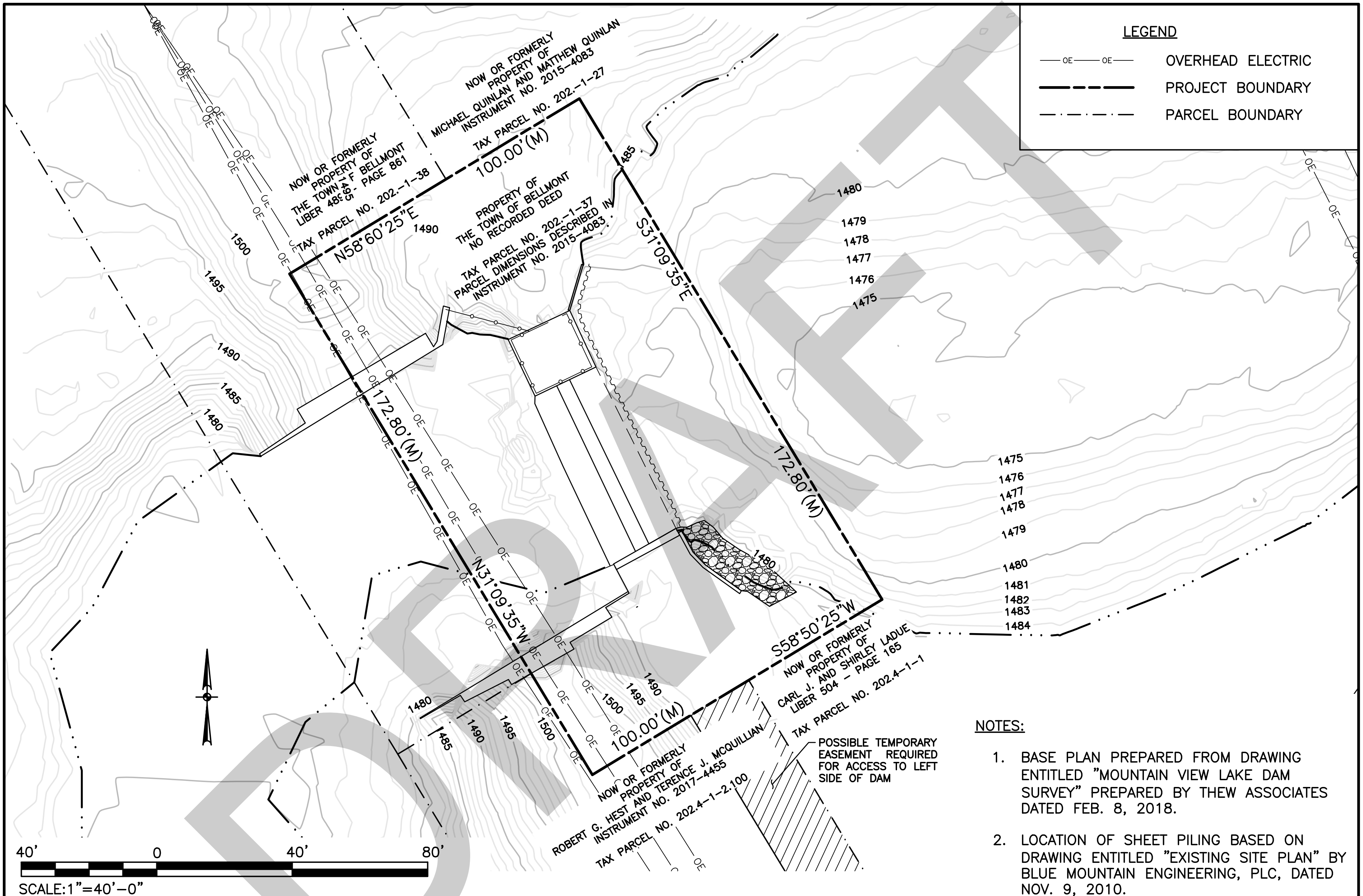


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FIGURE 6
SITE LIMITATIONS & PROPERTY LIMITS

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM

12.0 Alternatives

Three alternatives were developed for the rehabilitation of the Mountain View Lake Dam: Alternative 1, Alternative 2A and Alternative 2B. All alternatives will require installation of temporary cofferdams and a water diversion system during construction.

It is expected that all alternatives will be constructed using a phased construction approach. In the first phase, a cofferdam will be constructed on the upstream and downstream left side of the dam in order to utilize the existing gate structure for water diversion. For the second phase, the cofferdam will be relocated to the upstream and downstream right side of the dam and the improved spillway section will be used to pass water downstream. It is recommended that the cofferdam design be based on, at a minimum, the 10-year storm event. The top of cofferdam elevation will specified in the contract documents.

12.1 Alternative 1 – Rehabilitate Existing Dam

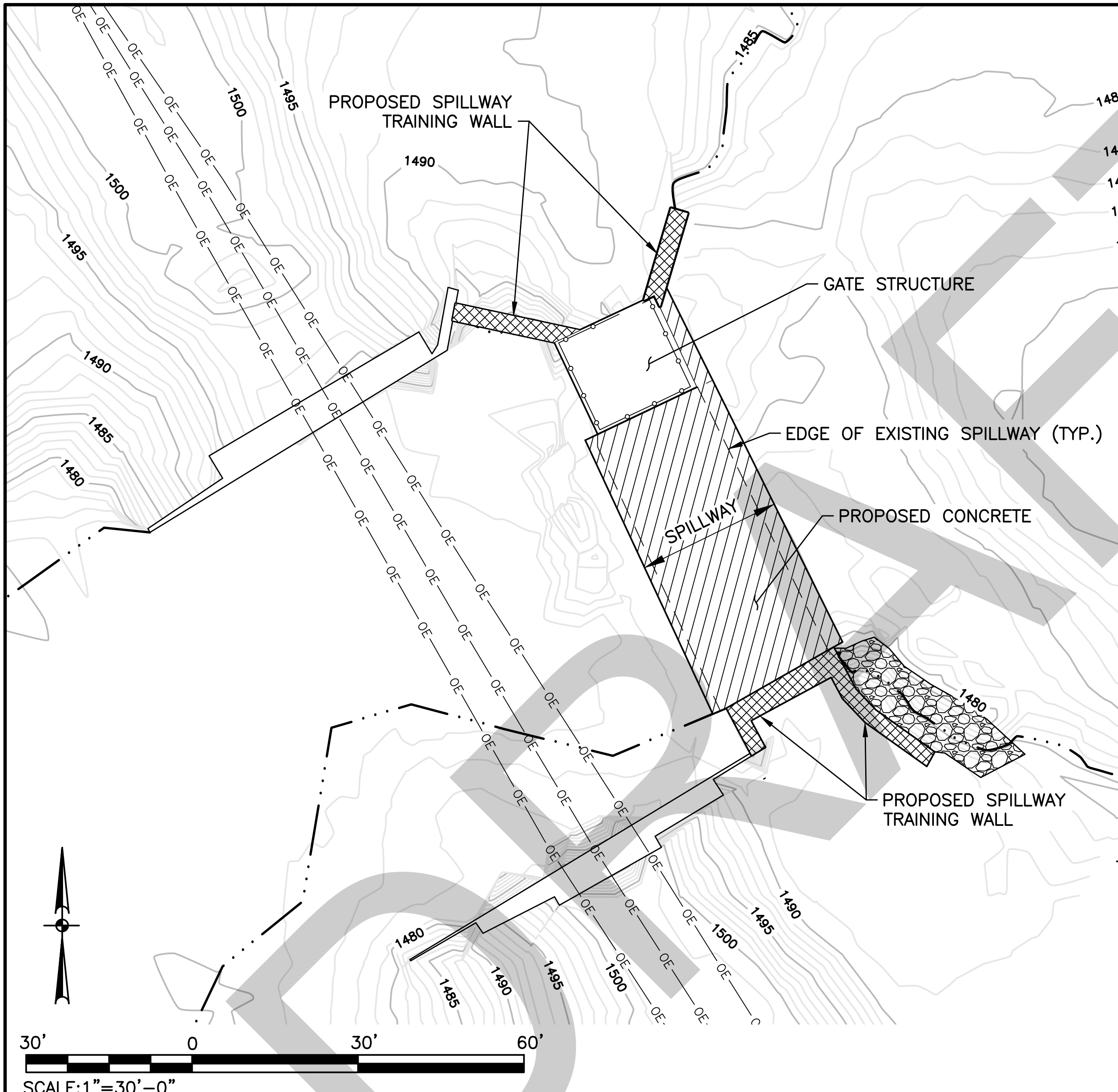
Alternative 1 involves rehabilitating the existing dam structure. This alternative seeks to improve the dam condition while retaining as much of the existing dam structure as possible. Alternative 1 includes encapsulating the existing timber crib overflow section in 2.5 feet-thick reinforced concrete. Portions of the timber crib spillway will be removed prior to placement of the concrete in order to maintain the same spillway crest elevation. The concrete would extend upstream of the dam to the top of the sheet pile to create a positive cutoff wall. A cutoff will be created at the existing gate structure with a concrete apron approximately 2.5 feet-thick , placed on the upstream side of the structure and will tie into the existing sheet pile. Voids below the timber crib and gate structure will be filled with a flowable fill or grout. The existing inoperable sluice gates and controls will be replaced as part of Alternative 1.

The current dam abutments are in significant disrepair with several areas of visible settlement and soil loss. The existing dam abutments will be removed and replaced as part of this alternative.

Alternative 1 is shown in **Figures 7 and 8.**

Proposed Alternative 1 will not increase the spillway capacity at the dam. The Spillway Design Flood (SDF) for this alternative is approximately El. 1489.4. The gate structure and surrounding abutments are at approximately El. 1490.0. **This design does not provide the minimum freeboard needed for the dam; therefore this design is not compliant with current NYSDEC Dam Safety Regulations.**

The success of Alternative 1 depends upon the conditions of the existing dam that are largely unknown. Alternative 1 will alleviate seepage issues below the gate structure and timber crib dam and will increase the longevity of the structure, but the inherent unknown condition of the existing structure may reduce the sustainability of the project. By using the existing sheet pile as a positive cutoff wall, this alternative may reduce the overall cost of the project, but the condition of the sheet pile is unknown. If the wall is damaged or not water-tight, seepage will still occur below the dam and gate structure. Additionally, the condition of the internal components of the timber-crib spillway section is unknown. Due to limited accessibility, all inspections have been limited to



NOTES:

1. BASE PLAN PREPARED FROM DRAWING ENTITLED "MOUNTAIN VIEW LAKE DAM SURVEY" PREPARED BY THEW ASSOCIATES DATED FEB. 8, 2018.

2. THIS ALTERNATIVE DOES NOT PROVIDE THE MINIMUM FREEBOARD REQUIRED BY NYSDEC REGULATIONS.

3. SCOPE OF WORK INCLUDES REMOVAL AND REPLACEMENT OF EXISTING GATES AND GROUTING OF VOIDS WITHIN TIMBER CIRB AND BENEATH GATE STRUCTURE.

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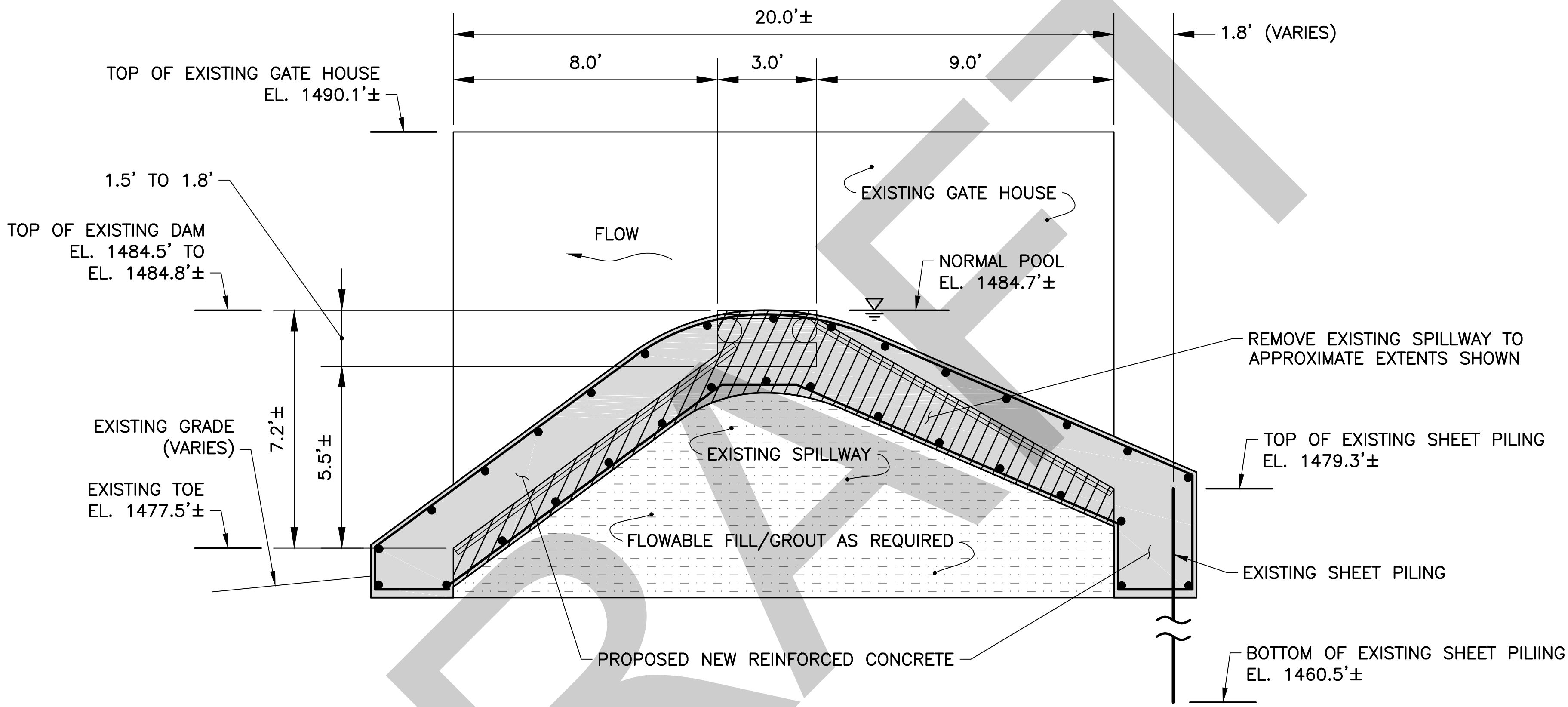
FIGURE 7
ALTERNATIVE 1 LAYOUT

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM



SPILLWAY SECTION
1" = 5'
(LOOKING NORTH)

NOTE:

1. TYPICAL CONCRETE OVERLAY OF 2'–6" MINIMUM

5' 0 5' 10'
SCALE:1"=5'–0"

GOMEZ AND SULLIVAN ENGINEERS Williamsville, NY • Utica, NY • Albany, NY • Henniker, NH www gomezandsullivan com	FIGURE 8 ALTERNATIVE 1 SECTION	TOWN OF BELLMONT, NY MOUNTAIN VIEW LAKE DAM

visual observations from the shore. The stability of the concrete overlay is dependent upon the condition of the existing timber-crib structure. If a section of the structure is missing or in significant disrepair, that section should be removed and replaced to support the concrete section.

12.2 Alternative 2 – Remove and Replace Existing Dam

The second alternative consists of removing the existing dam, including the gate structure, timber-crib spillway and the existing abutments, and constructing a new dam. Based upon the required spillway capacity and space restrictions, two alternatives were developed – Alternative 2A and Alternative 2B. Both alternatives include removing the existing dam. Alternative 2A includes constructing an approximately 110 feet long ogee crested concrete spillway. Alternative 2B includes constructing an approximately 100 feet long labyrinth weir spillway. Alternative 2A and Alternative 2B are shown in **Figures 9 through 12.**

Alternatives will require improvement of the underlying subsurface soils at the dam site. According to the subsurface investigation, the soils below the existing dam structure have a permeability varying between $4.6x10^{-4}$ to $5.7x10^{-4}$ cm/sec. Preliminary structural assessments show that this permeability will likely result in seepage below the dam and increased uplift pressures along the dam based. A soil mixing program is proposed to improve the conditions of the underlying soils and increase the overall stability of the proposed dam for Alternative 2A and 2B. The soil mixing program will consist of a mass soil mixing of the soils up to 30 feet below the base of the proposed dam. The bottom of the improved soil zone will rest on the Sand strata encountered during the recent test boring program.

Further information for Alternative 2A and 2B is provided below.

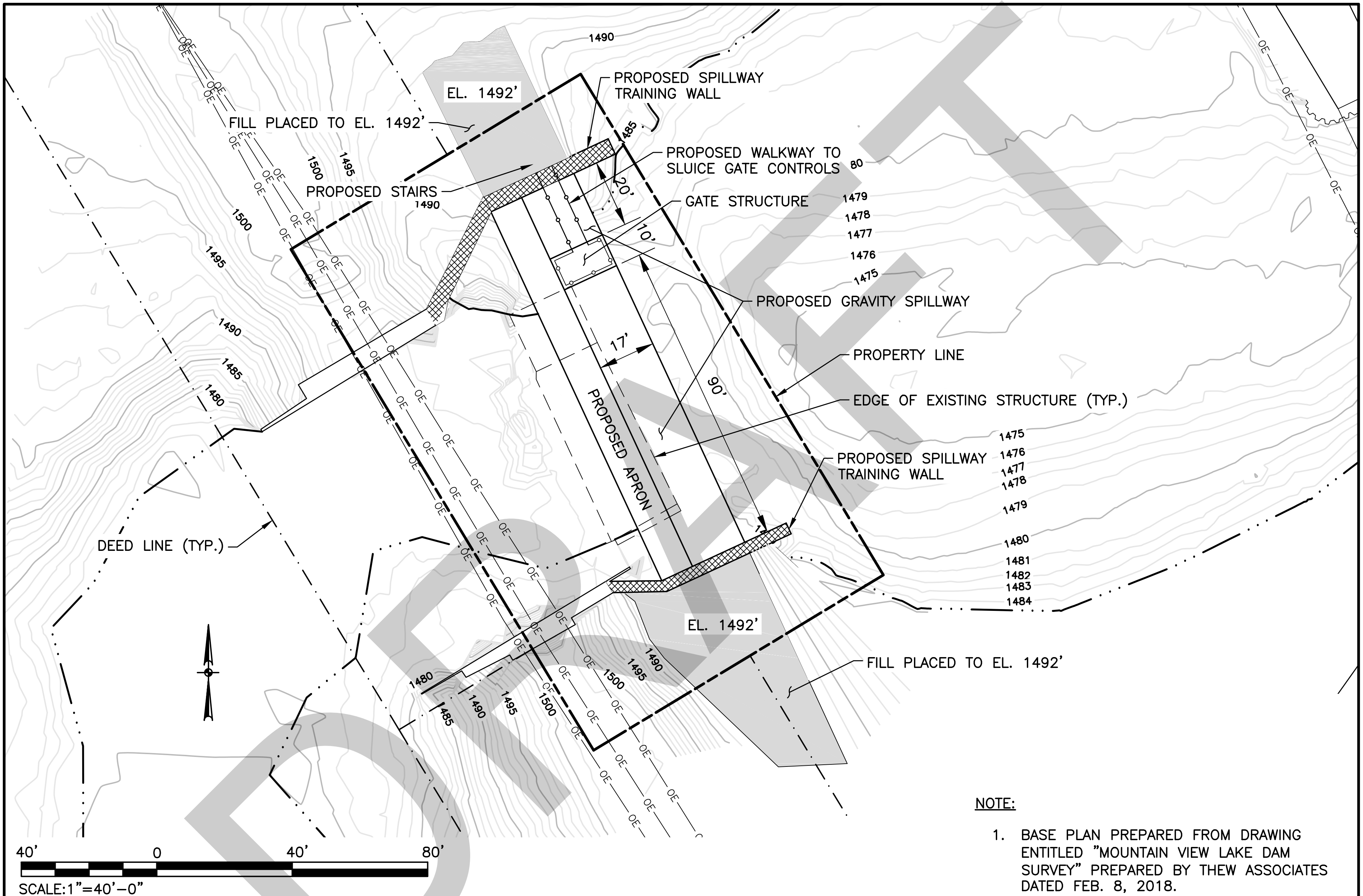
12.2.1 Alternative 2A

This alternative includes construction of an approximately 110 feet long concrete ogee crested spillway, concrete abutments, and gate structure. The crest of the proposed spillway will be at approximately El. 1484.7. A concrete apron will be placed at the toe of the dam and will extend approximately 10 feet downstream. Concrete retaining walls will be constructed at the left and right dam abutments and backfilled to an elevation of El. 1492.0 to allow for at least 2 feet of freeboard during a storm event as required by NYSDEC. The SDF for this spillway configuration for 150% of the 100-year flood event is approximately El. 1490.0

The proposed low-level outlet for Alternative 2A will consist of a 10-foot wide by 20-foot long concrete gate structure. A 4-feet by 4-feet sluice gate will control water discharge through the gate structure. Manual gate controls will be located at the top of the structure. The structure will be placed approximately 20 feet from the right dam abutment and a walkway be constructed over the spillway to provide access to the structure.

Space at the project site is extremely limited. In order to maintain 2 feet of freeboard during a storm event, as required by NYSDEC regulations, the non-overflow sections and abutments should be at El. 1492.0. In order to reach this elevation at the left abutment a permanent easement is required at Tax Parcel 202.4-1-1.

A proposed layout and cross-section of Alternative 2A is shown in **Figures 9 and 10**.



NOTE:

1. BASE PLAN PREPARED FROM DRAWING ENTITLED "MOUNTAIN VIEW LAKE DAM SURVEY" PREPARED BY THEW ASSOCIATES DATED FEB. 8, 2018.

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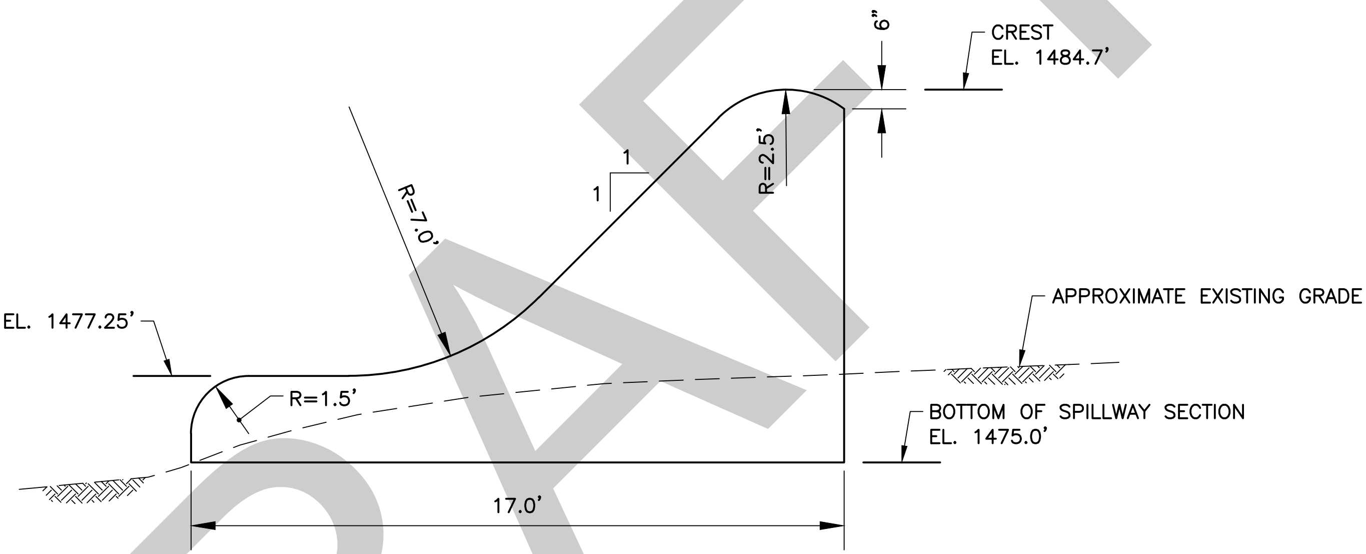
FIGURE 9
ALTERNATIVE 2A (OGEE) LAYOUT

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM



OGEE SPILLWAY SECTION
1" = 5'

SCALE: 1"=5'-0"

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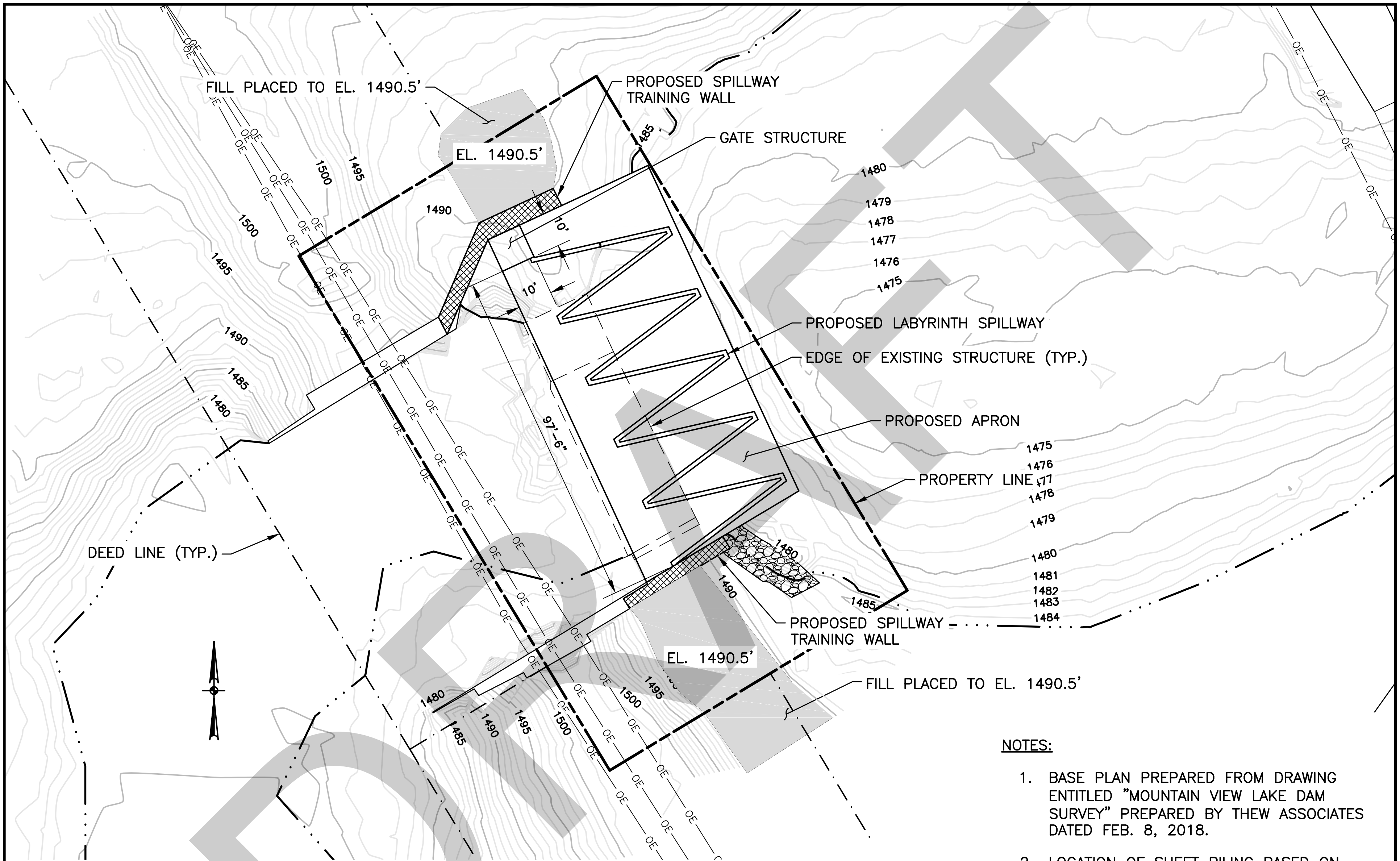
FIGURE 10
ALTERNATIVE 2A (OGEE) SECTION

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM



NOTES:

1. BASE PLAN PREPARED FROM DRAWING ENTITLED "MOUNTAIN VIEW LAKE DAM SURVEY" PREPARED BY THEW ASSOCIATES DATED FEB. 8, 2018.

2. LOCATION OF SHEET PILING BASED ON DRAWING ENTITLED "EXISTING SITE PLAN" BY BLUE MOUNTAIN ENGINEERING, PLC, DATED NOV. 9, 2010.

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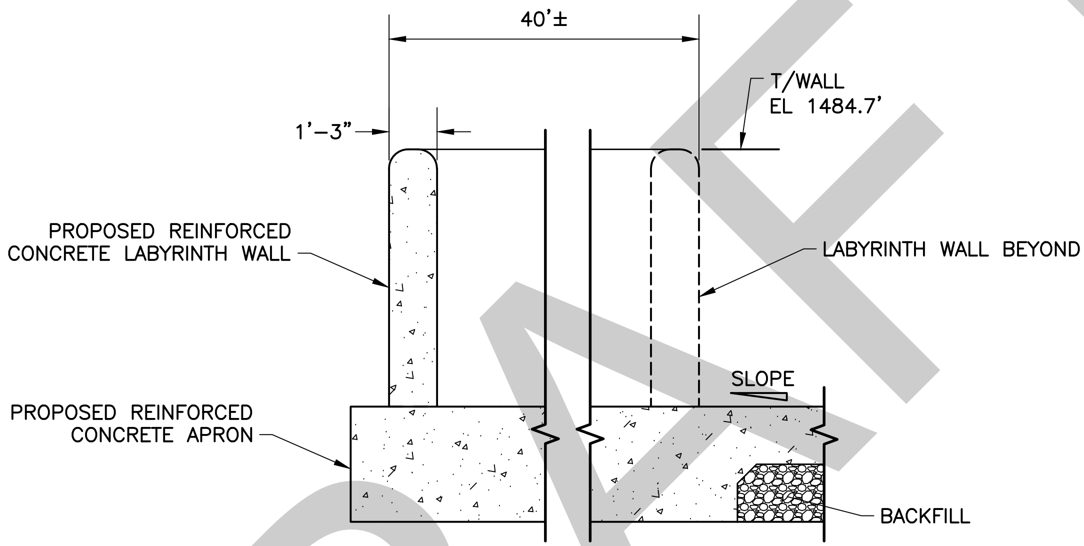
FIGURE 11
ALTERNATIVE 2B (LABYRINTH) LAYOUT

TOWN OF BELLMONT, NY

MOUNTAIN VIEW LAKE DAM



LABYRINTH SPILLWAY SECTION
1" = 5'

5' 0 5' 10'
SCALE:1"=5'-0"

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FIGURE 12
ALTERNATIVE 2B (LABYRINTH) SECTION

TOWN OF BELLMONT, NY
MOUNTAIN VIEW LAKE DAM

12.2.2 Alternative 2B

In order to contain the proposed spillway layout within the existing site property limits, a labyrinth weir alternative was considered. The labyrinth weir design increases the effective length of the spillway in order to provide additional spillway capacity. They are most practical where space constraints may prohibit construction of an ogee weir. Alternative 2B consists of removing the existing spillway and gate structures and constructing a labyrinth spillway approximately 100 feet long and 40 feet wide.

The new concrete gate structure will be constructed adjacent to the right abutment and will consist of a 4 foot by 4 foot sluice gate. Operator controls will be placed on top of the gate structure.

The SDF for Alternative 2B is approximately El. 1488.2 A permanent easement will be required at Tax Parcel 202.4-1-1, similar to Alternative 2A. Additionally, a permanent easement and a temporary easement will be required at tax parcel 202.-1-27, upstream of the project site, in order to construct a cofferdam and water diversion system.

The proposed spillway layout and cross-section for Alternative 2B is provided in **Figures 11 and 12**.

12.2.3 Hydraulic Analysis of Design Alternatives

Per NYSDEC guidelines, the SDF for an existing, large, Hazard Class "A" dam is the 100-year event. The SDF for a new dam of the same Hazard Classification and size is 150% of the 100-year event. A rating curve was developed for each proposed design alternative to estimate the SDF based upon NYSDEC guidelines. Using the rating curve as the outflow under each scenario, the peak discharge and water surface elevation was determined using reservoir routing.

Alternative 1 maintains the SDF elevation for the existing dam conditions as the spillway length and height are unchanging.

For the ogee spillway for Alternative 2A, a nappe profile was developed. Design coefficients were based upon values from Chow. It was assumed that there are no pier or abutment contractions. For Alternative 2A, the spillway length to pass the SDF at a flood elevation of El. 1490.0 is approximately 110 feet.

Several labyrinth spillway configurations were analyzed for Alternative 2B. Due to increased hydraulic efficiency, it was determined that a projected labyrinth spillway would pass the most flow. In sizing the spillway, three ratios were considered to ensure optimum hydraulic efficiency: the cycle width divided by the weir height was maintained between 2 and 4, the weir height divided by the wall thickness was maintained between 6 and 8, and the inside apex width divided by the cycle width was less than 0.08 (Crookston). Based upon this analysis, the SDF for the selected labyrinth spillway configuration is approximately El. 1488.2.

A summary of the SDF elevations for each alternative is presented in **Table 7** below.

Table 7 - Summary of Spillway Design Flood (SDF) Elevations for Design Alternatives

Alternative	**Required Spillway Capacity per NYSDEC Guidelines[1]**	**SDF Elevation for NYSDEC requirements (feet)**
Alternative 1 – Rehabilitation of Existing Dam Structure	100-year flood	El. 1489.4[2]
Alternative 2A	150% of 100-year flood	El. 1490.0
Alternative 2B	150% of 100-year flood	El. 1488.2

Notes:
1. Per NYSDEC requirements, the required spillway capacity for an existing dam is the 100-year flood event and 150% of the 100-year flood for a new dam.
2. The SDF Elevation for Alternative 1 under 150% of the 100-year flood event is approximately El. 1491.3 which will overtop the existing gate structure and dam abutments.

13.0 Opinion of Probable Construction Cost

The following conceptual opinions of probable construction costs, presented in **Table 8**, have been developed for the recommendations and remedial measures noted above. The costs are provided for general information only and actual costs may be somewhat more or less than indicated. The actual cost of the repairs can vary depending on construction methods selected by the contractor.

Table 8 - Opinion of Probable Construction Costs

Alternative	**Opinion of Probable Construction Cost (1)**
Alternative 1 – Rehabilitation of Existing Dam	$1,067,000
Alternative 2A – Construction of Ogee Spillway	$1,505,000
Alternative 2B – Construction of Labyrinth Spillway	$2,064,000

(1) Assumes 2019 Construction

The breakdown of anticipated costs is provided in **Appendix B.**

14.0 Permit Requirements

A number of permits are anticipated to be needed from federal, state and local agencies for implementation of the recommended improvements. It is anticipated that the selected alternatives may require the following permits. This list will be reviewed and revised as required as the design advances.

Federal Permits

- United States Army Corps of Engineers (USACE)
    - Section 404 Clean Water Act Covered under Nationwide Permit

- Environmental Protection Agency (EPA)
    - National Pollutant Discharge Elimination System (NPDES)

State Permits

- NYSDEC
    - Protection of Waters Permit
    - Dam Application Supplement D-2
    - Water Quality Certification under Section 401 of the Clean Water Act
    - Stream Disturbance
    - Incidental Take of Endangered/Threatened Species
    - Excavation and Fill in Navigable Waters
    - Freshwater Wetlands
    - Wild, Scenic, and Recreational Rivers
- New York State Office of General Services (NYSOGS)
    - State Owned Lands Under Water
- New York State Historic Preservation Office (NYSHPO)
    - National Historic Preservation Act Section 106

Regional Permits

- Adirondack Park Agency (APA)
    - Adirondack Park Agency Permit

15.0 Schedule

The current project schedule assumes the design phase of the project will be completed 2 months after the alternative selection by the Town of Bellmont. Potential conflicts and constraints to be managed include obtaining permits as described in Section 14.0. It is expected that the APA permit may be time-intensive but we are optimistic that review can occur in parallel with design and other approvals. The current expected project schedule is listed below:

- Selected Alternative by the Town of Bellmont, NY — March 2018
- 60% Design Completed and Permit Applications Submitted — April 2018
- Final Design Documents and Permit Applications — June 2018
- Permit Agency Review Comments — September 2018
- Bidding/Contract Award — January 2019
- Construction Start — April 2019
- Construction Completion — December 2019

To expedite the project, it is expected that permitting will begin once the 60% design has been accepted by the Town.

16.0 Conclusions

After developing the alternatives described herein, advantages and disadvantages were compared for each design alternative. A summary of the design alternatives is provided in **Table 9** below.

Table 9 – Summary of Design Alternatives

Alternative	Advantage	Disadvantage
Alternative 1 - Rehabilitate Existing Dam	1. Least cost 2. Maintain existing structure 3. Will not encroach outside of Town-owned property.	1. Will not bring the dam into compliance with DEC Dam Safety Regulations and will not prevent flooding due to a 100-year storm event nor 150% of the 100-year storm event. 2. Assumes good condition of the dam and sheet pile. Unknown conditions at the site may reduce sustainability of the project and lead to increases in overall cost.
Alternative 2A – Ogee Spillway	1. Complies with NYSDEC regulations and will prevent flooding around lake for up to 150% of the 100-year flood events. 2. Increased longevity of the dam structure from construction of new spillway, gates and abutments.	1. Approximately 800 square feet of permanent easements may be required from one?/two? property owners, to bring the dam abutments to El. 1492.0.
Alternative 2B – Labyrinth Spillway	1. Complies with NYSDEC regulations. 2. Increased longevity of the dam structure.	1. Permanent and temporary easements will likely be required from one/two property Owners to construct the dam. 2. The labyrinth design is more complex than the ogee crest spillway. This complexity results in higher construction costs and an extended construction schedule.

17.0 Recommendations

After analyzing the existing site conditions, site restrictions, and estimated construction cost and schedule, it is our opinion that Alternative 2A is the preferred alternative. It provides a cost-effective solution with minimal impacts to the surrounding area and is compliant with NYSDEC regulations.

Appendix A. Subsurface Investigation Report

MOUNTAIN VIEW LAKE DAM
NYS ID NO. 182-0276

Mountain View Lake Dam Rehabilitation
Subsurface Investigation Report

March 2, 2018

Project Operated by:

Town of Bellmont
P.O Box 35
Brainardsville, NY 12915

Prepared by:

GOMEZ AND SULLIVAN ENGINEERS

288 Genesee Street
Utica, NY 13502

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Appendices

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1.0 Report Limitations

The analyses and recommendations contained in this report are based on the data obtained from the borings performed for this project. This testing indicates subsurface conditions only at the specific locations and times, and only to the depths explored. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about the overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. These results do not reflect subsurface variations that may exist away from the boring locations and/or at depths below the boring termination depths. Subsurface conditions and water levels at other locations may differ from conditions occurring at the tested locations. In addition, it should be understood that the passage of time may result in a change in the conditions at the tested locations. If variations in subsurface conditions from those described in this report are observed during construction, the recommendations in this report must be re-evaluated. The geotechnical scope of services for this project did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air, on or below or around this site.

2.0 Introduction

This report summarizes the subsurface field exploration and laboratory programs, provides a discussion of the exploration program results, presents select soil and foundation parameters, and provides geotechnical engineering recommendations for the Mountain View Lake Dam Project located in Bellmont, New York.

Elevations noted herein are in feet and referenced to the United States Geological Survey (USGS). The vertical datum is based upon historic drawings which are referenced to a USGS disk on the southern bridge abutment, USC&GS No. C-29, 1931.

3.0 Existing Conditions

The Mountain View Lake Dam is located on the Salmon River in Bellmont, NY. It impounds Mountain View Lake which is primarily used for recreation. The dam was constructed in the late 1800s and was rehabilitated in 1979, 1996, and 2010.

The existing dam consists of a timber-crib spillway that is approximately 57 feet wide and a concrete gate structure, that is approximately 18 feet wide. The spillway section is approximately 8 to 9 feet high, with a crest elevation of approximately El. 1484.7. Discharge through the gate structure is regulated by two 7.5-foot-wide by 6.0-foot-high sluice gates with manual operators. The gate inverts are at El. 1478.0 while the top of the gate structure is at El. 1490.1. The sluice gates are closed and it is our understanding that they are not operational. Sheet pile is located on the upstream side of the dam, extending from approximately El. 1478.0 to El. 1460.7.

Significant seepage has been reported below the gate structure and timber crib over-flow section. According to reports, the gate structure may be founded on timber foundation.

4.0 Proposed Conditions

The proposed construction, as understood at the time of this report consists of the following:

- Construction and eventual removal of a temporary cofferdam upstream and downstream of the existing dam structure and temporary water diversion system;
- Removal of the existing timber-crib dam and concrete gate structure; and
- Construction of a new concrete gravity dam upstream of the existing dam site.

It is anticipated that construction of the proposed dam will consist of the following:

- An approximately 77 feet long concrete overflow section;
- Grout curtain (or other seepage cut-off) placed below the upstream side of the dam; and
- Concrete abutment sections that tie into natural ground.

Alternatively, the existing spillway and gate structure may be rehabilitated. Rehabilitation will consist of:

- Construction and eventual removal of a temporary cofferdam upstream and downstream of the existing dam structure and temporary water diversion system;
- Place approximately two feet of reinforced concrete over the existing timber crib;
- Place a reinforced concrete cap, integral with the crib concrete cover, over the length of the existing sheet pile cutoff wall;
- Grout voids in the gate structure foundation to provided adequate bearing and to mitigate observed seepage.

The alternative approaches for rehabilitation of Mountain View Dam will be evaluated in a Feasibility Study by Gomez and Sullivan.

5.0 Purpose and Scope

The purpose of this study was to investigate the subsurface conditions at the Mountain View Lake Dam. Specifically, the scope of work included the following:

- Reviewing available existing subsurface information;
- Conducting a subsurface investigation program consisting of 4 test borings to evaluate subsurface conditions and obtain soils for laboratory testing;

- Conducting geotechnical laboratory tests on select soil samples to assist with classification of soils encountered and to estimate the engineering properties of the soils;

- Developing geotechnical engineering recommendations for the design and construction of the proposed dam structure; and

- Preparing this report presenting the data collected as part of the investigation.

6.0 Previous Subsurface Exploration Program

A previous subsurface exploration program was performed by F. A. Dente Engineering, P.C. in 1995. Four test borings were drilled as part of the previous subsurface exploration program at the Mountain View Lake Dam between May 3 and May 5, 1995. The previous test borings B-1 and B-4 were drilled on land and were drilled using a truck mounted rotary drill rig and hollow stem auger casing advanced to 27 feet below ground surface (bgs). Previous test borings B-2 and B-3 were drilled over water using a portable tripod drilling frame set up on a pontoon boat. Borings B-2 and B-3 were terminated at 27 and 23.3 feet bgs, respectively.

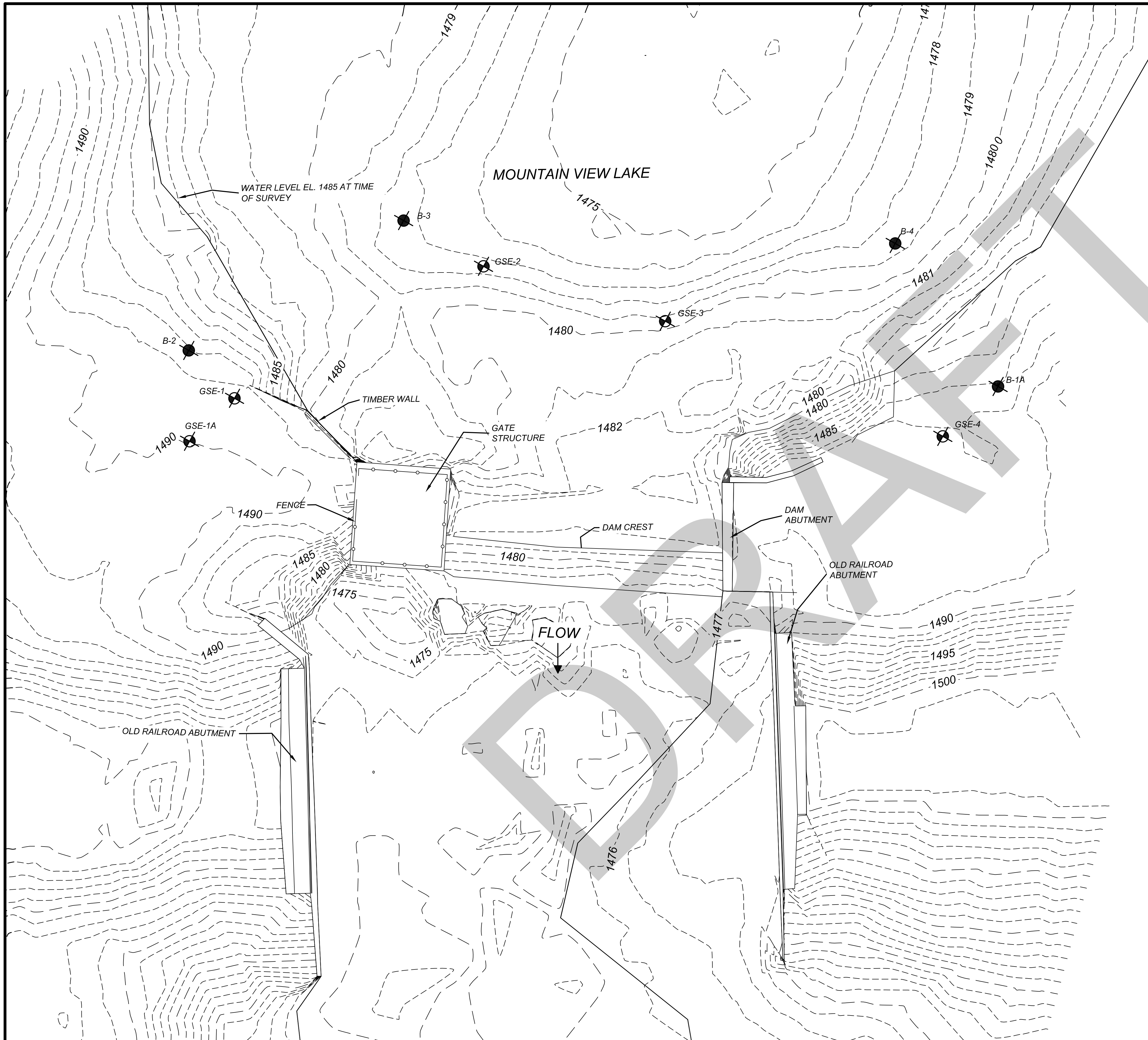
The approximate locations of the previous test borings are shown on **Figure 1**. The previous test boring logs are included in **Attachment A**.

7.0 Recent Subsurface Exploration Program

A recent subsurface exploration was performed to investigate the subsurface conditions at the Mountain View Lake Dam. The recent drilling program consisted of 5 test borings GSE-1 through GSE-4. The recent borings were drilled by Atlantic Testing Laboratories of Canton, New York between December 7, 2017 and January 10, 2018.

The recent test borings were drilled using drive and wash drilling techniques with 4-inch diameter casing. The recent test borings were drilled to depths between 12 and 50 feet bgs.

Split spoon sampling was conducted in soils continuously from ground surface or mudline (for borings drilled over water) to approximately 50 feet bgs at the recent test borings, excluding test boring GSE-1 which terminated at approximately 12 feet bgs. Sampling was conducted in general accordance with ASTM D-1586. The number of blows required to drive the sampler each 6-inch increment was recorded and the Standard Penetration Test (SPT) resistance (N-Value) was calculated as the sum of the blows over the middle 12 inches of penetration. Split spoon refusal was encountered at all test boring locations. Split spoon refusal was defined as less than 6-inches of penetration resulting from 50 blows from a 140-pound hammer or less than 12-inches of penetration resulting from 100 blows from a 140-pound hammer.



LEGEND:

B-1 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS DRILLED BY F.A. DENTE ENGINEERING, P.C. FROM MAY 3 TO MAY 5, 1995.

GSE-1 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS DRILLED BY ATLANTIC TESTING LABORATORIES OF CANTON, NEW YORK, FROM DECEMBER 7, 2017 TO JANUARY 10, 2018.

LEGEND:

1. BASE PLAN PREPARED FROM A DRAWING ENTITLED "MOUNTAIN VIEW LAKE DAM SURVEY" PREPARED BY THEW ASSOCIATES, SCALE 1"=20'.

2. TEST BORINGS GSE-1 THROUGH GSE-4 WERE OBSERVED AND LOGGED ON A FULL TIME BASIS BY A GOMEZ AND SULLIVAN ENGINEER. THE TEST BORINGS WERE LOCATED IN THE FIELD BY TAPING AND LINE-OF-SITE FROM EXISTING SITE FEATURES.

20' 0 20' 40'

SCALE: 1" = 20'

MOUNTAIN VIEW LAKE DAM
BORING LOCATION PLAN

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GSE PROJECT NO.: 1937	
SCALE: 1" = 20'	FIGURE 1
DATE: 1/31/2018	

A GSE representative visually classified the soil samples recovered in the field in general accordance with the Burmister classification system. Representative soil samples from each split spoon were collected and stored in jars for subsequent review and geotechnical laboratory testing.

When possible, groundwater levels at the test boring locations were estimated from the condition of the samples obtained and by observed water levels within the boreholes at the time of drilling.

Recent test borings GSE-2 and GSE-3 were backfilled upon completion with soil cuttings. Recent test borings GSE-1 and GSE-4 were backfilled upon completion with water-cement grout. The test boring locations were located in the field using measurements from existing features. The recent test boring locations are shown on **Figure 1**.

Test boring locations are included in **Appendix B**.

8.0 Geotechnical Laboratory Testing

Geotechnical laboratory tests were performed on select split spoon samples obtained from the recent test borings. All geotechnical laboratory tests were performed at the ATL laboratory in Canton, New York. The following laboratory tests were conducted:

- Nine grain size analysis tests were performed in accordance with ASTM D 422.
- Five grain size plus hydrometer tests were performed in accordance with ASTM D 422.
- Seven Atterberg Limit tests were performed in accordance with ASTM D 4318.
- Fifteen Moisture Content tests were performed in accordance with ASTM D 2219.

A summary of the geotechnical laboratory test results is presented in **Table 1**. The laboratory test results are included in **Attachment C**.

9.0 Subsurface Conditions

In general, the subsurface conditions encountered during the recent and previous test boring programs consisted of topsoil, fill, sand and silt, sand and gravel, sand, and silt & clay.

9.1 Topsoil

Topsoil was encountered at two of the recent test boring locations (GSE-1 and GSE-4). At the recent test boring locations, this layer ranged between 0.1 and 0.3 feet thick.

9.2 Fill

Fill was encountered at three of the recent test boring locations (GSE-1, GSE-2 and GSE-4). The fill layer generally ranged from 12 to 16 feet thick at the recent test boring locations where encountered. A one recent test boring location, GSE-1, the fill strata was not fully penetrated and

Table 1: Summary of Geotechnical Lab Test Data

Boring No.	Sample No.	Depth (ft bgs)	Strata	Grain Size [2]							Atterberg Limits [3]			Moisture Content (%) [4]
				Gravel %		*Sand %*			*Fines (%)*					
				Coarse	*Fine*	*Coarse*	*Medium*	*Fine*	*Silt*	*Clay*	*LL (%)*	*PL (%)*	*PI (%)*	
GSE-1A	S-6	18-20	Sand and silt	0	0	0	4	34	62		--	--	--	19.9
	S-11	28-30	Sand and silt	0	0	0	0	9	49	42	35	23	12	22.5
	S-16	38-40	Sand and silt	0	0	0	3	25	55	17	NP	NP	NP	19.8
	S-20	46-48	Sand and gravel	7	15	4	7	42	25		--	--	--	15.6
GSE-2	S-6	10-12	Sand and silt	0	0	1	3	11	51	34	35	22	13	26.1
	S-8	14-16	Sand and silt	0	0	1	11	19	52	17	--	--	--	22.3
	S-11	22-24	Sand and gravel	3	9	5	34	43	6		--	--	--	12.5
	S-18	36-38	Sand	0	0	0	0	50	50		--	--	--	24.7
GSE-3	S-6	12-14	Silt & clay	--	--	--	--	--	--	--	21	13	8	26.6
	S-9	18-20	Silt & clay	0	3	1	6	23	41	26	25	15	10	17.1
	S-17	38-40	Sand	3	2	2	6	52	35		--	--	--	18.1
GSE-4	S-8	14-16	Sand and silt	0	0	0	2	16	49	33	NP	NP	NP	22.8
	S-13	24-26	Sand and silt	0	0	0	4	25	61	10	--	--	--	18.8
	S-18	34-36	Sand and silt	0	1	1	2	29	48	19	29	21	8	11.1
	S-22	42-44	Sand	0	0	0	0	79	19	2	--	--	--	21.9

Notes:
1. Grain size analysis tests were performed in accordance with ASTM D 422.
2. Atterberg limits were performed in accordance with ASTM D 4318.
3. Moisture content tests were performed in accordance with ASTM D 2216.
4. -- indicates lab test was not performed.

Abbreviations

ft	Feet
bgs	Below ground surface
LL	Liquid limit
PL	Plastic limit
PI	Plasticity index
NP	Not plastic

is greater than 12 feet thick. The fill layer typically consisted of brown to dark gray, very loose to medium dense, fine to coarse SAND with varying amounts of fine to coarse GRAVEL, trace to little silt. Wood pieces were encountered within the fill strata at test boring location GSE-1. It is assumed the wood pieces are from a remnant of the old timber crib dam structure. SPT N-values in the fill layer ranged from 1 to 47 blows per foot (bpf) with an average of 14 bpf.

9.3 Silt and Sand

A silt and sand layer was encountered at all the recent test boring locations (excluding test boring location GSE-1). The silt and sand, where fully penetrated, ranged from approximately 4 to 29 feet thick. At test boring location GSE-4, the silt and sand layer was separated by an approximately 10 feet thick sand layer; the lower silt and sand layer was not fully penetrated as it was greater than 4 feet thick. Where primarily cohesive, the silt and sand strata generally consisted of medium stiff to hard, SILT to Clayey SILT to CLAY & SILT with varying amounts of fine to coarse sand and gravel. Where primarily cohesionless, the silt and sand strata generally consisted of loose to dense fine to coarse SAND with varying amounts of silt and fine to coarse gravel. The SPT N-values in the silt and sand layer ranged from about 5 to 75 bpf with an average of about 28 bpf.

9.4 Sand and Gravel

Sand and gravel was encountered at three of the recent test boring locations (GSE-1A, GSE-2, and GSE-3). The sand and gravel strata ranged from approximately 7 to 11 feet thick where fully penetrated. The sand and gravel layer was not fully penetrated at test boring location GSE-1A and was greater than approximately 5 feet thick. At test boring locations GSE-2 the sand and gravel layer was split into an upper and lower layer by an approximately 11 feet thick silt and sand layer. At test boring location GSE-3, the sand and gravel layer was split into an upper and lower layer by and approximately 9 feet thick silt & clay layer. The sand and gravel layer typically consisted of very dense, brown, fine to coarse SAND with varying amounts of fine to coarse GRAVEL, trace to some silt. The SPT N-values in the sand and gravel layer ranged from approximately weight of hammer (WOH) to 78 bpf with an average of 28 bpf.

9.5 Sand

Sand was encountered at all the recent test boring locations except for GSE-1. The sand layer ranged from approximately 10 to 22 feet thick where fully penetrated and was greater than 20 feet thick where not fully penetrated. The sand layer generally consisted of medium dense to very dense, brown, fine to medium SAND, little to some silt, trace fine to coarse gravel. The SPT N-value in the sand layer ranged from 9 bpf to greater than 111 bpf with an average of 58 bpf.

9.6 Silt & Clay

A silt & clay layer was encountered at recent test boring location GSE-3 and was approximately 9 feet thick. The silt & clay layer generally consisted of hard, SILT & CLAY, little to some fine to medium sand, trace to little fine to coarse gravel. The SPT N-values in the silt & clay layer ranged from approximately 32 bpf to 99 bpf with an average of 67 bpf.

A summary of subsurface conditions encountered during the recent and previous test boring programs is included in **Table 2**.

Table 2: Summary of Subsurface Exploration

Boring No.	Approximate Ground Surface Elevation[1,2]	Exploration Depth (ft)	Stratum Thickness						Depth to Groundwater (ft)[3]	Approximate Groundwater Elevation
			Topsoil	*Fill*	*Silt and Sand*	*Sand and Gravel*	*Silt & Clay*	*Sand*		
Test Borings by F.A. Dente Engineering, 1995										
B-1	NR	3.0	0.3	2.7	--	--	--	--	NR	NR
B-1A	1487.1	27.0	0.5	4.5	22.0	--	--	--	NR	NR
B-2	1488.2	27.0	--	--	21.5	5.5	--	--	NR	NR
B-3	1477.5	23.3	--	--	--	5.2/4.0[4]	4.0/3.3[5]	--	NR	NR
B-4	1478.6	19.5	--	--	7.5	7.0	--	--	NR	NR
Test Borings by Gomez and Sullivan, 2017-2018										
GSE-1	1489.1	12.0	0.1	11.9	--	--	--	--	8.5	1480.6
GSE-1A	1489.9	50.0	--	16.0	29.0	>5.0	--	--	22.8	1467.1
GSE-2	1476.8	50.0	--	--	11.0	10.0/7.0[6]	--	>22.0	NA[7]	NA
GSE-3	1479.5	50.0	--	--	--	11.0/10.0[4]	9.0	>20.0	NA[7]	NA
GSE-4	1488.1	50.0	0.3	11.7	24.0/>4.0	--	--	10.0	3.8	1484.3

Notes:
1. Elevations are based off the USGS vertical datum.
2. Ground surface for 1995 borings estimated based upon recent survey.
3. Groundwater levels were measured at the completion of drilling and may not represent static groundwater levels.
4. Sand and gravel layer separated by silt and clay layer. ##/## indicate strata thicknesses above and below silt and clay layer.
5. Silt & clay layer separated by sand and gravel layer. ##/## indicate strata thicknesses above and below sand and gravel layer.
6. Sand and gravel layer separated by silt & clay layer. ##/## indicate strata thicknesses above and below silt & clay layer.
7. Test borings B-2 and B-3 were drilled over water on Mountain View Lake

Abbreviations

ft	Feet
bgs	Below ground surface
--	Indicates stratum not encountered
>	Indicates stratum not fully penetrated
NR	Not recorded

10.0 Groundwater Conditions

Groundwater levels were measured at each test boring at the conclusion of drilling. All measurements were taken from the ground surface using an electronic water level indicator. The recorded groundwater levels ranged between approximately 3.8 to 22.8 feet below ground surface (El. 1467.1 to El. 1484.3) at the time of the recent subsurface investigation. A summary of groundwater levels measured during the drilling program is presented in **Table 2**.

11.0 Permeability Tests

In-situ permeability tests were performed at recent test boring locations GSE-1A and GSE-4. Falling head permeability tests were performed in accordance with the United States Department of the Navy, Naval Facilities Engineering Command (1982) (NAVFAC). The falling head permeability tests were performed using a cased hole with an uncased length of at least 12 inches over the test interval. The casing was filled with clean water to the top of the casing. The depth to the water level from the top of the casing was recorded at 1-minute intervals for the first 5 minutes and then at 5-minute intervals up to 15 minutes. Each permeability test was conducted twice.

A summary of the permeability tests is presented in **Table 3**. A log of the permeability tests is included in **Appendix D**.

12.0 Variation in Subsurface Conditions

The general subsurface conditions presented herein are based on soil and groundwater conditions observed at the test boring locations at the time of drilling. Subsurface conditions may vary between test boring locations. If conditions are found to be different than assumed, recommendations contained in this memorandum should be reevaluated by GSE and confirmed in writing.

Water levels measured in the test borings should not necessarily be considered to represent stabilized groundwater levels. Groundwater levels are expected to fluctuate with rainfall, time, season, temperature, climate, lake levels, and other factors. Further, the addition of drilling fluids into the borehole during drilling affects water level measurements made at the conclusion of drilling. Therefore, actual conditions at the time of construction may be different from those observed at the time of the explorations.

Table 3: Summary of Permeability Test Results

Boring No.	Depth of Test (ft bgs)	Strata	Permeability (cm/s)	Depth to Groundwater (ft bgs)
GSE-1A	30	Sand and Silt	5.67E-04	22.8
GSE-1A	40	Sand and Silt	4.60E-04	22.8
GSE-4	26	Sand and Silt	5.29E-04	3.8
GSE-4	36	Sand	7.15E-03	3.8

Note: 1. Permeability estimated via variable head field tests performed in accordance with Unites States Department of the Navy, Naval Facilities Engineering Command (1982)

Abbreviations

ft feet

bgs below ground surface

cm/s centimeters per second

13.0 Geotechnical Engineering Evaluations and Foundation Design Recommendations

13.1 General

Geotechnical engineering evaluations and recommendations have been made as they relate to the rehabilitation and/or replacement of the existing Mountain View Lake Dam in Bellmont, New York. In general, these evaluations have been made based on the results of the subsurface investigation and geotechnical laboratory testing program conducted for this study, published correlations with engineering soil properties and the design requirements of the New York State Building Code/2010 (Code). In addition, recommended design criteria are based on performance tolerances, such as allowable settlement as understood to relate to similar structures.

13.2 Geotechnical Design Recommendations

13.2.1 Foundation Design

The proposed dam structures may be supported on shallow or mat foundations founded on suitable bearing soils. Suitable bearing soils include the stiff to hard silt and sand layers. The subgrade should be protected and prepared in accordance with the recommendations provided below.

Suitable bearing soils, at the dam/spillway structure, are anticipated between 15 and 20 feet below ground surface. If unsuitable soils are encountered at the subgrade level, additional over-excavation below the proposed subgrade level may be required and existing soil replaced with compacted structural fill or a flowable fill. Unsuitable bearing soils include the topsoil, fill, or any other soft, loose, organic, or disturbed soils present at the foundation subgrade level.

Unsuitable soils may be improved/stabilized using a shallow soil mix (SSM) improvement technique. SSM in-situ soil treatment is used to strengthen soft soil formations, and decrease permeability of soil up to 35 feet below ground surface. SSM has the significant advantage of treating soils without excavation, dewatering, or shoring.

The foundations for the proposed structures, prepared and protected as described herein, may be designed for a maximum allowable bearing pressure of 2.0 tons per square foot (tsf) where the foundation bears on the hard sand and silt layer. Where a structure is founded on structural fill, the fill should extend to at least two feet beyond the edge of the foundation, then outward and downward at a slope of one horizontal to one vertical (1H:1V). Structural fill should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557.

Prior to placement of footings, the foundation subgrade should be prepared, protected, and verified in accordance with the recommendations provided herein.

13.2.2 Estimated Soil Properties

Based upon the subsurface investigation, laboratory testing, and established correlations between SPT N-values and soil parameters, soil parameters such as friction angle, presumptive allowable bearing capacity, cohesion, and permeability were estimated. The following soil parameters were estimated for the soil conditions encountered at the site.

Soil Strata	Allowable Bearing Capacity (psf)	Friction Angle (degrees)	Cohesion (psf)	Permeability (cm/sec)
Fill	500	26	0	NA
Sand and Gravel	6,000	29	0	3E-03
Silt and Sand	4,000	30	0	7E-04
Silt and Clay	4,000	30	0	7E-04
Sand	4,000	32	0	4E-03

13.2.3 Resistance to Unbalanced Lateral Loads

Unbalanced lateral loads should be designed to be resisted by friction at the base of the foundation. For purposes of design, a coefficient of friction of 0.5 should be used for the proposed structures. It is expected that the available friction will be sufficient to resist all unbalanced lateral loads. However, should lateral loads exceed the friction available, the surplus loads may be resisted by passive pressures on the foundations, provided the walls/beams are appropriately designed for the pressures. A passive pressure resistance of up to a maximum equivalent fluid pressure of 150 pcf may be assumed provided the foundations are backfilled with structural fill compacted to a density of at least 95 percent of the maximum dry density as determined by laboratory test ASTM D1557. The resistance from the upper 2 feet of soil should be neglected due to surface effects and potential for disturbance from frost action and other factors. Frictional resistance should be assumed to be mobilized first and to its full capacity before any passive pressure is developed.

13.2.4 Soil Permeability/Seepage Control

To increase the bearing capacity and decrease the permeability of the underlying soils, it is recommended that unsuitable soils underlying the proposed structures be improved using a shallow soil mix (SSM) improvement technique. SSM in-situ soil treatment is used to strengthen soft soil formations, and decrease permeability of soil up to 35 feet below ground surface. SSM has the significant advantage of treating soils without excavation, dewatering, or shoring.

14.0 Construction Considerations

14.1 Excavation

We anticipate that foundation excavations can be made using a combination of conventional earthmoving equipment. Boulders of variable dimensions are anticipated up to 11 feet below ground surface and may require rock and boulder excavation. Bedrock was not encountered during either test boring program and bedrock excavation is not anticipated.

Where open excavations are feasible, the side slopes should be design and sloped in accordance with OSHA regulations.

14.2 Excavation Support Systems

Excavations may require the use of excavation support systems to limit excavation quantities, assist in the control of groundwater inflows into the excavation and to protect adjacent existing facilities. The selection and type of excavation support system should be performed by the Contractor. The design of the excavation support system should be performed in conjunction with the design of the dewatering systems. The Contractor should be required to retain a professional engineer registered in the State of New York to design the excavation support systems.

Excavation support systems that are installed within the zone of influence of existing structures or new structures should be left in place. The zone of influence is defined as a line extending at least two (2) feet beyond the edge of the foundation of any structure, then outward and downward at a slope of 1H:1V. Any excavation support members left in place should be cut off at least fine (5) feet below the adjacent finished grade.

The use of sheeting for the support of excavation may not be feasible due to the presence of cobbles and boulders.

14.3 Support of Excavation Monitoring

Monitoring points shall be installed on the temporary excavation support system. Monitoring points should be placed on top of the temporary excavation support walls at a maximum spacing of 25 feet and should monitor lateral and vertical movement. Baseline elevations should be measured prior to the start of excavation. It may be necessary to install monitoring points on the inside face of the temporary excavation support walls at the excavation subgrade level to monitor lateral and vertical deflections. The monitoring points should be surveyed daily during the excavation and until backfilling begins. The monitoring points should be surveyed twice weekly until backfilling is complete.

If over 1 inch of movement of the wall occurs, the Contractor shall adjust their methods of work. If over 2 inches of movement of the wall occurs, the Contractor shall stop work, stabilize the excavation, and revise the method of work as necessary to prevent additional movement.

14.4 Dewatering

It is anticipated that a dewatering system will be required during construction. The Contractor will be responsible for designing and implementing a dewatering system that maintains a dry, undisturbed and stable subgrade. To avoid disturbance to the subgrade, the groundwater level should be maintained at least 2 ft below the subgrade level during the entire period of the excavation. The Contractor should be prepared to pre-drain the soil prior to excavation below the groundwater table using a system of sumps, wells, and/or well points designed by a professional engineer registered in the State of New York. The dewatering system should be designed and installed in coordination with the excavation support and cofferdam system.

The Contractor must be prepared to operate the dewatering system continuously, as required to complete the work and avoid flotation or uplift prior to completion of the new work. During periods where failure of the system would adversely impact the work completed, the contractor should be able to provide a back-up system to ensure continuous operation when necessary.

The Contractor must design the dewatering system to not adversely impact adjacent structures, utilities, or other site features. All dewatering, handling and disposal of pumped water and any special testing should be conducted in accordance with local regulations, permits and specifications.

If wet weather is encountered during construction, the Contractor should take care to schedule excavations to limit the duration of open cuts, slope the bottoms of excavations to facilitate drainage, and provide berms to limit runoff into the excavations. Additionally, all backfill materials should be stockpiled in such a manner that promotes runoff and limits saturation of the material.

14.5 Preparation and Protection of Foundation Subgrades

Care should be taken to avoid excess traffic over excavated subgrades prior to placement of structural fill or concrete foundations. Final excavation should be made using a smooth-edged bucket where possible. Any unsuitable material at the subgrade level should be removed and replaced with compacted structural fill. The exposed subgrade should be protected against precipitation and the subgrade should not be allowed to freeze.

Where structure foundation subgrades are in granular materials, soil subgrades should be proof rolled with at least four (4) passes of a vibratory compactor prior to placement of fill or concrete foundations.

14.6 Protection of Existing Structures

14.6.1 Preconstruction Survey

Prior to demolition of the existing dam and construction of the proposed dam, a preconstruction survey should be conducted to survey adjacent structures. The survey should be performed within 100 feet of the work. The survey shall include descriptions and locations of cracks, damage, or other defects on existing structures. A report shall be submitted to the Owner prior to the start of the work that includes information obtained from the preconstruction survey.

14.6.2 Settlement Monitoring

Settlement Monitoring Points (SMPs) shall be installed on all existing structures located within 50 feet of all excavations. The SMPs shall be monitored daily during the work, including installation of excavation supports, dewatering, demolition, and construction.

If settlement exceeds 0.25 inch, the contractor shall alter their method of work to prevent further settlement. If settlement exceeds 0.5 inch the Contractor shall stop all construction activities, stabilize the structure and revise their method of work to prevent additional settlement.

15.0 Backfill Materials

15.1 Screened Gravel

Screened gravel should be hard, durable, rounded or subangular particles of proper size and gradation and should be free from sand, loam, clay, excess fines, and other deleterious materials. The material should conform to the following gradation requirements:

Sieve Size	Percent Passing
5/8 inch	100
1/2 inch	40-100
3/8 inch	15-45
No. 10	0-5

15.2 Structural Fill

Granular fill used as structural fill below mat foundations should consist of a mineral soil free of organic material, loam, debris, frozen soil, or other deleterious material which may be compressible or which cannot be properly compacted. Structural fill should conform to the following gradation requirements:

Sieve Size	Percent Passing
3-inch	100
No. 4	20-70
No. 40	5-35
No. 200	0-10

Structural fill should be placed in lifts no thicker than 8 inches and compacted with suitable compaction equipment to at least 95 percent of its maximum dry density as calculated according to ASTM D1557. Lift thicknesses should be reduced to 4 inches in confined areas accessible only to hand-guided compaction equipment.

15.3 Common Fill

Common fill, used as backfill around structures where passive pressure is not relied on, in parking areas, and landscaped areas should consist of granular soils free from organic material, debris, frozen soil, or other deleterious material. It should contain cobbles no larger than 6 inches and have no more than 30 percent of material passing the No. 200 sieve.

Common fill should be placed in lifts not to exceed 12 inches, as placed, and compacted with suitable compaction equipment to at least 92 percent of maximum dry density as determined by ASTM D1557. Lift thickness should be reduced to 6 inches in confined areas accessible only to hand-guided compaction equipment.

15.4 Select Common Fill

Select common fill should be the same as common fill except that it should not contain gravel larger than 2 inches. Select common fill should consist of mineral soil, free from organic material, loam, debris, frozen soil, or other deleterious material which may be compressible or which cannot be compacted properly.

15.5 Construction Monitoring

It may be advantageous for a qualified geotechnical engineer or an experienced resident engineer to be present during construction to confirm that the Contractor complies with the recommendations described herein.

16.0 Conclusion

These preliminary recommendations have been prepared for the Mountain View Lake Dam project as understood at this time and described in this report. These recommendations have been prepared in accordance with generally accepted engineering practices. No other warranty, expressed or implied is made. In the event changes are made to the design or scope, conclusions and recommendations made in this report should not be considered valid unless verified in writing.

Appendix A. Previous Test Boring Logs

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F. A. DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-1	
PROJECT: Mountain View Lake Dam	DATE START: 5/3/95	FINISH: 5/3/95

LOCATION: Mountain View Lake, N.Y.	METHODS: HSAC and Soil Sampling per
CLIENT: C.J. Barrow Engineering, P.C.	ASTM D-1586 Procedures
DRILLER: Tri-State Drilling	SURFACE ELEVATION:
DRILL TYPE: Mobile B-50	INSPECTION: S.M.B.

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	SOD & TOPSOIL ~ 3" ±
	1	2	2				Brown fine to coarse SAND and GRAVEL,
				9	14		little Silt
							(Moist , Firm)
							Auger Refusal on Boulder at 3.0 feet
5'							End of Boring
10'							
15'							
20'							
25'							
30'							

F. A. DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-1A		
PROJECT: Mountain View Lake Dam	DATE	START: 5/3/95	FINSH: 5/3/95
LOCATION: Mountain View Lake, N.Y.	METHODS: HSAC and Soil Sampling per		
CLIENT: C.J. Barrow Engineering, P.C.	ASTM D-1586 Procedures		
DRILLER: Tri-State Drilling	SURFACE ELEVATION:		
DRILL TYPE: Mobile B-50	INSPECTION: S.M.B.		

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	TOPSOIL
							FILL: Brown F-C SAND, GRAVEL COBBLES,
							BOULDERS
5'	1	1	5				
				5	6	10	Black SAND, little Silt
							grades - Brown SILT, little fine Sand
	2	7	6				grades - Wet
10'				5	5	11	
	3	3	5				
				6	6	11	
							(Moist to Wet, Loose to Firm)
							Grey SILT, little Clay
15'							
	4	2	2				SAND SEAM noted
				3	4	5	
20'							
	5	3	6				
				5	6	11	
							(Wet to Moist, Loose to Firm
							Brown fine SAND and SILT, trace Clay
25'							
	6	2	3				
				5	7	8	(Wet, Loose)
							End of Boring at 27.0 feet
30'							

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F. A. DENTE ENGINEERING, P.C.

SUBSURFACE LOG B-2

PROJECT: Mountain View Lake Dam	**DATE** START: 5/3/95 FINISH 5/3/95
LOCATION: Mountain View Lake, N.Y.	**METHODS:** HSAC and Soil Sampling per
CLIENT: C.J. Barrow Engineering, P.C.	ASTM D-1586 Procedures
DRILLER: Tri-State Drilling	**SURFACE ELEVATION:**
DRILL TYPE: Mobile B-50	**INSPECTION:** S.M.B.

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
	1	4	6				Brown fine SAND, little Silt
				8	19	13	grades - fine to coarse SAND & GRAVEL, some
							Cobbles & Boulders
5'							(Wet , Firm)
	2	23	14				
				4	6	18	Brown SILT, little fine to coarse SAND, trace
							Clay
10'							
	3	4	6				grades - light grey SILT, little Clay
				6	10	12	
15'							
	4	6	9				grades - grey SILT, some Clay Partings of
				18	17	27	grey very fine Sand
20'							
	5	7	9				
				12	19	21	
25'							
	6	6	9				
				8	12	17	(Moist to Wet, medium to Hard)
							End of Boring at 27.0 feet
30'							

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F. A. DENTE ENGINEERING, P.C.

SUBSURFACE LOG B-3

PROJECT: Mountain View Lake Dam	**DATE** START: 5/3/95 FINSIH: 5/3/95
LOCATION: Mountain View Lake, N.Y.	**METHODS:** HSAC and Soil Sampling per
CLIENT: C.J. Barrow Engineering, P.C.	ASTM D-1586 Procedures
DRILLER: Tri-State Drilling	**SURFACE ELEVATION:**
DRILL TYPE: Mobile B-50	**INSPECTION:** S.M.B.

SAMPLE DEPTH	#	BLOWS ON SAMPLER 6"	12"	18"	24"	N	CLASSIFICATION / OBSERVATIONS
							WATER
5'							
							Bottom of Pond at 6.8'
	1	3	10				Brown fine to coarse SAND & GRAVEL, trace
				7	3	17	Silt
10'							
							(Wet, Firm)
	2	17	19				Grey SILT, little to some Clay
				13	13	32	
15'							
							(Wet, Hard)
	3	4	16				Grey fine to coarse SAND & GRAVEL, trace
				17	23	33	Silt
20'							(Wet, Compact)
							Grey SILT & CLAY, Partings of fine Sand
	4	17	26				
				50		76	(Wet, Hard)
							End of Boring at 23.3 feet
25'							
30'							

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F. A. DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-4	
PROJECT: Mountain View Lake Dam	**DATE** START: 5/5/95	FINISH: 5/5/95
LOCATION: Mountain View Lake, N.Y.	**METHODS:** HSAC and Soil Sampling per	
CLIENT: C.J. Barrow Engineering, P.C.	ASTM D-1586 Procedures	
DRILLER: Tri-State Drilling	**SURFACE ELEVATION:**	
DRILL TYPE: Mobile B-50	**INSPECTION:** S.M.B.	

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
							WATER
5'							Bottom of Pond at 5.0'
	1	1	8				Brown fine to coarse SAND & GRAVEL, trace
				19	11	27	Silt
10'							
	2	6	7				
				6	6	13	(Wet, Firm)
							Brown SILT, little very fine Sand, trace Clay
15'							
	3	2	9				grades - Grey
				16	22	25	Layer of fine to coarse SAND & GRAVEL
	4	2	21				
				27	33	48	(Wet, Firm to Very Compact)
20'							End of Boring at 19.5 feet
25'							
30'							

Appendix B. Recent Test Boring Logs

GOMEZ AND SULLIVAN ENGINEERS

Williamsville, NY • Utica, NY • Albany, NY • Henniker, NH
www.gomezandsullivan.com

Project: Mountain View Dam – Subsurface Investigation Bellmont, NY

Boring No. GSE–1
Page No. 1 of 1
Project No. 1937
Checked By: WJF

Client	Town of Bellmont, NY	Drill Rig	Geoprobe	Groundwater Observations		
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic	Date	Time	Depth
Crew	P. Collins	Soil Sampler	2" Split–Spoon	1/2/2018	12:30 PM	8.5 feet
G&S Rep.	E. Wroe	Rock Sampler	NA			
Date Start	1/2/2018 End 1/2/2018	Casing	3" Diameter			
Location	Right Abutment	Abandonment	Grout			
G.S. Elev.	1489.1 Datum	Weather	–5°–10°F; Periodic Snow			

DEPTH (FT)	Sample Information No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	1	S	24/13	0–2	8–14–9–8	1" Topsoil Dry, medium dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Topsoil	
	2	S	24/5	2–4	8–10–9–10	Dry, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt	Fill	
	3	S	24/9	4–6	22–8–8–7	Moist, medium dense, dark gray, fine to coarse SAND, some fine to coarse gravel, trace silt		
	4	S	24/5	6–8	4–1–WOH–WOH	Moist, very loose, dark gray, fine to coarse SAND and WOOD pieces, some fine to coarse gravel		
10	5	S	24/5	8–10	1–8–10–14	WOOD pieces and fine to coarse SAND		Core barrel unable to core through wood.
	6	S	24/10	10–12	11–28–19–22	WOOD pieces		
15						Test boring terminated at 12 feet below ground surface and offset to B–1A.		
20								
25								
30								

Notes:

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project:	Mountain View Dam – Subsurface Investigation Bellmont, NY
Boring No.	GSE–1A
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Project No.	1937
Checked By:	WJF

Client	Town of Bellmont, NY	Drill Rig	Geoprobe
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	P. Collins	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	1/2/2018 End 1/4/2018	Casing	3" Diameter
Location	Right Abutment	Abandonment	Grout
G.S. Elev.	1489.9 Datum	Weather	–5°–10°F; Periodic Snow

Groundwater Observations

Date	Time	Depth
1/2/2018	4:45 PM	13.0 feet
1/3/2018	8:45 AM	9.5 feet
1/3/2018	9:42 AM	14.5 feet
1/3/2018	12:00 PM	22.8 feet

DEPTH (FT)	Sample Information No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
							Fill	Test boring B–1A offset from B–1 after wood obstructions were encountered. B–1A drilled to approximately 8 feet below ground surface prior to sampling
10	1	S	24/9	8–10	3–4–2–2	Wet, very loose, dark brown, fine to coarse SAND, some clayey silt, trace fine gravel		
	2	S	24/2	10–12	1–1–WOH–2	Wet, very loose, dark brown, fine SAND, little silt		
	3	S	24/0	12–14	WOH–1–2–4	No recovery		
15	4	S	24/6	14–16	2–3–4–4	Wet, loose, brown, fine SAND, trace silt		
	5	S	24/12	16–18	4–7–6–8	Wet, medium dense, gray, fine SAND, little silt	Silt and Sand	
20	6	S	24/14	18–20	5–6–8–8	Wet, stiff, gray, fine SILT and fine to medium SAND		
	7	S	24/15	20–22	9–10–12–12	Wet, very stiff, gray, SILT and fine SAND		
	8	S	24/17	22–24	13–11–13–13	Wet, medium dense, gray–brown, fine SAND, some silt		
25	9	S	24/16	24–26	8–8–10–10	Wet, very stiff, brown, SILT and fine to medium SAND		
	10	S	24/18	26–28	7–11–14–17	Wet, very stiff, brown, SILT and fine to coarse SAND		
30	11	S	24/17	28–30	7–10–15–16	Wet, very stiff, brown, CLAY & SILT, trace fine sand		

Notes:

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project: Mountain View Dam – Subsurface Investigation Bellmont, NY

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Client	Town of Bellmont, NY	Drill Rig	Geoprobe
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	P. Collins	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	1/2/2018 End 1/4/2018	Casing	4" Diameter
Location	Right Abutment	Abandonment	Grout
G.S. Elev.	1489.9 Datum	Weather	–5°–10°F; Periodic Snow

Groundwater Observations

Date	Time	Depth

DEPTH (FT)	No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	12	S	24/18	30–32	10–10–16–17	Wet, very stiff, gray–brown, SILT, little fine sand	Silt and Sand	
	13	S	24/16	32–34	10–9–11–12	Wet, very stiff, gray–brown, SILT, little fine to medium sand		
35	14	S	24/18	34–36	6–10–15–18	Wet, medium dense, brown, fine to medium SAND, some silt		
	15	S	24/14	36–38	8–12–17–18	Wet, medium dense, brown, fine SAND and SILT		
40	16	S	24/20	38–40	12–17–20–19	Wet, hard, brown, SILT and fine SAND		
	17	S	24/12	40–42	9–12–18–19	Wet, hard, brown, SILT, some fine sand		
	18	S	4/4	42–44	50/4"	Wet, hard, brown, SILT and fine to medium SAND		
45	19	S	0/0	44–46	50/0"	No recovery		
	20	S	24/6	46–48	35–33–34–35	Wet, very dense, brown, fine SAND, some silt, some fine to coarse gravel	Sand and Gravel	
50	21	S	24/12	48–50	13–23–39–41	Wet, very dense, brown, fine SAND, trace fine gravel, trace silt		
55						Test boring terminated at 50 feet below ground surface.		
60								

Notes:

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project:
Mountain View Dam – Subsurface Investigation
Bellmont, NY

Boring No. GSE–2
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Checked By: WJF

				Groundwater Observations		
Client	Town of Bellmont, NY	Drill Rig	CME–45C	Date	Time	Depth
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic			
Crew	B. Perry	Soil Sampler	2" Split–Spoon			
G&S Rep.	E. Wroe	Rock Sampler	NA			
Date Start	12/7/2017 End 12/8/2017	Casing	4" Diameter			
Location	See Note 1 Below	Abandonment	Soil Cuttings			
G.S. Elev.	1476.8 Datum	Weather	10°–20°F; Periodic Snow			

DEPTH (FT)	Sample Information No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	1	S	24/2	0–2	1–WOH–WOH–WOH	Wet, very loose, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Sand and Gravel	Three 1" diameter coarse gravel pieces in spoon tip
	2	S	24/2	2–4	WOH–WOH–10–8	Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt		
	3	S	24/3	4–6	10–16–28–29	Wet, dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little silt		
	4	S	24/0	6–8	22–26–28–19	No recovery		
10						Boulder		
	5	S	24/17	10–12	5–10–15–18	Wet, very stiff, brown, SILT, some fine sand, trace fine gravel	Silt and Sand	
	6	S	24/17	12–14	19–16–18–22	Wet, hard, brown and white mottled, CLAY & SILT, little fine to medium sand		
15	7	S	24/0	14–16	18–23–24–30	No recovery		
	8	S	24/20	16–18	5–17–21–25	Wet, hard, light brown, SILT, some fine to medium sand		
20	9	S	24/20	18–20	10–22–27–30	Wet, dense, brown, fine to coarse SAND and SILT		
	10	S	24/22	20–22	50/2"	No recovery		
	11	S	24/24	22–24	23–32–46–45	Wet, very dense, brown, fine to medium SAND, little fine to coarse gravel, trace silt	Sand and Gravel	
25	12	S	24/3	24–26	24–24–25–28	Wet, dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt		
	13	S	24/16	26–28	30–26–31–46	Wet, very dense, brown, fine to medium SAND, some fine to coarse gravel, trace silt		
30	14	S	15/15	28–30	29–61–50/3"	Wet, very dense, brown, fine to medium SAND, trace silt	Sand	

Notes: Boring location in Mountain View Lake. Mudline approximately 8 feet below water surface.

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project: Mountain View Dam – Subsurface Investigation Bellmont, NY

Boring No.	GSE–2
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Checked By:	WJF

Client	Town of Bellmont, NY	Drill Rig	CME–45C
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	B. Perry	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	12/7/2017 End 12/8/2017	Casing	4" Diameter
Location	See Note 1 Below	Abandonment	Soil Cuttings
G.S. Elev.	1476.8 Datum	Weather	10°–20°F; Periodic Snow

Groundwater Observations

Date	Time	Depth

DEPTH (FT)	No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	15	S	24/12	30–32	12–19–32–48	Wet, very dense, brown, fine to medium SAND, some fine to coarse gravel, trace silt	Sand	
	16	S	21/21	32–34	34–54–10–50/3"	Wet, very dense, brown, fine to medium SAND, trace silt		
35	17	S	24/20	34–36	36–44–53–57	Wet, very dense, brown, fine to medium SAND, trace silt		
	18	S	24/15	36–38	26–30–43–46	Wet, very dense, brown, fine to medium SAND and SILT		
40	19	S	24/14	38–40	20–28–36–41	Wet, very dense, brown, fine SAND, trace silt		
	20	S	24/12	40–42	16–29–40–40	Wet, very dense, brown, fine SAND, trace silt		
	21	S	24/12	42–44	11–9–12–18	Wet, medium dense, brown, fine SAND, some silt		
45	22	S	24/19	44–46	13–18–19–21	Wet, dense, brown, fine SAND, some silt		
	23	S	24/19	46–48	14–21–31–39	Wet, very dense, brown, fine SAND, little silt		
50	24	S	10/5	48–50	38–50/4"	Wet, very dense, brown, fine SAND, little silt 1mm clay seam 4 inches from tip of spoon		
55						Test boring terminated at 50 feet below mudline.		
60								

Notes: Boring location in Mountain View Lake. Mudline approximately 8 feet below water surface.

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project:
Mountain View Dam – Subsurface Investigation
Bellmont, NY

Boring No. GSE-3
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Project No. 1937
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Client	Town of Bellmont, NY	Drill Rig	CME-45C
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	B. Perry	Soil Sampler	2" Split-Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	12/12/2017 End 12/13/2017	Casing	4" Diameter
Location	See Note 1 Below	Abandonment	Soil Cuttings
G.S. Elev.	1479.5 Datum	Weather	10°-20°F; Periodic Snow

Groundwater Observations

Date	Time	Depth

DEPTH (FT)	Sample Information No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	1	S	24/3	0-2	2-3-WOH-WOH	Wet, very loose, brown, fine to coarse SAND and fine GRAVEL, trace silt	Sand and Gravel	
	2	S	24/0	2-4	1-1-WOH-1	No recovery		
	3	S	24/6	4-6	WOH-WOH-8-20	Wet, loose, dark brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt		
						Boulder		
10	4	S	24/7	8-10	24-15-14-25	Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt		
	5	S	24/0	10-12	17-36-36-35	No recovery	Silt & Clay	
	6	S	24/8	12-14	6-14-18-23	Wet, hard, brown, SILT & CLAY, little fine to medium sand		
15	7	S	24/13	14-16	15-19-32-34	Wet, hard, brown, SILT & CLAY, little fine to medium sand, little fine to coarse gravel		
	8	S	24/22	16-18	23-39-45-48	Top 19": Wet, hard, gray-brown, SILT & CLAY, little fine to medium sand Bottom 3": Wet, very dense, brown, fine to medium SAND, little silt		
20	9	S	24/24	18-20	8-41-58-46	Wet, hard, brown, SILT & CLAY, some fine to medium sand, trace fine gravel		
	10	S	24/11	20-22	42-29-32-26	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little clayey silt	Sand and Gravel	
	11	S	24/24	22-24	17-19-24-23	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt		
25	12	S	24/11	24-26	9-12-25-27	Top 1": Wet, very dense, brown, coarse GRAVEL, trace silt Bottom 10": Wet, very dense, brown, fine to medium SAND, trace silt		
	13	S	24/5	26-28	17-33-37-50	Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt		
30	14	S	24/2	28-30	35-50/4"	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little silt		

Notes: Boring location in Mountain View Lake. Mudline approximately 7.7 feet below water surface.

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project: Mountain View Dam – Subsurface Investigation Bellmont, NY		Boring No.	GSE–3
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		Project No.	1937
		Checked By:	WJF

Client	Town of Bellmont, NY	Drill Rig	CME–45C
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	B. Perry	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	12/7/2017 End 12/8/2017	Casing	4" Diameter
Location	See Note 1 Below	Abandonment	Soil Cuttings
G.S. Elev.	1479.5 Datum	Weather	10°–20°F; Periodic Snow

Groundwater Observations

Date	Time	Depth

DEPTH (FT)	No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	15	S	10/10	30–32	37–50–35–50/4"	Wet, very dense, brown, fine to medium SAND, trace silt	Sand	
	16	S	24/17	32–34	9–6–3–10	Wet, loose, brown, fine to medium SAND, trace silt		
35								
40	17	S	21/21	38–40	21–24–37–50/3"	Wet, very dense, brown, fine to medium SAND, some clayey silt, trace fine gravel		
45	18	S	23/23	43–45	21–33–41–50/5"	Wet, very dense, brown, fine to medium SAND, little silt, trace fine gravel		
50	19	S	24/24	48–50	20–37–50–53	Wet, very dense, brown, fine SAND, little silt		
55						Test boring terminated at 50 feet below mudline.		
60								

Notes: Boring location in Mountain View Lake. Mudline approximately 7.7 feet below water surface.

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project: Mountain View Dam – Subsurface Investigation Bellmont, NY

Boring No. GSE–4

Project No. 1937
Checked By: WJF

Client	Town of Bellmont, NY	Drill Rig	Geoprobe
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	P. Collins	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	1/8/2018 End 1/10/2018	Casing	3" Diameter
Location	Left Abutment	Abandonment	Grout
G.S. Elev.	1488.1 Datum	Weather	10°–20°F; Periodic Snow

Groundwater Observations

Date	Time	Depth
1/9/2018	9:00 AM	3.8 feet

DEPTH (FT)	No.	Type	Pen./Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	1	S	24/16	0–2	1–1–3–4	3" Topsoil Dry, loose, brown, fine to coarse SAND, little clayey silt	Topsoil	
	2	S	24/10	2–4	4–10–9–12	Wet, medium dense, brown, fine to coarse SAND, trace silt	Fill	
	3	S	24/8	4–6	5–13–4–3	Top 3": Moist, medium dense, brown, fine to coarse GRAVEL and fine to medium SAND, trace silt Bottom 5": Wet, loose, dark brown, fine to coarse SAND, trace silt	Fill	
	4	S	24/16	6–8	1–1–6–7	Wet, loose, dark brown to brown, fine to medium SAND, little silt	Fill	
10	5	S	24/14	8–10	7–7–8–5	Wet, medium dense, brown, fine to medium SAND, little silt – 2" black fine to coarse SAND layer about 5" from top of sample	Fill	
	6	S	24/17	10–12	5–5–8–8	Wet, medium dense, brown, fine SAND, trace silt	Fill	
	7	S	24/15	12–14	4–4–2–4	Wet, loose, brown, fine SAND, some silt	Silt and Sand	
15	8	S	24/13	14–16	3–3–2–2	Wet, medium stiff, brown, SILT, little fine sand	Silt and Sand	
	9	S	24/18	16–18	1–3–4–6	Wet, medium stiff, brown, Clayey SILT and fine SAND	Silt and Sand	
20	10	S	24/15	18–20	3–4–6–8	Wet, stiff, brown, CLAY & SILT, little fine sand	Silt and Sand	
	11	S	24/15	20–22	2–4–5–5	Wet, medium stiff, brown, CLAY & SILT, some fine to medium sand	Silt and Sand	
	12	S	24/18	22–24	4–2–11–14	Top 11": Wet, medium stiff, brown, Clayey SILT and fine SAND Bottom 5": Wet, medium dense, orange–brown, fine SAND, some silt	Silt and Sand	
25	13	S	24/18	24–26	9–12–12–13	Wet, medium dense, orange–brown, SILT, some fine to medium sand	Silt and Sand	
	14	S	24/24	26–28	4–19–17–22	Wet, dense, brown, fine to medium SAND and SILT	Silt and Sand	
30	15	S	24/15	28–30	7–26–29–38	Top 8": Wet, dense, brown, fine to medium SAND and SILT Bottom 7": Wet, very dense, brown, fine to coarse GRAVEL and fine to medium SAND, trace silt	Silt and Sand	

Notes:

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

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Project:
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Client	Town of Bellmont, NY	Drill Rig	Geoprobe
Drilling Co.	Atlantic Testing Laboratories	Hammer	Automatic
Crew	P. Collins	Soil Sampler	2" Split–Spoon
G&S Rep.	E. Wroe	Rock Sampler	NA
Date Start	1/8/2018 End 1/10/2018	Casing	3" Diameter
Location	Left Abutment	Abandonment	Grout
G.S. Elev.	1488.1 Datum	Weather	10°–20°F; Periodic Snow

Groundwater Observations

Date	Time	Depth

DEPTH (FT)	Sample Information No.	Type	Pen./ Rec. (in.)	Depth (ft)	Blows/6"	Sample Description & Classification	Stratum Description	Notes
	16	S	24/6	30–32	19–25–35–39	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Silt and Sand	
	17	S	24/14	32–34	17–18–24–19	Wet, dense, brown, fine SAND and SILT		
35	18	S	24/10	34–36	5–14–14–18	Wet, very stiff, brown, SILT and fine to medium SAND, trace fine gravel		
	19	S	24/24	36–38	12–23–35–34	Wet, very dense, brown, fine SAND, trace silt	Sand	
40	20	S	21/21	38–40	13–14–37–50/3"	Wet, very dense, brown, fine to medium SAND, trace silt, trace fine gravel		
	21	S	23/19	40–42	7–11–24–50/5"	Wet, dense, brown, fine to medium SAND, trace silt		
	22	S	24/24	42–44	31–29–39–37	Wet, very dense, brown, fine SAND, some silt		
45	23	S	24/18	44–46	11–18–32–53	Wet, very dense, brown, fine to medium SAND, trace silt 4" SILT and fine SAND layer about 4" from bottom of sample		
	24	S	24/24	46–48	12–28–42–50	Wet, very dense, brown, fine SAND and SILT	Silt and Sand	
50	25	S	24/18	48–50	24–34–41–51	Wet, very dense, brown, fine SAND and SILT		
55						Test boring terminated at 50 feet below ground surface.		
60								

Notes:

Legend: S=Soil Sample; C=Rock Core; NA=Not Applicable; WOH=Weight of Hammer

Appendix C. Geotechnical Laboratory Testing

Note: Lab test results provided for borings B-1A through B-4. Boring labels should be classified as GSE-1A through GSE-4.

ATLANTIC TESTING LABORATORIES

WBE certified company

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS

ASTM D 2216

PROJECT INFORMATION

Client:	Beardsley Architects & Engineers	**ATL Report No.:**	CD4328SL-02-01-18
Project:	Mt. View Dam Project	**Report Date:**	January 22, 2018
	Bellmont, New York	**Date Received:**	January 15, 2018

TEST DATA

Boring No.	Sample No.	Depth (ft)	Moisture Content (%)
B-1A	S-6	18-20	19.9
	S-11	28-30	22.5
	S-16	38-40	19.8
	S-20 [1]	46-48	15.6
B-4	S-8	14-16	22.8
	S-13	24-26	18.8
	S-18 [1]	34-36	11.1
	S-22	42-44	21.9

REMARKS

1. Sample mass was less than the minimum mass outlined in the referenced test method.

Reviewed By: Judy Ames

Date: 1/22/18

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY

Report No.: CD4328SL-02-01-18

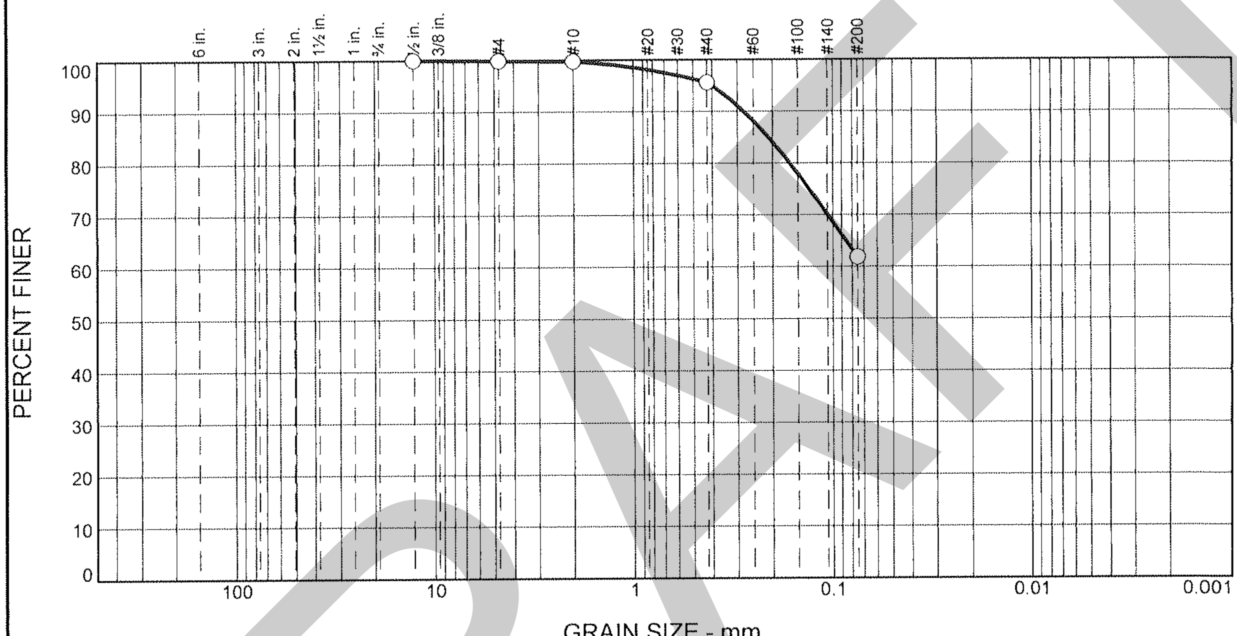
Client: Beardsley Architects & Engineers

Date: 1/22/18

Sample No: B-1A, S-6 **Source of Sample:** Boring Sample

Location: In-place

Elev./Depth: 18-20'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	34	62	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	100		
#40	96		
#200	62		

* (no specification provided)

Soil Description

Grey SILT; and mf+ SAND

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.2105 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture Content = 19.9%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Amos

Date: 1/22/18

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY

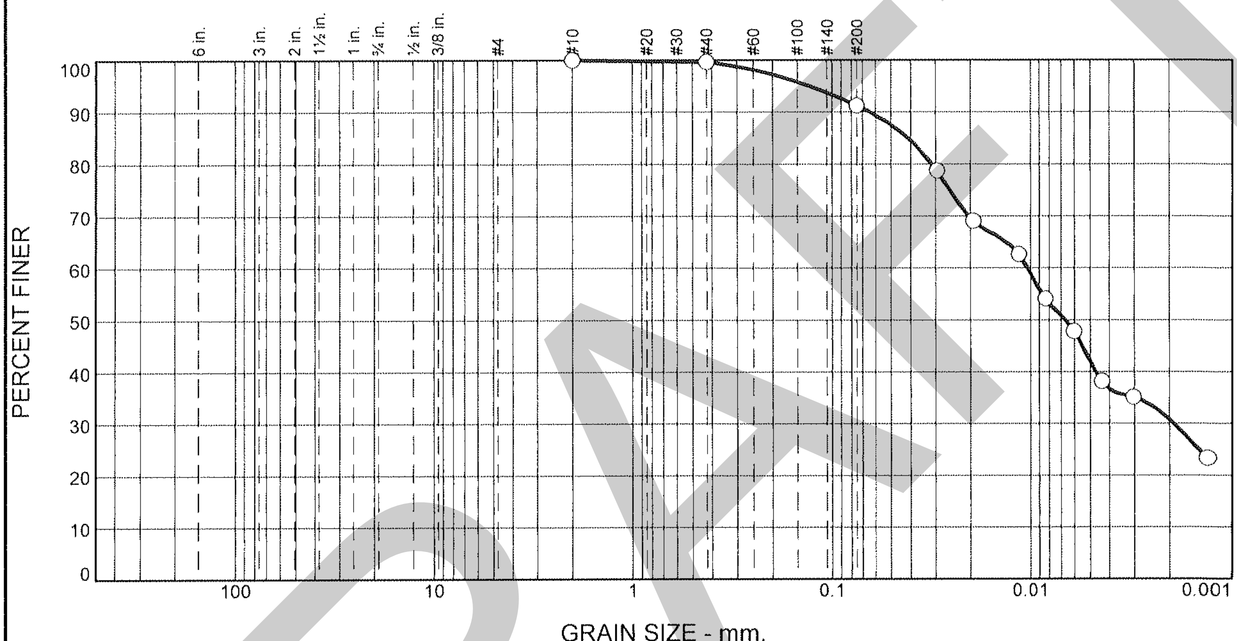
Report No.: CD4328SL-02-01-18

Client: Beardsley Architects & Engineers

Date: 1/22/18

Sample No: B-1A, S-11 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 28-30'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	9	49	42

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	100		
#200	91		

* (no specification provided)

Soil Description

Brown SILT; and CLAY; trace f SAND

Atterberg Limits

PL= 23 LL= 35 PI= 12

Coefficients

D_{85}= 0.0413 D_{60}= 0.0103 D_{50}= 0.0066
D_{30}= 0.0019 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

Moisture Content = 22.5%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames

Date: 1/22/18

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY

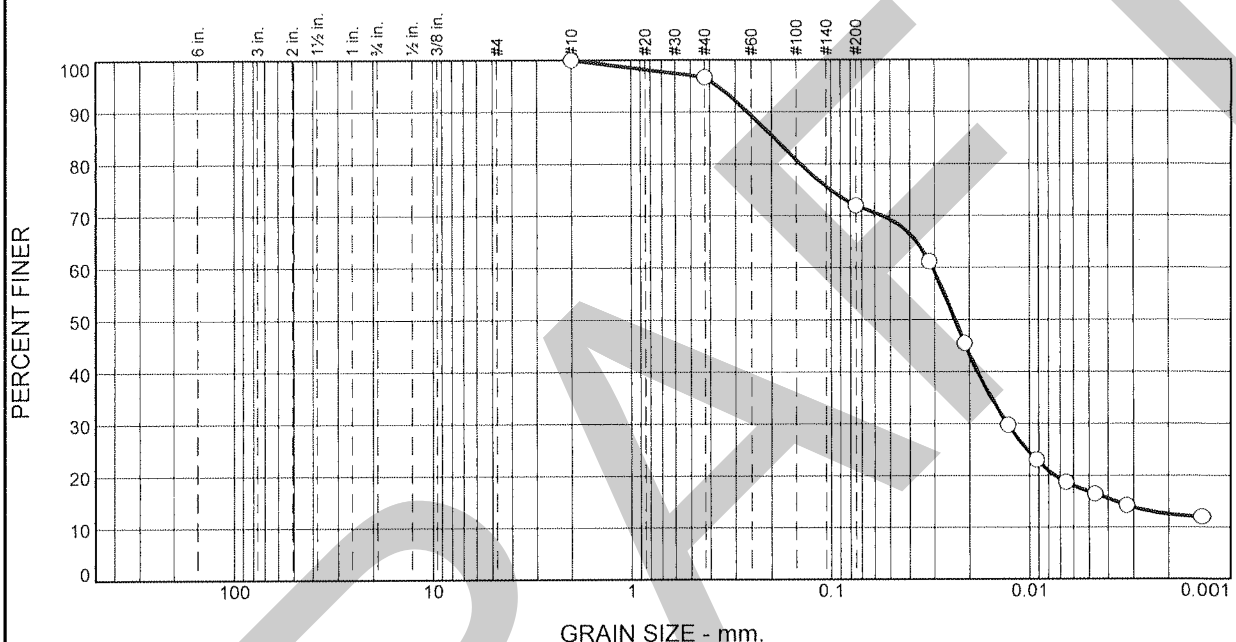
Report No.: CD4328SL-02-01-18

Client: Beardsley Architects & Engineers

Date: 1/22/18

Sample No: B-1A, S-16 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 38-40'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	25	55	17

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	97		
#200	72		

Soil Description

Brown SILT; some mf+ SAND; little CLAY

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.1927 D_{60}= 0.0307 D_{50}= 0.0237
D_{30}= 0.0129 D_{15}= 0.0037 D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content = 19.8%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames

Date: 1/22/18

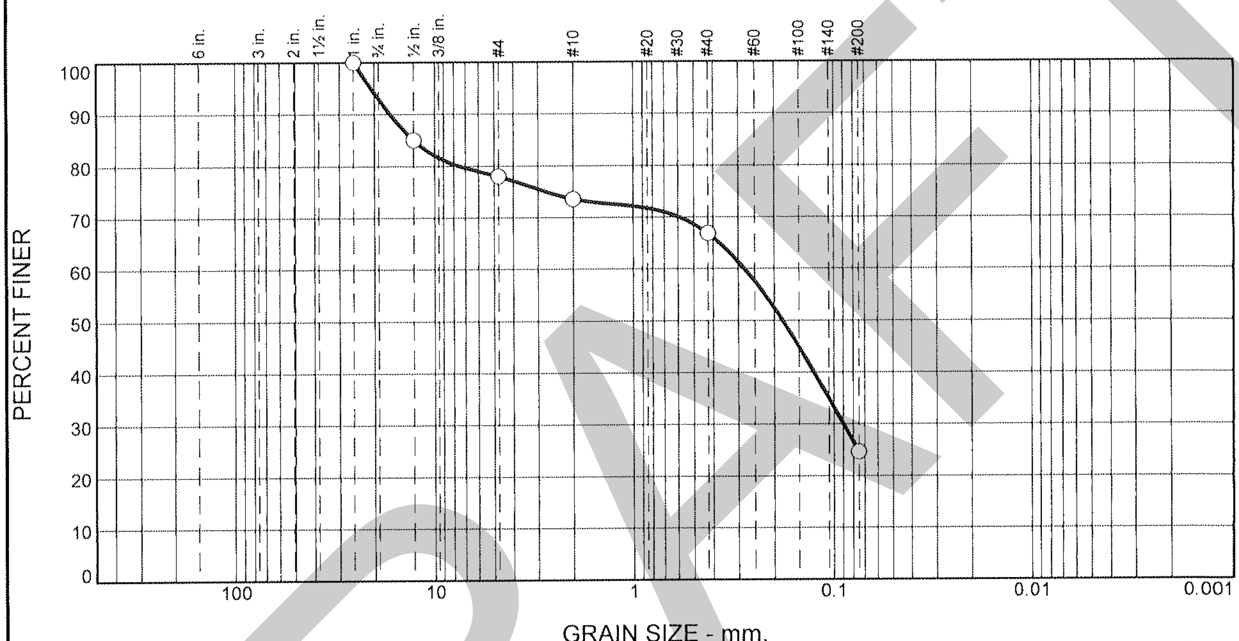
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-02-01-18

Client: Beardsley Architects & Engineers **Date:** 1/22/18

Sample No: B-1A, S-20 **Source of Sample:** Boring Sample
Location: In-place **Elev./Depth:** 46-48'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	7	15	4	7	42	25	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1"	100		
1/2"	85		
#4	78		
#10	74		
#40	67		
#200	25		

Soil Description

Brown c-mf+ SAND; some SILT; some mf- GRAVEL

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 12.7030 D_{60}= 0.2804 D_{50}= 0.1815
D_{30}= 0.0895 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture Content = 15.6%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames

Date: 1/22/18

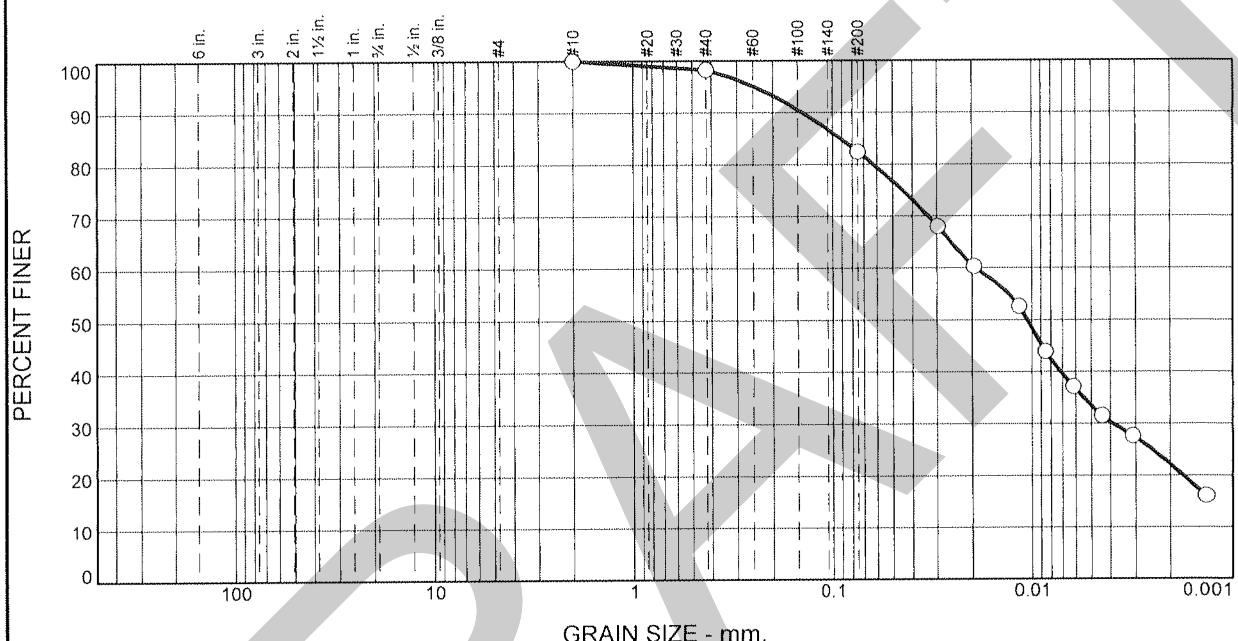
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY   **Report No.:** CD4328SL-02-01-18

Client: Beardsley Architects & Engineers   **Date:** 1/22/18

Sample No: B-4, S-8   **Source of Sample:** Boring Sample
Location: In-place   **Elev./Depth:** 14-16'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	2	16	49	33

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	98		
#200	82		

Soil Description

Brown SILT; some CLAY; little mf+ SAND

Atterberg Limits

PL= NP   LL= NP   PI= NP

Coefficients

D_{85}= 0.0915 D_{60}= 0.0191 D_{50}= 0.0105
D_{30}= 0.0039 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML   AASHTO= A-4(0)

Remarks

Moisture Content = 22.8%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames

Date: 1/22/18

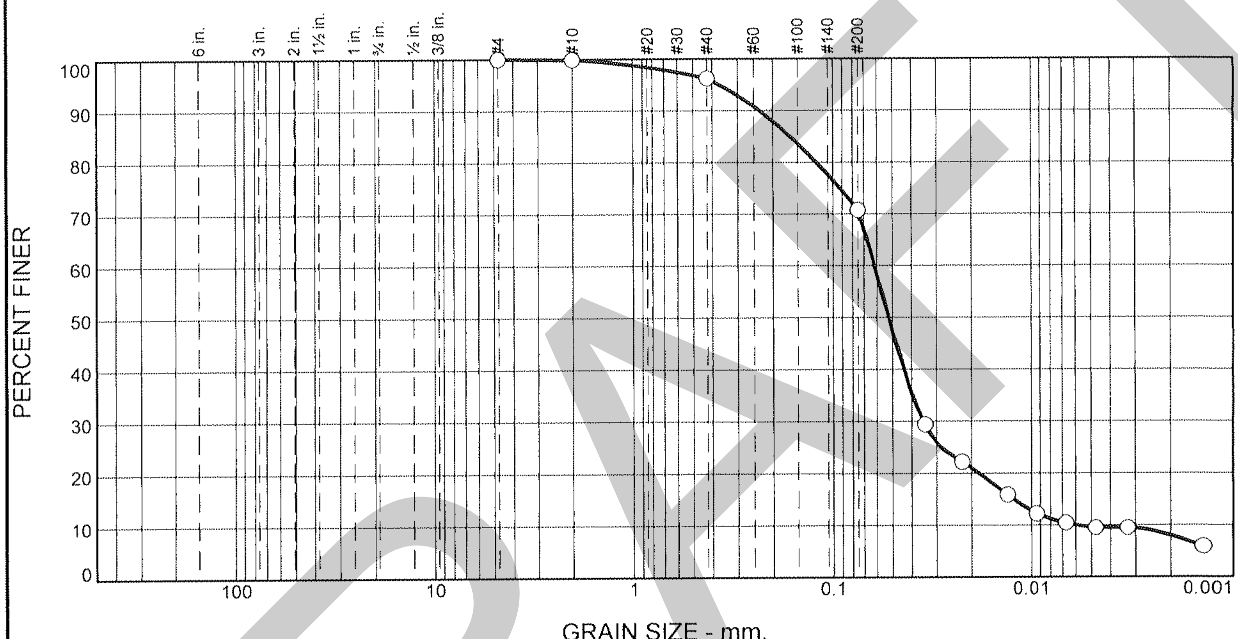
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-02-01-18

Client: Beardsley Architects & Engineers **Date:** 1/22/18

Sample No: B-4, S-13 **Source of Sample:** Boring Sample
Location: In-place **Elev./Depth:** 24-26'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	25	61	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#4	100		
#10	100		
#40	96		
#200	71		

* (no specification provided)

Soil Description

Orange Brown SILT; some mf+ SAND; trace CLAY

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.1636 D_{60}= 0.0618 D_{50}= 0.0523
D_{30}= 0.0350 D_{15}= 0.0122 D_{10}= 0.0059
C_u= 10.53 C_c= 3.37

Classification

USCS= AASHTO=

Remarks

Moisture Content = 18.8%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/22/18

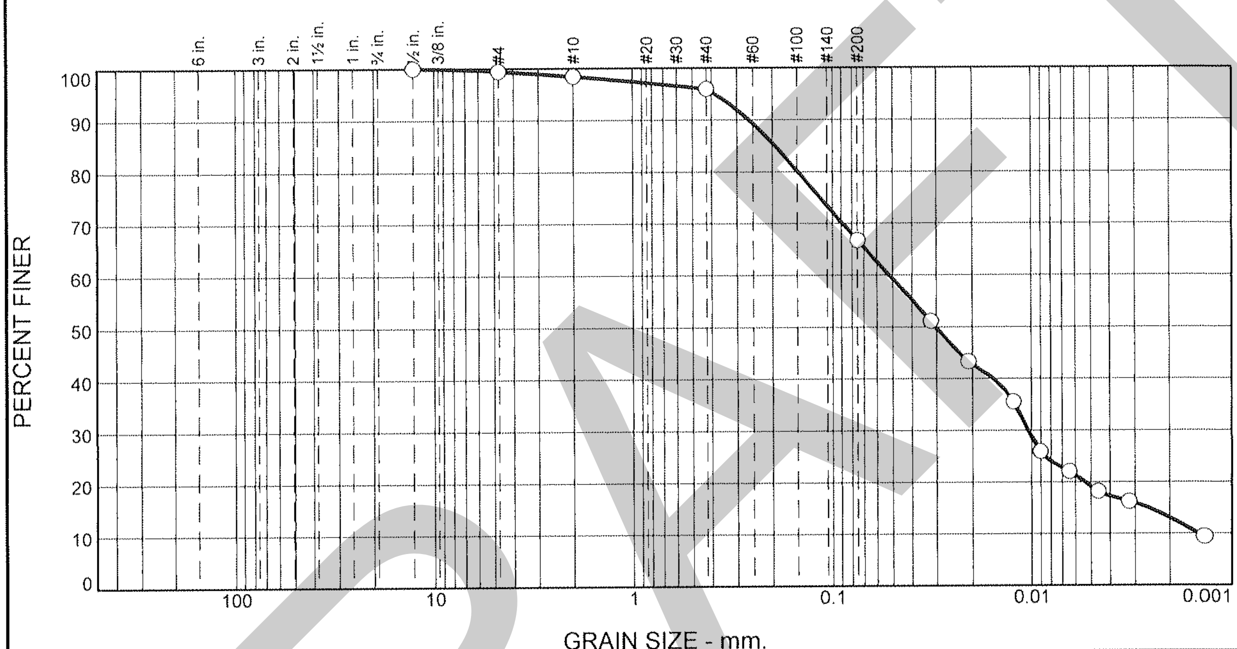
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY
Report No.: CD4328SL-02-01-18

Client: Beardsley Architects & Engineers
Date: 1/22/18

Sample No: B-4, S-18 **Source of Sample:** Boring Sample
Location: In-place
Elev./Depth: 34-36'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	1	2	29	48	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	99		
#10	98		
#40	96		
#200	67		

Soil Description

Brown SILT; some cmf+ SAND; little CLAY; trace f GRAVEL

Atterberg Limits

PL= 21 LL= 29 PI= 9

Coefficients

D_{85}= 0.1938 D_{60}= 0.0518 D_{50}= 0.0303
D_{30}= 0.0104 D_{15}= 0.0026 D_{10}= 0.0014
C_u= 35.92 C_c= 1.43

Classification

USCS= CL AASHTO= A-4(4)

Remarks

Moisture Content = 11.1%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Amos

Date: 1/22/18

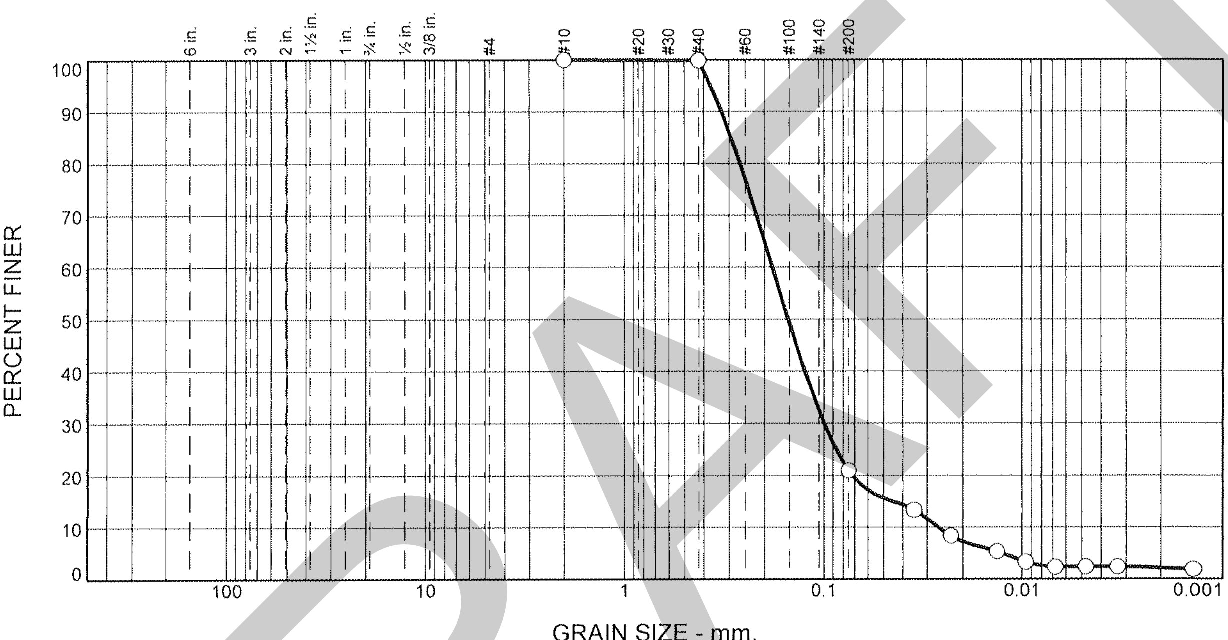
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-02-01-18

Client: Beardsley Architects & Engineers **Date:** 1/22/18

Sample No: B-4, S-22 **Source of Sample:** Boring Sample
Location: In-place **Elev./Depth:** 42-44'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	79	19	2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	100		
#200	21		

* (no specification provided)

Soil Description

Brown f SAND; little SILT; trace CLAY

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.2934 D_{60}= 0.1825 D_{50}= 0.1517
D_{30}= 0.0995 D_{15}= 0.0445 D_{10}= 0.0264
C_u= 6.91 C_c= 2.05

Classification

USCS= AASHTO=

Remarks

Moisture Content = 21.9%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/22/18

ATLANTIC TESTING LABORATORIES

WBE certified company

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
ASTM D 4318

PROJECT INFORMATION

Client:	Beardsley Architects & Engineers	**ATL Report No.:**	CD4328SL-02-01-18
Project:	Mt. View Dam Project	**Report Date:**	January 22, 2018
	Bellmont, New York	**Date Received:**	January 15, 2018

TEST DATA

Boring No.	Sample No.	LL	PL	PI
B-1A	S-11	35	23	12
B-1A	S-16	NP	NP	NP
B-4	S-8	NP	NP	NP
B-4	S-18	29	21	8

SAMPLE INFORMATION

Boring No.	Sample No.	Maximum Grain Size (mm)	Estimated Amount of Sample Retained on No. 40 Sieve (%)	As Received Moisture Content (%)
B-1A	S-11	2	0	22.5
B-1A	S-16	2	3	19.8
B-4	S-8	2	2	22.8
B-4	S-18	12.5	4	11.1

PREPARATION INFORMATION

Boring No.	Sample No.	Preparation	Method of Removing Oversized Materia
B-1A	S-11	Wet	Not Necessary
B-1A	S-16	Wet	Hand Picking
B-4	S-8	Wet	Hand Picking
B-4	S-18	Wet	Hand Picking

EQUIPMENT INFORMATION

Liquid Limit Procedure:	Multipoint - Method A	X	Single Point - Method B	
Liquid Limit Apparatus:	Manual	X	Motor Driven	
Liquid Limit Grooving Tool Material:	Plastic	X	Metal	
Liquid Limit Grooving Tool Shape:	Flat	X	Curved (AASHTO Only)	
Plastic Limit:	Hand Rolled	X	Mechanical Rolling Device	

Reviewed By: Judy Ames Date: 1/22/18

ATLANTIC TESTING LABORATORIES

WBE certified company

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS
ASTM D 2216

PROJECT INFORMATION

Client:	Beardsley Architects & Engineers	**ATL Report No.:**	CD4328SL-01-12-17
Project:	Mt. View Dam Project	**Report Date:**	December 29, 2017
	Bellmont, New York	**Date Received:**	December 20, 2017

TEST DATA

Boring No.	Sample No.	Depth (ft)	Moisture Content (%)
B-2	S-6 [1]	10-12	26.1
	S-8	14-16	22.3
	S-11 [1]	20-22	12.5
	S-18	36-38	24.7
B-3	S-6	10-12	26.6
	S-9 [1]	16-18	17.1
	S-17 [1]	38-40	18.1

REMARKS

1. Sample mass was less than the minimum mass outlined in the referenced test method.

Reviewed By: Judy Amos

Date: 1/3/18

ATLANTIC TESTING LABORATORIES

WBE certified company

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
ASTM D 4318

PROJECT INFORMATION

Client: Beardsley Architects & Engineers
Project: Mt. View Dam Project
Bellmont, New York

ATL Report No.: CT4328SL-01-12-17
Report Date: December 29, 2017
Date Received: December 20, 2017

TEST DATA

Boring No.	Sample No.	LL	PL	PI
B-2	S-6	35	22	13
B-3	S-6	21	13	8
B-3	S-9	25	15	10

SAMPLE INFORMATION

Boring No.	Sample No.	Maximum Grain Size (mm)	Estimated Amount of Sample Retained on No. 40 Sieve (%)	As Received Moisture Content (%)
B-2	S-6	12.5	4	26.1
B-3	S-6	4.75	25	26.6
B-3	S-9	12.5	10	17.1

PREPARATION INFORMATION

Boring No.	Sample No.	Preparation	Method of Removing Oversized Materia
B-2	S-6	Wet	Hand Picking
B-3	S-6	Wet	Pulverizing and Screening
B-3	S-9	Wet	Pulverizing and Screening

EQUIPMENT INFORMATION

Liquid Limit Procedure:	Multipoint - Method A	X	Single Point - Method B	
Liquid Limit Apparatus:	Manual	X	Motor Driven	
Liquid Limit Grooving Tool Material:	Plastic	X	Metal	
Liquid Limit Grooving Tool Shape:	Flat	X	Curved (AASHTO Only)	
Plastic Limit:	Hand Rolled	X	Mechanical Rolling Device	

Reviewed By: Judy Ames Date: 1/3/18

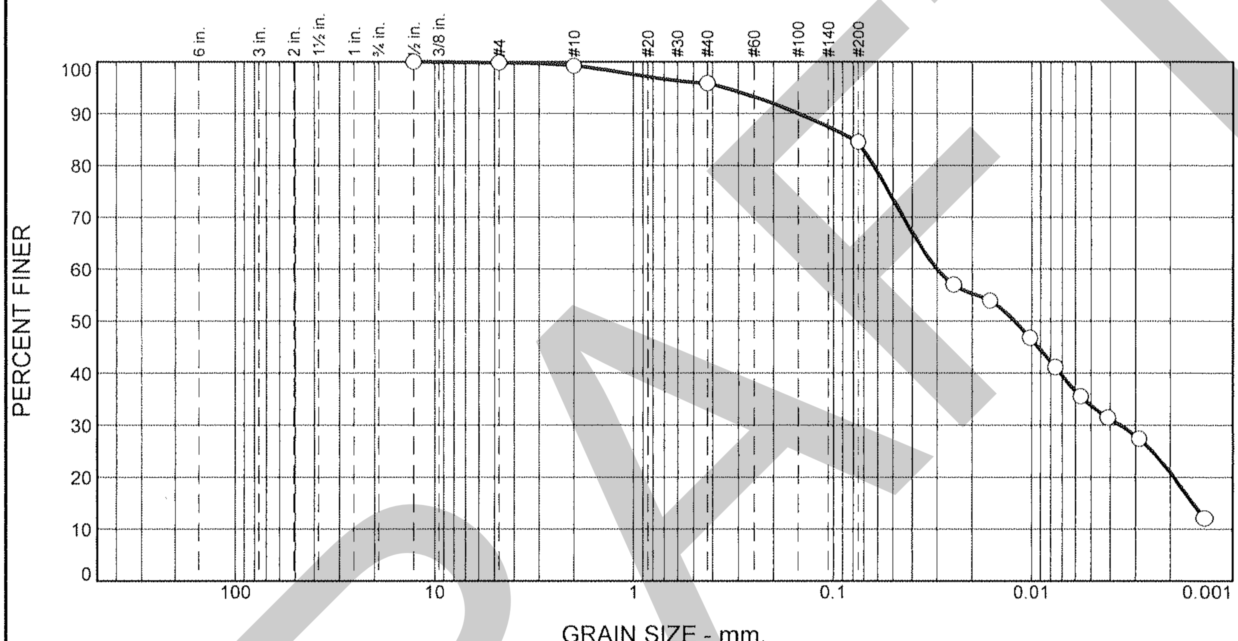
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-2, S-6 **Source of Sample:** Boring Sample
Location: In-place **Elev./Depth:** 10-12'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	3	11	51	34

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	99		
#40	96		
#200	85		

* (no specification provided)

Soil Description

Brown SILT; some CLAY; little cmf+ SAND

Atterberg Limits

PL= 22 LL= 35 PI= 13

Coefficients

D_{85}= 0.0791 D_{60}= 0.0299 D_{50}= 0.0122
D_{30}= 0.0036 D_{15}= 0.0015 D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

Moisture Content = 26.1%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Amos Date: 1/3/18

ATLANTIC TESTING LABORATORIES

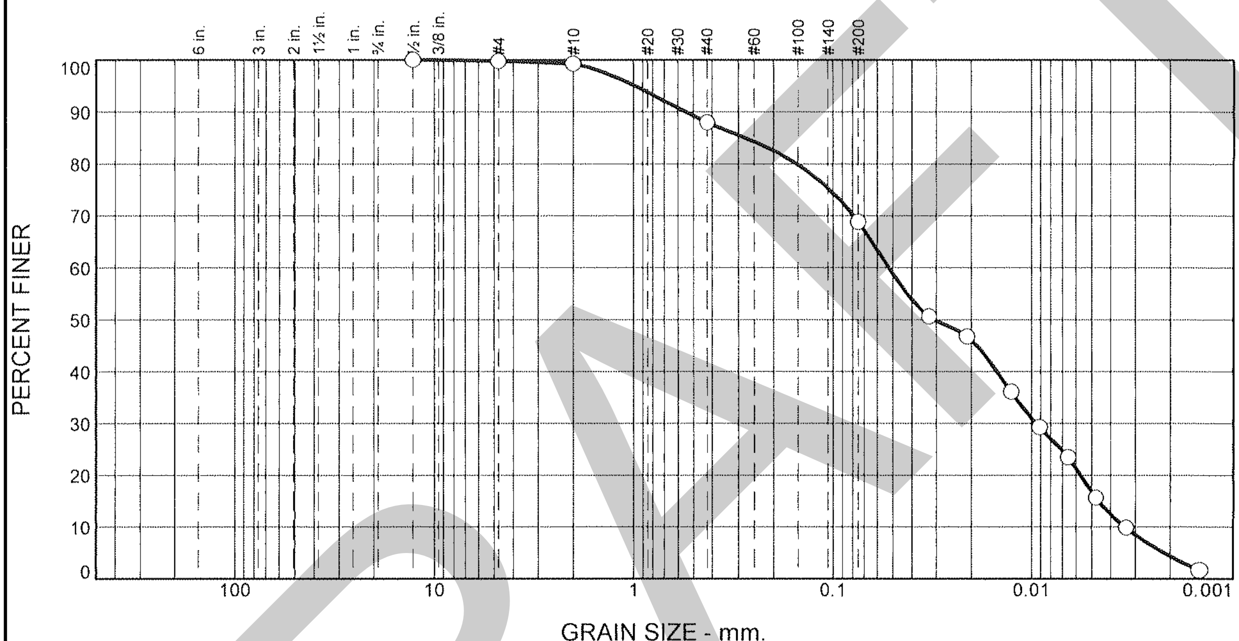
Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-2, S-8 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 14-16'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	11	19	52	17

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	99		
#40	88		
#200	69		

* (no specification provided)

Soil Description

Brown SILT; some c-mf+ SAND; little CLAY

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.2755 D_{60}= 0.0523 D_{50}= 0.0307
D_{30}= 0.0095 D_{15}= 0.0046 D_{10}= 0.0034
C_u= 15.46 C_c= 0.51

Classification

USCS= AASHTO=

Remarks

Moisture Content = 22.3%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/3/18

ATLANTIC TESTING LABORATORIES

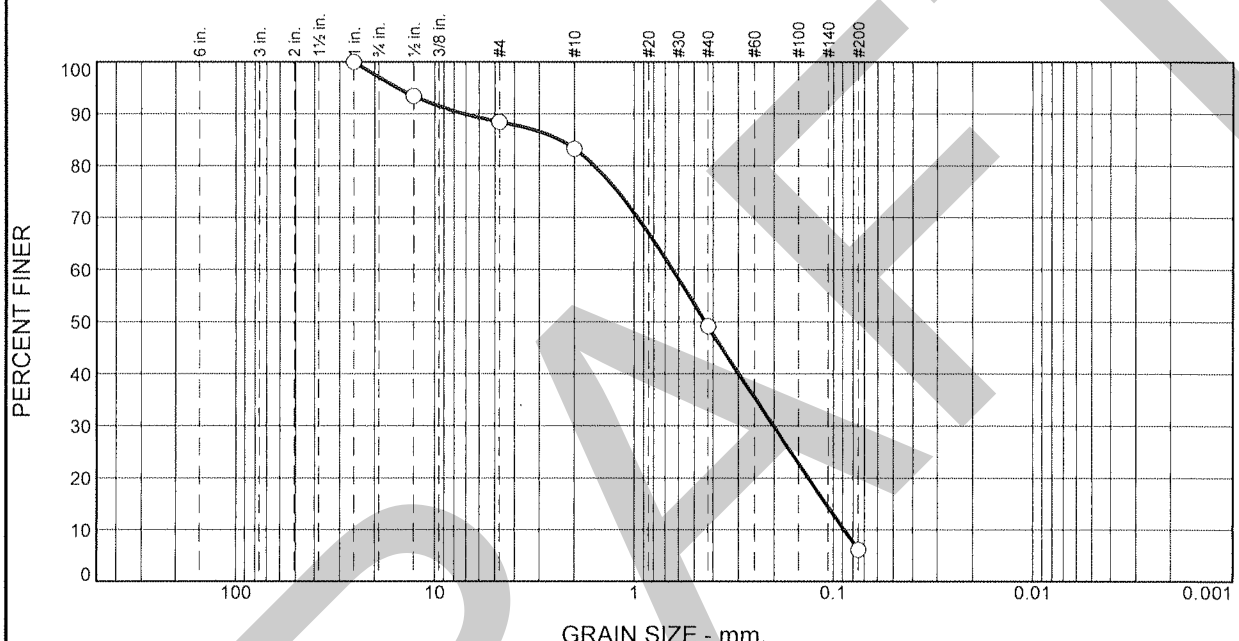
Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-2, S-11 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 20-22'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	3	9	5	34	43	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1"	100		
1/2"	93		
#4	88		
#10	83		
#40	49		
#200	6.1		

* (no specification provided)

Soil Description

Brown c-mf+ SAND; little mf GRAVEL; trace SILT

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 2.3740 D_{60}= 0.6426 D_{50}= 0.4393
D_{30}= 0.2003 D_{15}= 0.1085 D_{10}= 0.0882
C_u= 7.29 C_c= 0.71

Classification

USCS= AASHTO=

Remarks

Moisture Content = 12.5%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/3/18

ATLANTIC TESTING LABORATORIES

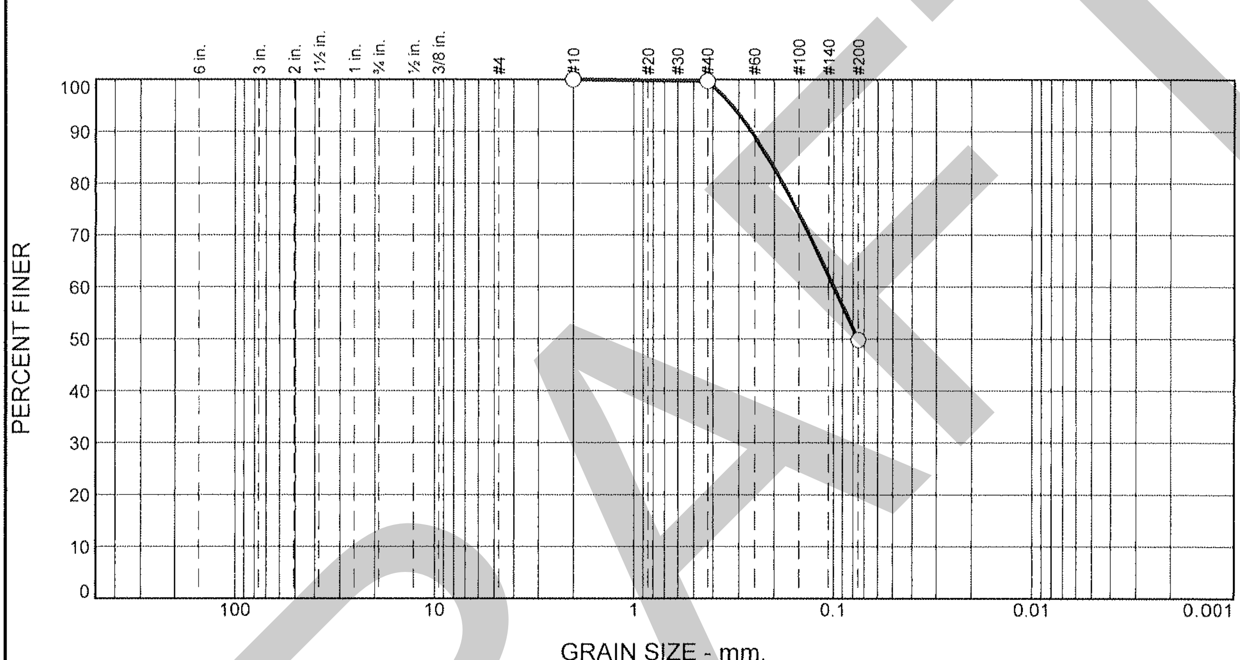
Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-2, S-18 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 36-38'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	50	50	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	100		
#200	50		

* (no specification provided)

Soil Description

Brown f SAND; and SILT

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.2142 D_{60}= 0.0996 D_{50}= 0.0755

D_{30}= D_{15}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture Content = 24.7%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/3/18

ATLANTIC TESTING LABORATORIES

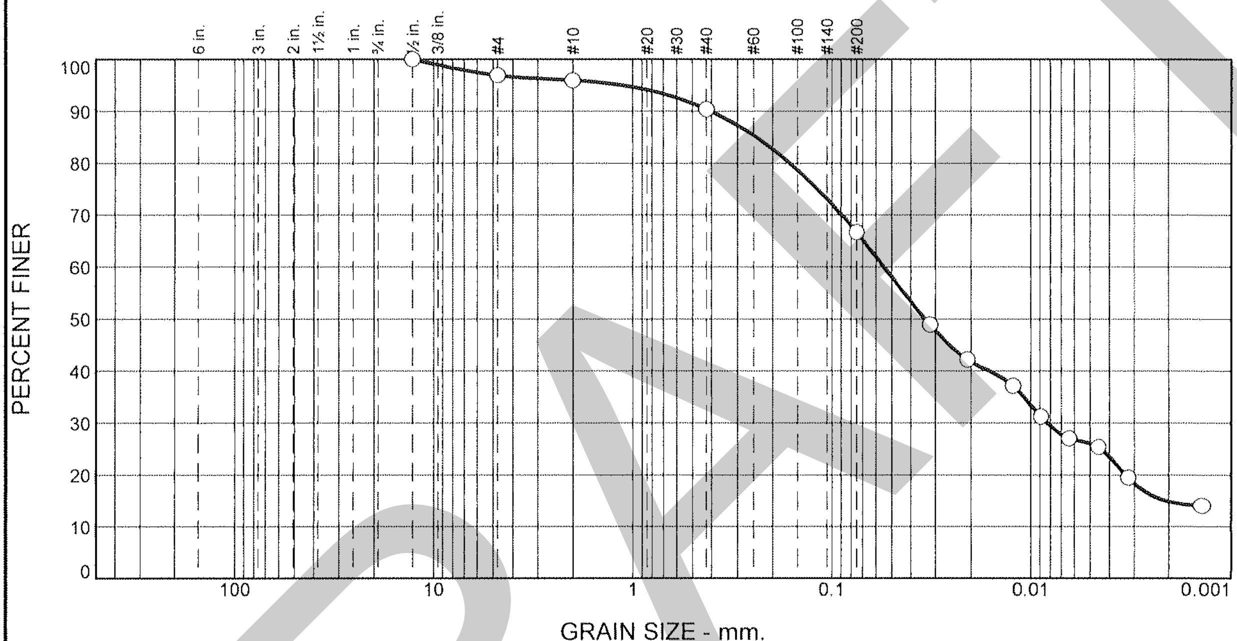
Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-3, S-9 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth:** 16-18'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	3	1	6	23	41	26

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	97		
#10	96		
#40	90		
#200	67		

Soil Description

Brown SILT; some c-mf+ SAND; some CLAY; trace f GRAVEL

Atterberg Limits

PL= 15 LL= 25 PI= 10

Coefficients

D_{85}= 0.2412 D_{60}= 0.0545 D_{50}= 0.0338
D_{30}= 0.0083 D_{15}= 0.0021 D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(4)

Remarks

Moisture Content = 17.1%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Ames Date: 1/3/18

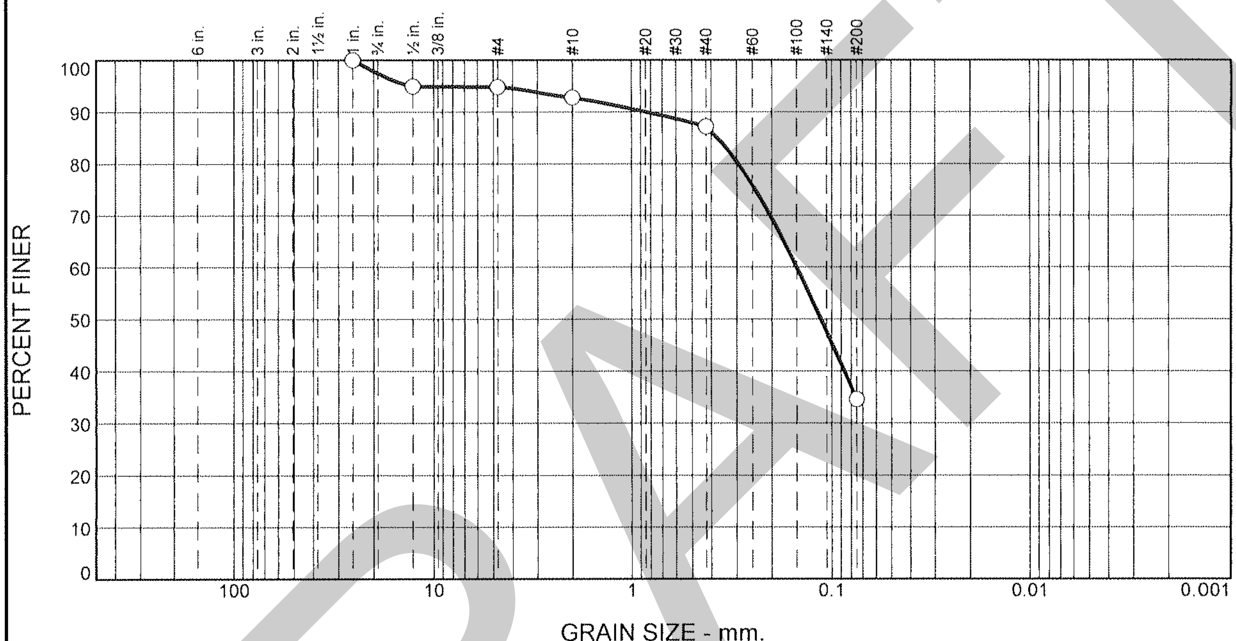
ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

Project: Mt. View Dam Project, Bellmont, NY **Report No.:** CD4328SL-01-12-17

Client: Beardsley Architects & Engineers **Date:** 12/29/17

Sample No: B-3, S-17 **Source of Sample:** Boring Sample
Location: In-place **Elev./Depth:** 38-40'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	3	2	2	6	52	35	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1"	100		
1/2"	95		
#4	95		
#10	93		
#40	87		
#200	35		

* (no specification provided)

Soil Description

Brown c-mf+ SAND; some SILT; trace mf GRAVEL

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.3726 D_{60}= 0.1497 D_{50}= 0.1131
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture Content = 18.1%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judy Amos Date: 1/3/18

Appendix D. Permeability Test Results

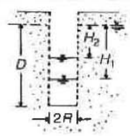
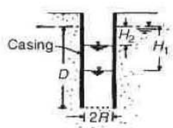
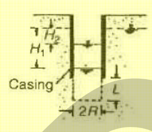
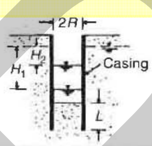
GOMEZ AND SULLIVAN
ENGINEERS

Falling head permeability tests performed in general accordance with:

1. "Seepage of Soil Principles and Applications" by Lakshmi N. Reddi, 2003
2. US Department of Navy, Naval Facilities Engineering Command (1982)

From Seepage of Soils Page 46

TABLE 2.1 Computation of Permeability from Variable Head Tests When the Wells or Piezometers Are Located in a Saturated Isotropic Stratum of Infinite Depth

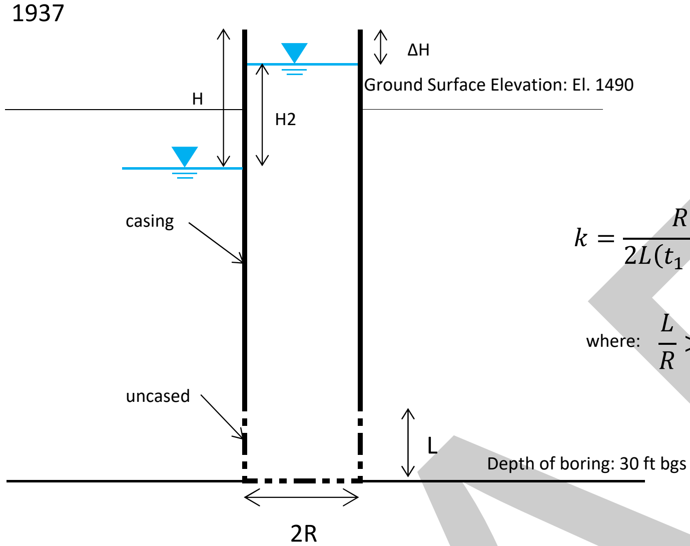
Condition	Diagram	Shape Factor F	Permeability k	Applicability
(A) Uncased hole		$F = 16\pi DS'R$	$k = \frac{R}{16DS'} \times \frac{H_2 - H_1}{t_2 - t_1}$ for $\frac{D}{R} < 50$	Simplest methods for permeability determination. Not applicable in stratified soils. For values of S', see Fig. 2.25*a*.
(B) Cased hole, soil flush with bottom		$F = \frac{11R}{2}$	$k = \frac{2\pi R}{11(t_2 - t_1)} \ln \frac{H_1}{H_2}$ for 6 in. (0.1524 m) < D < 60 in. (1.524 m)	Used for permeability determination at shallow depths below the water table. May yield unreliable results in falling head test with silting of bottom of hole.
(C) Cased hole, uncased or perforated extension of length L		$F = \frac{2\pi L}{\ln(L/R)}$	$k = \frac{R^2}{2L(t_2 - t_1)} \ln \frac{L}{R} \ln \frac{H_1}{H_2}$ for $\frac{L}{R} > 8$	Used for permeability determination at greater depths below water table.
(D) Cased hole, column of soil inside casing to height L		$F = \frac{11\pi R^2}{2\pi R + 11L}$	$k = \frac{2\pi R + 11L}{11(t_2 - t_1)} \ln \frac{H_1}{H_2}$	Principal use is for permeability in vertical direction in anisotropic soils.

Source: Adapted from U.S. Department of the Navy, Naval Facilities Engineering Command (1982).

Results				
Test Boring	Depth to Groundwater (ft bgs)	Depth of Test (ft bgs)	Soil Strata	Estimated Permeability (cm/sec)
B-1A	22.8	30	Sand and Silt	5.67E-04
B-1A	22.8	40	Sand and Silt	4.60E-04
B-4	3.8	26	Sand and Silt	5.29E-04
B-4	3.8	36	Sand	7.15E-03

GOMEZ AND SULLIVAN ENGINEERS

Project:	Mountain View Lake Dam	Boring No.:	B-1A
Client:	Town of Bellmont, NY	Date:	1/4/2018
Location:	Bellmont, NY	Time:	9:00 AM
Project No.:	1937	Weather:	19°F, Clear



$$k = \frac{R^2}{2L(t_1 - t_2)} \ln\frac{L}{R} \ln\frac{H_1}{H_2}$$

where: $\frac{L}{R} > 8$

Stickup (ft):	1.67	Casing Diameter (in):	3
Depth of Boring (ft):	30.0	L (in):	13
Casing Length (ft):	30.5	Drilling Method:	Drive and wash
H, Depth to groundwater (ft bgs):	22.8	Water Temperature:	36°F

Test 1

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	5.8	267.9	0.02	1.68E-04
2	15.8	257.9	0.06	4.69E-04
3	22.0	251.6	0.08	6.63E-04
4	28.3	245.4	0.11	8.62E-04
5	33.8	239.9	0.13	1.04E-03
10	55.0	218.6	0.22	3.55E-04
15	64.0	209.6	0.27	4.22E-04
			Average	5.69E-04

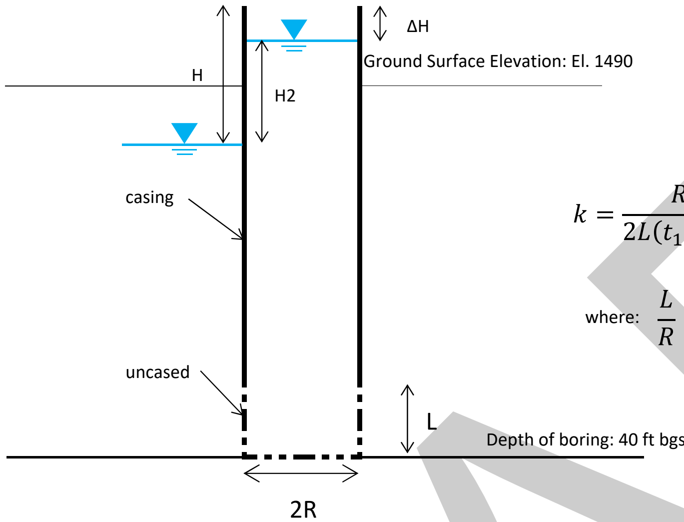
Test 2

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	8.5	265.1	0.03	2.50E-04
2	15.3	258.4	0.06	4.54E-04
3	21.5	252.1	0.08	6.47E-04
4	27.5	246.1	0.11	8.38E-04
5	33.0	240.6	0.13	1.02E-03
10	52.8	220.9	0.21	3.39E-04
15	63.8	209.9	0.27	4.20E-04
			Average	5.66E-04

Average Permeability at 30 ft bgs: 5.67E-04 cm/sec

GOMEZ AND SULLIVAN ENGINEERS

Project:	Mountain View Lake Dam	Boring No.:	B-1A
Client:	Town of Bellmont, NY	Date:	1/4/2018
Location:	Bellmont, NY	Time:	9:00 AM
Project No.:	1937	Weather:	19°F, Clear



$$k = \frac{R^2}{2L(t_1 - t_2)} \ln\frac{L}{R} \ln\frac{H_1}{H_2}$$

where: $\frac{L}{R} > 8$

Stickup (ft):	1.58	Casing Diameter (in):	3
Depth of Boring (ft):	40.0	L (in):	13
Casing Length (ft):	40.5	Drilling Method:	Drive and wash
H, Depth to groundwater (ft bgs):	22.8	Water Temperature:	36°F

Test 1

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	6.8	266.9	0.02	1.98E-04
2	12.3	261.4	0.05	3.62E-04
3	17.3	256.4	0.07	5.15E-04
4	22.5	251.1	0.09	6.79E-04
5	27.5	246.1	0.11	8.38E-04
10	41.8	231.9	0.17	2.62E-04
15	52.5	221.1	0.21	3.37E-04
			Average	4.56E-04

Test 2

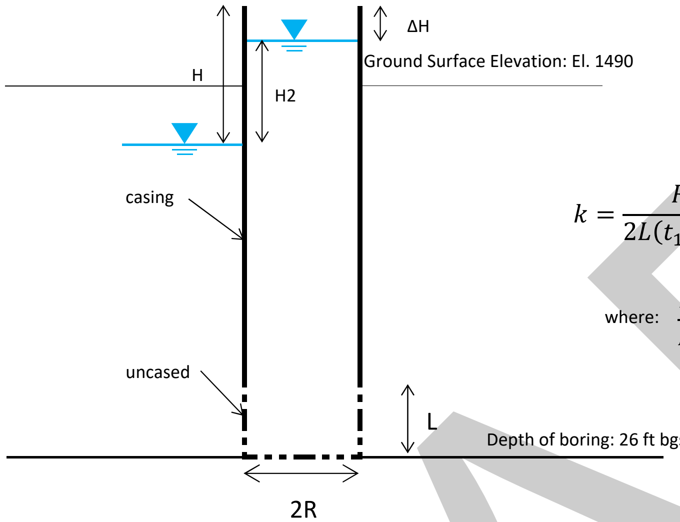
Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	7.0	266.6	0.03	2.05E-04
2	13.3	260.4	0.05	3.93E-04
3	18.5	255.1	0.07	5.54E-04
4	22.5	251.1	0.09	6.79E-04
5	27.0	246.6	0.10	8.22E-04
10	42.3	231.4	0.17	2.65E-04
15	52.5	221.1	0.21	3.37E-04
			Average	4.65E-04

Average Permeability at 40 ft bgs: 4.60E-04 cm/sec

GOMEZ AND SULLIVAN
ENGINEERS

Project: Mountain View Lake Dam
Client: Town of Bellmont, NY
Location: Bellmont, NY
Project No.: 1937

Boring No.: B-4
Date: 1/8/2018
Time: 11:00 AM
Weather: 22°F, Clear



$$k = \frac{R^2}{2L(t_1 - t_2)} \ln\frac{L}{R} \ln\frac{H_1}{H_2}$$

where: $\frac{L}{R} > 8$

Stickup (ft): 0.25
Depth of Boring (ft): 26.0
Casing Length (ft): 25.0
H, Depth to groundwater (ft bgs): 3.8

Casing Diameter (in): 3
L (in): 15
Drilling Method: Drive and wash
Water Temperature: 36°F

Test 1

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	1.4	44.2	0.03	2.24E-04
2	2.6	43.0	0.06	4.33E-04
3	3.1	42.5	0.07	5.19E-04
4	4.6	41.0	0.11	7.82E-04
5	5.3	40.4	0.12	8.94E-04
10	10.0	35.6	0.25	3.62E-04
15	14.1	31.5	0.37	5.42E-04
			Average	5.37E-04

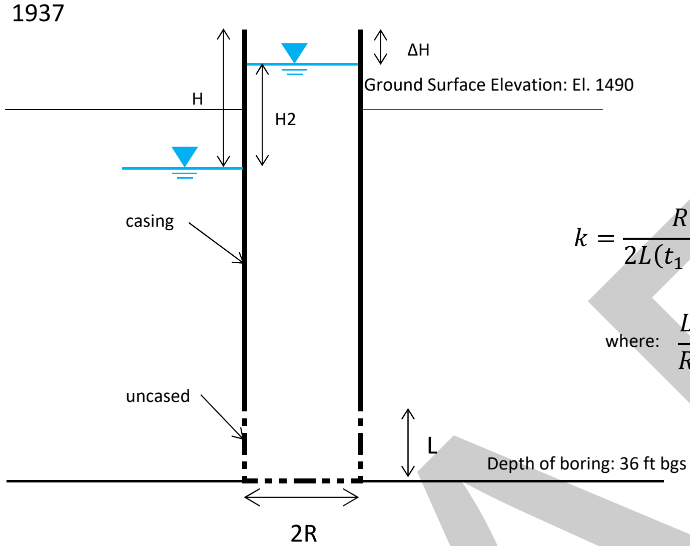
Test 2

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.000	0.0	--	--
1	1.250	44.4	0.03	2.03E-04
2	2.750	42.9	0.06	4.55E-04
3	3.125	42.5	0.07	5.19E-04
4	4.375	41.2	0.10	7.37E-04
5	5.125	40.5	0.12	8.72E-04
10	9.750	35.9	0.24	3.52E-04
15	13.625	32.0	0.35	5.19E-04
			Average	5.22E-04

Average Permeability at 26 ft bgs: 5.29E-04 cm/sec

GOMEZ AND SULLIVAN ENGINEERS

Project:	Mountain View Lake Dam	Boring No.:	B-4
Client:	Town of Bellmont, NY	Date:	1/8/2018
Location:	Bellmont, NY	Time:	3:30 PM
Project No.:	1937	Weather:	22°F, Clear



$$k = \frac{R^2}{2L(t_1 - t_2)} \ln\frac{L}{R} \ln\frac{H_1}{H_2}$$

where: $\frac{L}{R} > 8$

Stickup (ft):	0.25	Casing Diameter (in):	3
Depth of Boring (ft):	36.0	L (in):	15
Casing Length (ft):	35.0	Drilling Method:	Drive and wash
H, Depth to groundwater (ft bgs):	3.8	Water Temperature:	36°F

Test 1

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	23.1	22.5	0.71	5.17E-03
2	30.4	15.2	1.10	8.02E-03
3	32.8	12.9	1.27	9.26E-03
4	33.6	12.0	1.34	9.77E-03
5	34.1	11.5	1.38	1.01E-02
10	35.6	10.0	1.52	2.22E-03
15	37.5	8.1	1.73	2.53E-03
			Average	6.72E-03

Test 2

Time (min)	ΔH (in)	H2 (in)	ln H1/H2	k (cm/sec)
0	0.0	0.0	--	--
1	23.1	22.5	0.71	5.17E-03
2	31.3	14.4	1.16	8.45E-03
3	34.1	11.5	1.38	1.01E-02
4	36.1	9.5	1.57	1.15E-02
5	37.0	8.6	1.67	1.22E-02
10	38.0	7.6	1.79	2.62E-03
15	40.0	5.6	2.10	3.07E-03
			Average	7.58E-03

Average Permeability at 36 ft bgs: 7.15E-03 cm/sec

Appendix B. Opinion of Probable Construction Cost

Mountain View Lake Dam

Draft: Screening Level Opinion of Probable Costs

Alternative 1 - Dam Rehabilitation

Rev. March 2018 (WJF)

Item	Description	Unit	Quantity	Unit Price ($)	Estimated Cost($)
1	Mobilization and Demobilization (10% of Subtotal)	Allowance			$63,000
	Spillway Structure - Removal				
2	Timber Crib Removal	CY	67	$90	$6,000
3	Excavation	CY	130	$30	$4,000
	Gate Structure - Removal				
4	Concrete Removal	CY	105	$90	$9,000
5	Gate Removal	LS	1	$2,000	$2,000
6	Excavation	CY	65	$30	$2,000
	Concrete Placement				
7	Spillway Concrete	CY	140	$550	$77,000
8	Concrete Aprons	CY	100	$650	$65,000
9	Grout Voids Below Structures	CY	180	$800	$144,000
	Remove and Replace Abutments				
10	Excavation	CY	260	$90	$23,000
11	Concrete Retaining Wall	CY	60	$2,000	$120,000
	Gate Rehabilitation				
12	Gate Rehabilitation	Lump Sum	1	$30,000	$30,000
	Site Access				
13	Access Road, Ramps, Etc	LS	1	$30,000	$30,000
14	Care and Diversion of Water	Allowance	1	$115,000	$115,000

Subtotal	$690,000
Contingency (30%)	$207,000
Engineering Design Services @ 8 %	$71,760
Construction Phase Services [1]	$56,000
Construction Admin. (3%)	$21,000
Escalation for 2019 Construction (2%)	$20,915
Total Cost	$1,067,000

Notes:

1 - Construction Phase Services assume weekly visits from engineering firm, construction lasts ~6 months.

Mountain View Lake Dam

Draft: Screening Level Opinion of Probable Costs

Alternative 2A - Ogee Spillway

Rev. March 2018 (WJF)

Item	Description	Unit	Quantity	Unit Price ($)	Estimated Cost($)
1	Mobilization and Demobilization (10% of Subtotal)	Allowance			$92,000
	Spillway Structure - Removal				
2	Timber Crib Removal	CY	175	$90	$16,000
3	Left Abutment Removal	CY	190	$90	$17,000
4	Excavation	CY	80	$30	$2,000
	New Ogee Spillway				
5	Spillway Concrete	CY	550	$550	$303,000
6	Reinforced Concrete Abutment Walls	CY	65	$650	$42,000
7	Hand Rails	LF	120	$75	$9,000
8	Excavation	CY	555	$30	$16,700
9	Supplemental Stone Protection (D/S Dam)	CY	20	$150	$3,000
10	Access Bridge to Gate Structure	SF	100	$95	$9,500
	Right Gate Structure - Removal				
11	Concrete Removal	CY	105	$90	$9,000
12	Gate Removal	LS	1	$2,000	$2,000
13	Excavation	CY	65	$30	$2,000
	New Low-Level Outlet				
14	Reinforced Concrete	CY	120	$650	$78,000
15	Hand Rail	LF	25	$75	$2,000
16	Steel Grating Walkway	SF	100	$90	$9,000
17	4' x 4' Sluice Gate	EA	1	$14,000	$14,000
	Foundation Stabilization				
18	Cut-off Wall	LS	1	$240,000	$240,000
	Site Access				
19	Access Road, Ramps, Etc	LS	1	$30,000	$30,000
	Care and Diversion of Water	Allowance	1	$115,000	$115,000

Subtotal	$1,011,000
Contingency (30%)	$303,000
Engineering Design Services @ 8 %	$105,120
Construction Phase Services [1]	$56,000
Construction Admin. (3%)	$30,000
Escalation for 2019 Construction (2%)	$30,102
Total Cost	$1,505,000

Notes:

1 - Construction Phase Services assume weekly visits from engineering firm, construction lasts ~6 months.

Mountain View Lake Dam

Draft: Screening Level Opinion of Probable Costs

Alternative 2B - Labyrinth Spillway

Rev. March 2018 (WJF)

Item	Description	Unit	Quantity	Unit Price ($)	Estimated Cost($)
1	Mobilization and Demobilization (10% of Subtotal)	Allow			$136,000
	Spillway Structure Removal				
2	Timber Crib Removal	CY	175	$90	$16,000
3	Left Abutment Removal	CY	190	$90	$17,000
4	Excavation	CY	80	$30	$2,000
	New Labyrinth Spillway				
5	Reinforced Concrete Slab	CY	579	$550	$318,000
6	Reinforced Concrete Labyrinth Walls	CY	155	$1,400	$217,000
7	Reinforced Concrete Labyrinth Walls - Tight Quarters	CY	50	$1,800	$90,000
8	Hand Rail	LF	125	$75	$9,000
9	Excavation	CY	1,400	$30	$42,000
10	Reinforced Concrete Abutments	CY	70	$650	$45,500
11	Supplemental Stone Protection (D/S Dam)	CY	20	$150	$3,000
	Right Gate Structure - Removal				
12	Concrete Removal	CY	105	$90	$9,000
13	Gate Removal	LS	1	$2,000	$2,000
14	Excavation	CY	65	$30	$2,000
	New Low-Level Outlet				
15	Reinforced Concrete	CY	120	$650	$78,000
17	4' x 4' Sluice Gate	LS	1	$14,000	$14,000
18	Steel Grating Walkway	SF	100	$90	$9,000
18	Hand Rail	LF	40	$75	$3,000
	Care and Diversion of Water	Allow	1	$95,000	$95,000
	Foundation Stabilization				
20	Cut-off Wall	LS	1	$240,000	$240,000
	Site Access				
21	Access Road, Ramps, Etc	LS	1	$30,000	$30,000
	Care and Diversion of Water	Allowance	1	$135,000	$135,000

Subtotal	$1,377,000
Contingency (30%)	$413,000
Engineering Design Services @ 8 %	$143,200
Construction Phase Services (1)	$90,000
Construction Admin. (3%)	$41,000
Escalation for 2019 Construction (2%)	$41,284
Total Cost	$2,064,000

Notes:

1 - Construction Phase Services assume weekly visits from engineering firm, construction lasts ~8 months.