ADDENDUM NO. 1

2014 - Grove Road Bridge Replacement

Essex County, NY

June 30, 2014

TO ALL HOLDERS OF BIDDING DOCUMENTS:

This Addendum, issued to bid document holders of record, indicates clarifications to the bid documents for the 2014 - Grove Road Bridge Replacement project. All clarifications described herein shall be incorporated into the Contractor's bid proposal. This Addendum is part of the Contract Documents. Adjustments required by each item shall be understood to apply to all document references affected by the clarifications described.

1. **General:** A Pre-Bid meeting was held for the project at the site on June 26, 2014 at 9:30 AM. Minutes from the meeting are enclosed and are a part of this Addendum and the Contract Documents.

2. **General:** A copy of the Geotechnical Report for the project is attached to this Addendum for reference only. This report is provided for informational purposes and shall not be considered to be part of the contract documents. If distributed to others by the bidder or contractor, it must be delivered in its entirety only.

   It is the bidder's responsibility to determine if the information contained in this geotechnical report is adequate for bidding purposes. The bidders may make their own investigations, tests and analyses for use in bid preparation if additional information is required. Contractors will not be relieved of any of their obligations for performance of the work for the project, nor shall they be entitled to any additional compensation on the premise of differing subsurface conditions or soils types which may be encountered.

   Individual subsurface boring logs were prepared based upon the visual classifications and laboratory testing. The individual subsurface logs and keys explaining the terms used in their preparation are presented in the geotechnical report and should be reviewed for a description of the conditions encountered at the specific test boring locations. It should be understood that conditions are only known at the specific depths and locations sampled. Conditions at other depths and locations may differ. Determinations of earthwork quantities for bidding must not rely solely on the soil strata thicknesses measured at the discrete test boring locations completed for this investigation. The bidder should perform their own explorations as needed to obtain representative thicknesses of soil layers and strata as required to prepare their bids for the work.

3. **Regarding Drawing C-5:** *Typical Pedestrian Fence Detail* - DELETE the entire detail and SUBSTITUTE THEREFORE the attached *Typical Pedestrian Fence Detail.*

4. **Regarding Drawing N-1:** *Pedestrian Fence Notes* - DELETE all references to fence system bottom rails, boulevard clamps, tension bars and tension bands.

END OF ADDENDUM NO. 1
(attachments)

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PRE-BID MEETING MINUTES

Report Date: June 30, 2014

Project: 2014 - Grove Road Bridge Replacement

Attending:
Carl B. Schoder, PE - Schoder Rivers Assoc.
Matthew Huntington, PE - Schoder Rivers Assoc.
James Dougan - AES Northeast, PLLC
Chris Garrow - Essex Co. DPW
Kirk Bassarab, PE - Essex Co. DPW
Randy Douglas - Town of Jay
Paul Mintz - Town of Jay
John Dockum - Town of Jay
Mark Vondell - Town of Jay
Gary Olcott - Peckham Road Corp.
Brian Mergenthaler - US Bridge, Inc.
Paul Laskey - Contech, Inc.
Jamie Flynn - Kubricky Construction
Scott Pierce - Bast Hatfield

Distribution: Via posting on the Essex County Website as a part of Addendum No. 1 for access by all holders of bidding documents.

A scheduled pre-bid meeting was held for the above referenced project on June 26, 2014 at 9:30 AM at the project site. The following items were discussed:

1. Schoder reviewed bidding and construction requirements for the project, the project schedule, and similar items as stated in the bidding documents.

2. Bassarab reviewed the schedule for completion of overhead utility relocations. It is anticipated that a work order for NYS Electric and Gas will be in place at the time of bid for the project. The contractor must schedule the directional drilling work for the installation of the new sewer force main river crossing to coordinate with the pole relocation schedule to be provided by the utility company.

3. Schoder reviewed maintenance and protection of traffic requirements for the project, noting that the Contractor is required to provide a Maintenance and Protection of Traffic Plan submittal indicating the proposed means and methods of keeping the existing bridge open to traffic until the new bridge is ready for use. The plan shall include proposed methods for keeping traffic open on School Street at all times, staging cranes within the work area, installation and removal of safe operation temporary earth support systems, protecting new utility poles if they are located within existing travel lanes, and similar items to occur within the work area.

4. Schoder noted that the relocation of the west side of School Street at the northwest corner of the intersection with Grove Road must be completed prior to the installation of the temporary earth support system required for construction of the west abutment. A temporary compacted gravel driving surface is acceptable at this location until final paving work is performed. Essex county DPW will provide signage at this intersection as required to indicate a one-way traffic flow at the temporary gravel roadway

and to limit truck traffic from turning from and into the north section of School Street.

5. Schoder noted that the Geotechnical Investigation Report prepared during the design phase of the work will be made available as a part of Addendum No. 2 for the project.

6. Dougan noted that reconstruction work within the existing sewer pump station located at the southwest corner of the intersection of School Street and Grove Road will be occurring while the bridge project is under construction. The contractor shall provide access to this pump station at all times. Dougan noted that an emergency generator will also be installed south of the pump station outside of the project work area.

7. In clarification of Note 9 on Drawing C-6, the contractor shall include in their bid 5 cubic yards of flowable fill to be used for the sealing of the existing north (in) invert at Sewer Manhole MH-2.

8. In modification of *Bridge Superstructure Notes* on Drawing N-2, Note No. 13, the bridge trusses may be fabricated and delivered in two or three sections. All shop and field connections for the bridge system shall be bolted connections.

The meeting adjourned at 11:00 AM.

Respectfully submitted:

Carl B. Schoder

Carl B. Schoder, PE
Principal

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November 27, 2013

Mr. Anthony LaVigne
Essex County DPW
8053 Route 9
Elizabethtown, NY 12932

Re: Geotechnical Study
Grove Road Bridge
Ausable Forks, NY
Dente File No. FDE-13-190

Gentlemen;

At your request, we completed a subsurface investigation and a geotechnical evaluation for the Grove Road Bridge located in the town of Ausable Forks, New York. Presented herein is a summary of the subsurface investigation results and our recommendations to assist in planning for its replacement.

PROJECT AND SITE DESCRIPTION

The existing bridge was originally constructed in the early 1900's and it's west foundation and its abutment were undermined by several feet in 2011 as a result of heavy flooding. Large stone rip rap was placed about the abutment foundation in 2012 as a temporary repair method to improve the stability of the abutment and to limit the potential for additional scour.

As we understand it the bridge will be replaced with a new steel truss spanning across the East Branch of the Ausable River about 125 feet . The location of the bridge is shown on the attached portion of the Boring Location Plan together with the current and 1903 USGS topographic quadrangles for the area. These maps are provided to assist the reader in locating the site and reviewing the topography of the general area within which it exists.

SUBSURFACE CONDITIONS

Five test borings were completed at the approximate locations shown on the attached Subsurface Investigation Plan, one in 2012 and four in 2013. As the borings were advanced, soil samples were recovered in general accord with the Standard Procedure for Penetration Test and Split-Spoon Sampling of Soil, ASTM D1586. Where boulders and bedrock were encountered core sampling was performed in general accord with ASTM D

2113 procedures. Representative portions of the recovered soil and rock samples were visually classified by a geotechnician who prepared the attached subsurface logs.

It should be understood that the boring logs present a description of the conditions encountered on the date, specific location investigated and the depths sampled. Conditions at locations and depths other than those investigated may differ, and these differences may impact upon the geotechnical recommendations. It should also be understood that conditions can change with time. The subsurface logs should be reviewed for the specific conditions encountered at the investigated location.

Beneath the pavement and subbase at all locations, fill was encountered. At the locations on the west shore, the fill consisted of compact, brown/black, fine to coarse grained sand and gravel with some cinders and rubble in varying relative proportions and extended to depths beneath the grade of about 8 to 13 feet.

Below these fill materials on the west shore are indigenous deposits of fine to coarse grained sand and gravel with little silt. These alluvial soils were firm to compact, brown, and also contained numerous cobbles and boulders. Borings B-3 and 4 advanced in 2013 on the west side of the river met refusal in boulders on several attempts at the locations investigated. In 2012, Boring B-1, found these soils extended to a depth of about 23 feet where they graded into a brown/gray fine grained sand with lesser amounts of medium to coarse grained sand and gravel. These soils in turn graded to a firm, well graded sand and gravel with little silt that extended to depths of about 42 feet where a dense glacial till soil was encountered. The till soils were grayish brown sand, silt, and gravel, also likely containing cobbles and boulders. These soils were wet and very compact in relative density. The deepest boring was ended within the till soils at a depth of about 46 feet below the road grade.

On the east side of the river, abutment and foundation backfill was also encountered and it consisted of compact, brown and black, fine to coarse grained sand and gravel with some slag, cinders and rubble including steel and trash in varying relative proportions which extended to depths beneath the grade of about 12 to 13 feet. Below the fill materials are indigenous deposits of fine to coarse grained sand and gravel with little silt. These alluvial soils were loose, brown, and did not contain boulders. Bedrock was encountered beneath these soils at depths of about 17 and 19 feet and was core sampled. The core, a Granitic Gneiss, was hard and sound with a recovery of 94% and an RQD of 73%.

Groundwater measurements were attempted during the test boring drilling as reported on the logs. The groundwater measurements within the augers in these deposits are considered representative of stabilized conditions. In our opinion, the groundwater level will generally be at or near the water level in the river throughout the year.

Geotechnical Recommendations

In our opinion the planned bridge may be supported upon spread foundations within sheet piles installed for scour protection, if required, or driven or drilled in piles. It should be understood that if the spread foundation option is selected, all fills and any organic materials contained within or beneath these fill soils must be removed from beneath the foundation. If spread foundations and a sheet pile abutment are not selected, drilled in micro piles or driven H-pile foundations are considered an alternative. However because of the cobbles and numerous boulders present, the H-Pile installation may prove difficult.

Based on the available subsurface information Seismic Site Class D would be applicable for the conditions at the west abutment and either C or B for the east abutment dependent upon the foundation selected and its depth. The soils beneath the site should not liquify during the design seismic event.

Steel sheet piles may be used to form a cofferdam or an abutment wall, both designed as a cantilever or tied back system. If steel sheetpiling is used, it will be necessary to remove obstructions as the fills contain rubble, steel and boulders and the native soils contain cobbles and numerous boulders.

Excavation to establish bearing for soil bearing foundations should proceed through the fill and any buried organic soils or at least one (1) foot beneath these grades, whichever is deeper. Structural fill required to establish the design bearing grade should extend beyond the edge of the foundations a distance at least equal to half the depth of the structural fill placed beneath the foundations. The bearing grade excavation should be backfilled with a crusher-run stone similar in gradation and quality to a NYSDOT Section 304 Type 2 Material. The material should be placed in a single lift and be compacted to at least 95 percent of its maximum dry density established through the procedures of ASTM D-1557, the Modified Proctor Test. If the grades are established at or within a foot of the stream/groundwater levels, we recommend the foundation grade be prepared by placing a layer of synthetic fabric such as Mirafi 500X upon the approved bearing grade, followed by at least 12 inches of a 50/50 blend of NYSDOT number 1 and 2 sized aggregate to create a working surface that can also be dewatered with ordinary sumps and pumps set within it.

Dependent upon river levels during construction, the excavations planned may penetrate saturated soils and groundwater, which will coincide with the river levels in the immediate project area. Common sump and pump techniques from within cofferdam sheets should be capable of limited depression and control of the water table at this site with deeper wells within the sheet piling required for depression of more than a few feet. The dewatering system must be designed and operated to assure that the system does not fail and allow groundwater to rise, possibly creating "quick" conditions at the bearing grades within the cofferdam or buoyant forces upon partially completed structures.

Sheet pile cantilever walls or enclosed cofferdams should be designed to achieve stability for varying water elevations that might occur during the construction process. The Contractor's dewatering plan, as well as any construction sheeting and shoring, should be designed by a Licensed Professional Engineer. The design should meet the requirements of 29 CFR Part 1926 Occupational Safety and Health Standards - Excavations for Type C Soils.

The structural fill used to backfill the abutment walls above the water table should consist of NYSDOT Section 304 Type 4 Processed Sand and Gravel material. The fill should be placed in loose layers no more than one (1) foot thick and each layer be compacted to no less than 95 percent of the material's maximum dry density determined through the procedures of ASTM D-1557, the Modified Proctor Compaction test.

The following parameters are recommended for use in the design of the bridge foundations, abutments, and wing walls;

Fill Parameters

1.	Overburden Unit Weight (Total)	=	125 lbs/Cu. Ft.
2.	Friction Angle of Soil	=	30 Degrees
3.	Coefficient of Active Earth pressure	=	0.33
4.	Coefficient of At-Rest Earth pressure	=	0.5
5.	Coefficient of Passive Earth pressure	=	3.0
6.	Coefficient of Sliding Friction	=	0.58
7.	Resistance Factor for Passive Resistance	=	0.50
8.	Resistance Factor for Shear Resistance	=	0.80

Sand/Gravel/Silt Overburden Parameters

(1)	Factored Bearing Resistance	=	5,000 PSF
(2)	Nominal Bearing Resistance	=	15,000 PSF
(3)	Overburden Unit Weight (Total)	=	135 lbs/Cu. Ft.
(4)	Friction Angle of Soil	=	32 Degrees
(5)	Coefficient of Active Earth pressure	=	0.31
(6)	Coefficient of At-Rest Earth pressure	=	0.47
(7)	Coefficient of Passive Earth pressure	=	3.25
(8)	Coefficient of Sliding Friction	=	0.58
(9)	Resistance Factor for Passive Resistance	=	0.50
(10)	Resistance Factor for Shear Resistance	=	0.80

Abutment and sheet pile abutment walls should be designed to restrain lateral earth pressures calculated for the At-Rest Condition. Wing and temporary cofferdams may be designed to resist Active Lateral Earth Pressures.

Settlement of the bridge's spread foundations, where bearing on soil, should occur in a semi-elastic manner as loads are actually applied and cease with each incremental loading of the foundations. We believe that the foundations will settle in total and differentially less than about one (1) inch, provided our recommendations concerning bearing grade preparation are followed. It should be understood that actual settlements will be dependent in great part upon the care exercised during bearing grade preparation.

The east abutment foundation may also be designed to bear upon the bedrock surface, however, it may prove difficult to install a cofferdam and dewater the soils above the bedrock as the Gneiss rock is hard and the sheets will not create a good seal with the irregular rock surface. It may be necessary to perform cement or silicate grouting about the sheet piles to seal the interface and allow dewatering to proceed effectively.

The rock bearing foundation may be designed for a nominal rock bearing resistance of 30 tons per square foot (tsf) and a resistance factor of 0.60. The unfactored coefficient of friction between the concrete and bedrock may be assumed equal to 0.70.

Uplift and overturning loads may be resisted by the weight of the foundation and if necessary rock anchors. The rock anchors may be designed on the basis of an allowable bond stress between the bedrock and annulus grout equal to 100 pounds per square inch (psi). The anchors should be post-tensioned, double corrosion protected and designed and installed in general accord with the "Post Tensioning Institute Recommendations on Rock and Soil Anchors." A unit weight of 160 pcf can be assumed for the bedrock within the zone of influence of the anchor(s).

At least one anchor should be performance tested to verify the suitability of the design parameters and enable modifications to be made prior to installation of the remaining anchors. The performance tests should be made by loading the anchor and measuring its elongation to the nearest 0.001 inch per the recommendations from Section 3.7.1 of the Post Tensioning Institute publication. After the performance test has been evaluated and any modifications in anchor design made, the remaining anchor installations can proceed. All anchors should be proof-tested per Section 3.7.2 of the Post Tensioning Institute publication.

If spread foundation and scour protection are not selected for this site, we recommend that the bridge's west abutment be supported with either driven H piles or drilled in micro piles both designed to develop their capacity through shear and tip resistance within the overburden soils and/or bedrock at these sites.

Drilled Micro Pile Foundations

The micro piles should be designed and constructed with a minimum eight (8) inch diameter and may be permanently cased or uncased as desired and reinforced as necessary. We anticipate that the piles will require temporary casing throughout their depth to maintain stability of the holes during their construction.

The tabulations presented subsequently provide a summary of recommended allowable capacity versus diameter and embedment within the overburden or bedrock, if encountered.

It should be noted that the design of the bridge piles assumes that support will be developed through skin friction within the overburden soils.

MICRO PILE LENGTH (1)	PILE DIAMETER VS. FACTORED & NOMINAL BEARING RESISTANCE (KIPS)	
	8"	12"
30'	45 / 100	90 / 200

1. Assumes pile is embedded entirely within overburden soils. If bedrock is encountered above the planned bearing depth, the pile should terminate ten feet into bedrock or at the design length, whichever is less.

Capacities at other diameters and lengths should not be interpolated. All total capacities should be reviewed by the geotechnical engineer prior to final design. Uplift capacity can be calculated as 65% of the allowable compression load to account for an increased Factor of Safety. Piles should be spaced no closer than about 30 inches edge to edge. In order to prevent disturbance to the setting grout, no pile installation should be permitted within 10 feet and not before 24 hours adjacent to a newly installed pile deriving support within the overburden.

Lateral loads should be resisted by battered piles. Further, the lateral load restraint of the pile caps may be included and evaluated using a net At-Rest lateral earth pressure equal to 60 pcf at a lateral translation of ¼- inch.

Settlement of the piles should be limited to elastic compression of the shafts provided our recommendations are followed.

Driven H-Pile Foundations
Steel H-piles driven to practical refusal in the till soils at depths below about 45 feet may be designed for a Nominal Bearing Resistance equal to the pile cross-sectional area times 23 kips per square inch and the Factored Bearing Resistance calculated using 10.5 kips per square inch . For example, HP10x42 section piles with area of 12.4 square inches would have a Factored Bearing Resistance of 130 kips (12.4 in^2 x 10.5 ksi). The pile sections can be assumed to develop lateral load capacities of at least 10 kips at translations of one-quarter (¼) inch or less with a semi fixed head condition.

The H-Piles should be fitted with a cast steel Pruyn Point Shoe HP75500 as manufactured by Associated Pile and Fitting Co., Inc. to protect the piles as they are driven into the till. The piles should be spaced no closer than three feet and at this spacing no pile group reduction factor for vertical loads is necessary. Group reductions for lateral loads will also not be required assuming a single row of piles supports the integral abutment.

The piles should be driven to refusal using a hammer with a minimum energy rating of 30,000 foot-pounds. After the pile tip reaches the expected till depth and penetration becomes 1-inch or less for 20 consecutive blows, refusal is achieved if the penetration for 20 additional blows is less than 1-inch.

A wave equation analysis should be performed to verify that the hammer, cushion, and pile section actually employed achieves the design capacity without over-stressing the pile. Dynamic load testing should be conducted on at least one pile. Results of the wave equation analysis and load testing can be used to refine the pile driving criteria.

Settlement of the pile top should consist of elastic shortening of the pile under the design load and penetration of the pile into the bearing surface. The total movement of the pile top should be less than one-half inch.

Summary

This report was prepared for specific application to the project site and the construction planned. It was prepared on the basis of a limited number of investigated locations at the site. Subsurface conditions at other than the investigated locations may be different. We should be allowed the opportunity to review appropriate plans and specifications prior to their release for bidding. The Geotechnical Engineer should be retained to observe and test earthwork and bearing grades during construction. This report was prepared using methods and practices common to Geotechnical Engineering in the area at the time, no other warranties, expressed or implied, are made.

A sheet entitled "Important Information about your Geotechnical Engineering Report" prepared by the Association of Engineering Firms Practicing in the Geosciences is attached to this report. This sheet should never be separated from this report and be carefully reviewed as it sets the only context within which this report should be used.

We appreciate the opportunity to be of service. Should questions arise or if we may be of any other service, please contact us at your convenience.

Yours truly,
Dente Engineering, P.C.

Fred A. Dente, P.E.
President

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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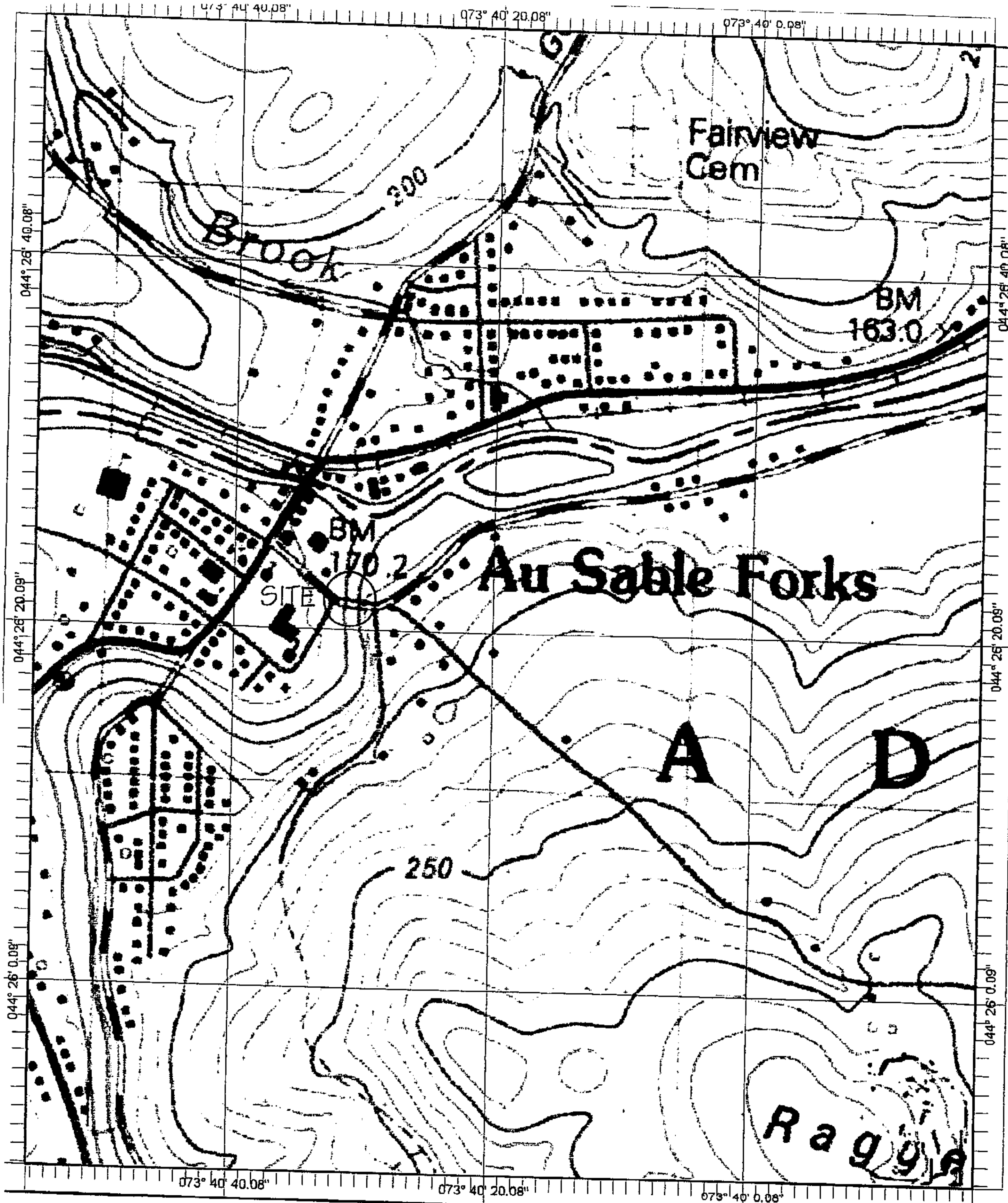
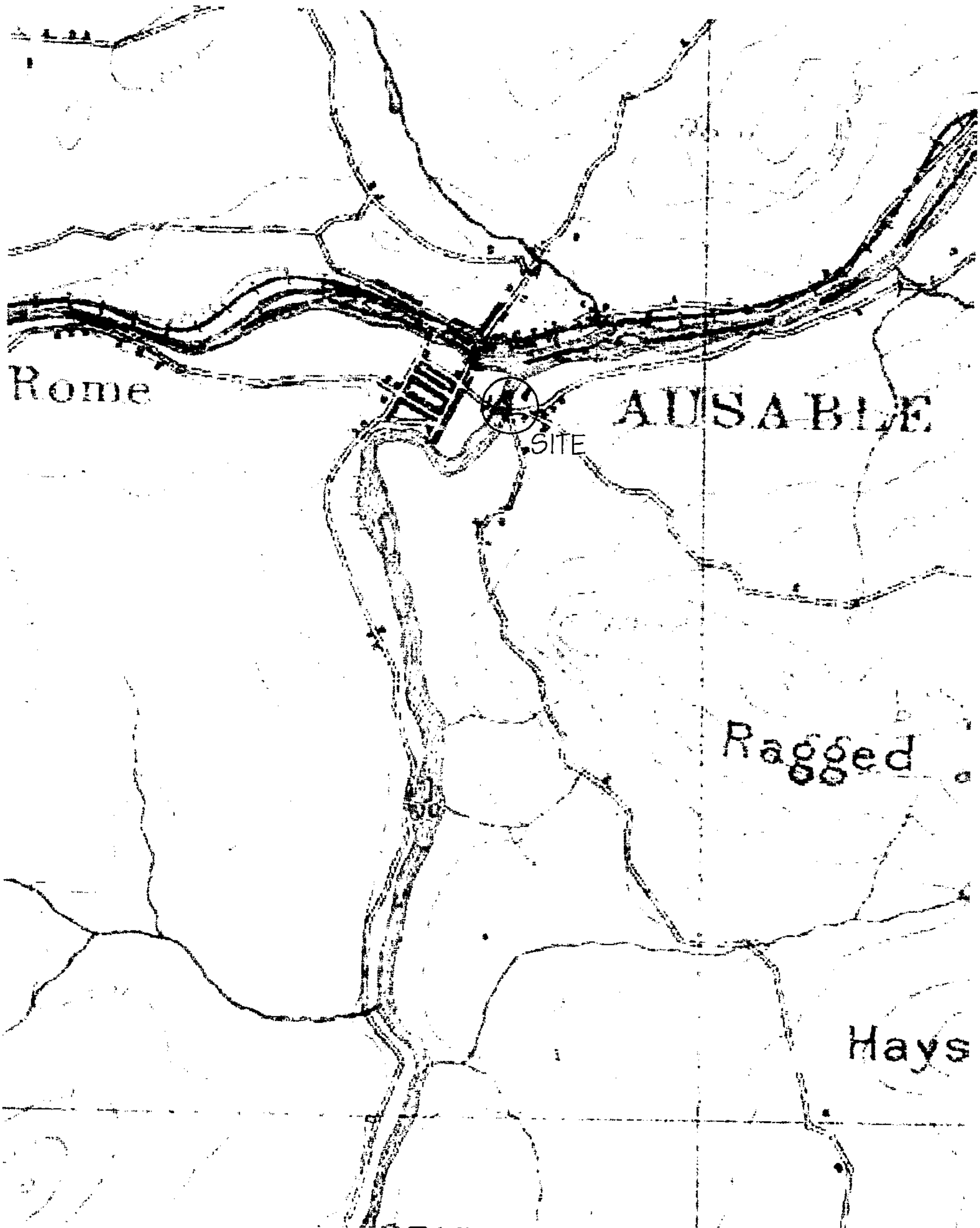
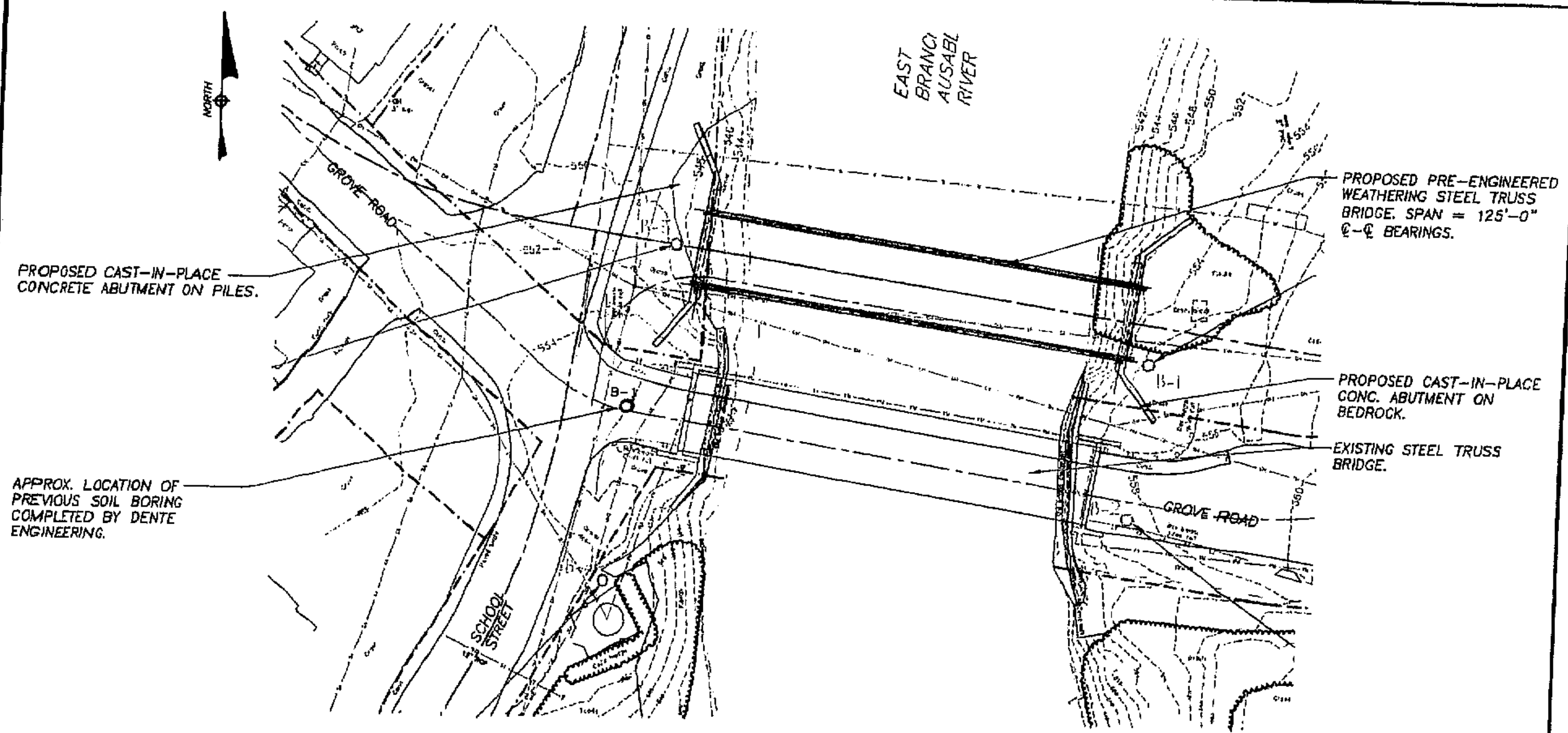


Name: AU SABLE FORKS
Date: 9/7/112
Scale: 1 inch equals 666 feet

Location: 044° 26' 21.5" N 073° 40' 16.9" W
Caption: GROVE ROAD BRIDGE
AUSABLE FORKS, NEW YORK
FDE-13-190



Grove Road Bridge, Au Sable Forks, New York 1903, FDE-13-190



BORING LOCATION PLAN

SCHODER RIVERS ASSOCIATES
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Evergreen Professional Park
453 Dixon Road, Suite 7, Bldg. 3
Queensbury, New York 12804
(518) 761-0417, FAX: (518) 761-0613

SCALE:	AS SHOWN	DRAWN BY:	SRA
DATE:	8/28/13	ENG. BY:	CBS
PROJ. NO:	12-474.07.1	CHK'D BY:	CBS

CLIENT NAME
ESSEX COUNTY D.P.W.
Elizabethtown, NY

DRAWING TITLE
GROVE ROAD BRIDGE REPLACEMENT
Ausable Forks, NY

REVISIONS

REV.	DATE	DESCRIPTION
1	9/10/13	

DRAWING NO.
SHT. 1 OF 1
REV. 1

INTERPRETATION OF SUBSURFACE LOGS

The Subsurface Logs present observations and the results of tests performed in the field by the Driller, Technicians, Geologists and Geotechnical Engineers as noted. Soil/Rock Classifications are made visually, unless otherwise noted, on a portion of the materials recovered through the sampling process and may not necessarily be representative of the materials between sampling intervals or locations.

The following defines some of the terms utilized in the preparation of the Subsurface Logs.

SOIL CLASSIFICATIONS

Soil Classifications are visual descriptions on the basis of the Unified Soil Classification ASTM D-2487 and USBR, 1973 with additional comments by weight of constituents by BUHRMASTER. The soil density or consistency is based on the penetration resistance determined by ASTM METHOD D1586. Soil Moisture of the recovered materials is described as DRY, MOIST, WET or SATURATED.

SIZE DESCRIPTION		RELATIVE DENSITY/CONSISTENCY (basis ASTM D1586)			
		GRANULAR SOIL		COHESIVE SOIL	
SOIL TYPE	PARTICLE SIZE	DENSITY	BLOWS/FT.	CONSISTENCY	BLOWS/FT.
BOULDER	> 12	LOOSE	< 10	VERY SOFT	< 3
COBBLE	3" - 12"	FIRM	11 - 30	SOFT	4 - 5
GRAVEL-COARSE	3" - 3/4"	COMPACT	31 - 50	MEDIUM	6 - 15
GRAVEL - FINE	3/4" - #4	VERY COMPACT	50 +	STIFF	16 - 25
SAND - COARSE	#4 - #10			HARD	25 +
SAND - MEDIUM	#10 - #40				
SAND - FINE	#40 - #200				
SILT/NONPLASTIC	< #200				
CLAY/PLASTIC	< #200				

SOIL STRUCTURE		RELATIVE PROPORTION OF SOIL TYPES	
STRUCTURE	DESCRIPTION	DESCRIPTION	% OF SAMPLE BY WEIGHT
LAYER	6" THICK OR GREATER	AND	35 - 50
SEAM	6" THICK OR LESS	SOME	20 - 35
PARTING	LESS THAN 1/4" THICK	LITTLE	10 - 20
VARVED	UNIFORM HORIZONTAL PARTINGS OR SEAMS	TRACE	LESS THAN 10

Note that the classification of soils or soil like materials is subject to the limitations imposed by the size of the sampler, the size of the sample and its degree of disturbance and moisture.

ROCK CLASSIFICATIONS

Rock Classifications are visual descriptions on the basis of the Driller's, Technician's, Geologist's or Geotechnical Engineer's observations of the coring activity and the recovered samples applying the following classifications.

CLASSIFICATION TERM	DESCRIPTION
VERY HARD	NOT SCRATCHED BY KNIFE
HARD	SCRATCHED WITH DIFFICULTY
MEDIUM HARD	SCRATCHED EASILY
SOFT	SCRATCHED WITH FINGERNAIL
VERY WEATHERED	DISINTEGRATED WITH NUMEROUS SOIL SEAM
WEATHERED	SLIGHT DISINTEGRATION, STAINING, NO SEAMS
SOUND	NO EVIDENCE OF ABOVE
MASSIVE	ROCK LAYER GREATER THAN 36" THICK
THICK BEDDED	ROCK LAYER 12" - 36"
BEDDED	ROCK LAYER 4" - 12"
THIN BEDDED	ROCK LAYER 1" - 4"
LAMINATED	ROCK LAYER LESS THAN 1"
FRACTURES	NATURAL BREAKS AT SOME ANGLE TO BEDS

Core sample recovery is expressed as percent recovered of total sampled. The ROCK QUALITY DESIGNATION (RQD) is the total length of core sample pieces exceeding 4" length divided by the total core sample length for N size cored.

GENERAL

- Soil and Rock classifications are made visually on samples recovered. The presence of Gravel, Cobbles and Boulders will influence sample recovery classification density/consistency determination.
- Groundwater, if encountered, was measured and its depth recorded at the time and under the conditions as noted.
- Topsoil or pavements, if present, were measured and recorded at the time and under the conditions as noted.
- Stratification Lines are approximate boundaries between soil types. These transitions may be gradual or distinct and are approximated.

DENTE ENGINEERING, P.C.

SUBSURFACE LOG B-1

PROJECT: Grove Road Bridge	**DATE**	START: 10/23/13	FINISH: 10/23/13
LOCATION: Au Sable Forks, New York	**METHODS:** 3 1/4" Hollow Stem Augers, ASTM D1586 Drilling Methods with Auto Hammer		
CLIENT: Essex County DPW			
JOB NUMBER: FDE-13-190	**SURFACE ELEVATION:** +/- 556.0'		
DRILL TYPE: CME 45C	**CLASSIFICATION:** O.Burns		

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	+/- 1" Topsoil
	1	1	2				FILL: Brown F-M SAND, Little Coarse Sand
				2	2	4	and Gravel (MOIST)
	2	2	3				Grades Light Brown/Dark Brown Mottled
				2	2	5	
	3	8	11				Grades Black CINDERS and SLAG
5'				11	41	22	
	4	50/.1				50+	cobble note
	5	50/.2				50+	
10'	6	8	4				Grades Brown F-C SAND, Some Gravel,
				2	6	6	Little Organics
	7	50/.2				50+	Grades Dark Brown/Black
							(MOIST, LOOSE, FIRM, AND V. COMPACT)
15'	8	WH	1				Brown/Dark Brown Mottled F-M SAND, Little
				7	50/.4	8	Coarse Sand and Silt **(WET, LOOSE)**
		Core Run #1 17.5'-22.5' REC=94% RQD=73%					White, Hard Hornblende Granitic GNEISS with Occasional Horizontal and Low Angle
20'							Fractures
25'							End of boring 22.5' depth.
							Driller notes several prior attempts were made to install the soil boring; the first extended to 8.0' depth, the second to 6.0' depth, and the third to 12.0' depth.
30'							

DENTE ENGINEERING, P.C.

SUBSURFACE LOG B-1.1

PROJECT: Grove Road Bridge	**DATE**	START: 9/6/12	FINISH: 9/7/12

LOCATION: Au Sable Forks, New York	**METHODS:** 4 1/4" Hollow Stem Augers with
CLIENT: Essex County DPW	ASTM D1586 Drilling Methods
JOB NUMBER: FDE-12-166	**SURFACE ELEVATION:**
DRILL TYPE: CME 55	**CLASSIFICATION:** O.Burns

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	+/- 4" Asphalt, +/- 14" Bankrun Base
	1	9	38				FILL: Brown/Black F-C SAND and GRAVEL,
				28	19	66	Some Cinders, trace brick and mortar (MOIST)
5'	2	5	28				
				16	20	44	
10'	3	13	16				
				15	6	31	(MOIST, COMPACT)
15'	4	8	12				Brown F-C SAND and GRAVEL, Little Silt
				9	5	21	(WET)
20'	5	19	31				Similar with cobbles and boulders noted
				19	17	50	(WET, FIRM TO COMPACT)
25'	6	4	5				Brown/Gray Fine SAND, Little Medium to
				7	9	12	Coarse Sand
30'							

DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-1.2		
PROJECT: Grove Road Bridge	**DATE**	START: 9/6/12	FINISH: 9/7/12
LOCATION: Au Sable Forks, New York	**METHODS:** 4 1/4" Hollow Stem Augers with ASTM D1586 Drilling Methods		
CLIENT: Essex County DPW			
JOB NUMBER: FDE-12-166	**SURFACE ELEVATION:**		
DRILL TYPE: CME 55	**CLASSIFICATION:** O.Burns		

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
	7	2	2				Brown Fine SAND, Little Medium to Coarse
				4	5	6	Sand and Gravel
							(WET, FIRM TO LOOSE)
							- - - - - - - - - - - -
35'	8	6	10				Brown/Gray F-C SAND and GRAVEL, Little
				15	20	25	Silt
40'	9	5	12				
				15	18	27	
							(WET, FIRM)
							- - - - - - - - - - - -
							TILL: Brown/Gray F-C SAND, Some Silt and
45'	10	18	55				Gravel **(WET, VERY COMPACT)**
				100/.4		155+	
							End of boring 46.4' depth with split spoon refusal.
50'							Groundwater measured at 14.5' depth within auger casings after Sample #4.
							Drilling mud was introduced to borehole after Sample #6.
55'							
60'							

DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-2		
PROJECT: Grove Road Bridge	**DATE**	START: 11/7/13	FINISH: 11/7/13

LOCATION: Au Sable Forks, New York	**METHODS:** 3 1/4" Hollow Stem Augers, ASTM
CLIENT: Essex County DPW	D1586 Drilling Methods with Auto Hammer
JOB NUMBER: FDE-13-190	**SURFACE ELEVATION:** +/- 558.0'
DRILL TYPE: CME 45C	**CLASSIFICATION:** O.Burns

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	+/- 1.5" Asphalt, +/- 4" Base
	1	10	14				FILL: Brown F-C SAND and GRAVEL,
				8	9	22	trace silt (MOIST)
	2	6	3				Grades Dark Brown/Black, Little Slag
				3	6	6	
5'	3	7	10				Grades to Black CINDERS
				5	13	15	
	4	5	19				NO RECOVER: cobble noted, steel noted
				12	7	31	at 8.0' depth
10'	5	20	20				Grades Brown/Red GRAVEL, Some F-C
				21	18	41	Sand
							(MOIST, FIRM, LOOSE, AND COMPACT)
15'	6	4	3				Brown F-M SAND, trace silt (WET), Grades
				1	1	4	to Dark Brown, trace organics
	7	1	2				**(WET, LOOSE)**
				50/.4		52+	ROCK noted **(WET, VERY COMPACT)**
20'							End of boring 18.4' depth with split spoon refusal.
							Top of rock noted at 18.0' depth.
							Groundwater measured at 14.8' depth within auger casings upon completion of borehole.
25'							Driller notes a prior attempt to install the soil boring extended to 8.0' depth when steel was encountered.
30'							

DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-3

PROJECT: Grove Road Bridge	**DATE**	START: 11/7/13 FINISH: 11/7/13

LOCATION: Au Sable Forks, New York	**METHODS:** 3 1/4" Hollow Stem Augers, ASTM
CLIENT: Essex County DPW	D1586 Drilling Methods with Auto Hammer
JOB NUMBER: FDE-13-190	**SURFACE ELEVATION:** +/- 549.0'
DRILL TYPE: CME 45C	**CLASSIFICATION:** O.Burns

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
	1	1	2				FILL: Brown to Black F-C SAND, Little
				4	5	6	Gravel and Asphalt (MOIST)
	2	5	5				Grades Some Slag
				7	5	12	
	3	2	2				Grades Some Cinders
5'				4	4	6	
	4	6	5				
				1	1	6	**(MOIST, LOOSE AND FIRM)**
	5	1	1				Brown F-C SAND, Little Gravel and Organic
				17	6	18	Silt and top of sample **(WET, FIRM)**
10'	6	7	14				Brown F-C SAND and GRAVEL
				21	3	35	
	7	11	1				
				6	4	7	
							(WET, LOOSE AND COMPACT)
15'	8	7	50/.4			50+	
							Boulders noted
20'							
							End of boring 20.5' depth.
25'							
30'							

End of boring 20.5' depth.
Groundwater measured at 10.3' depth within auger casings after Sample #7.
Driller notes two prior attempts were made to install soil boring. Steel was encountered at 5.5' depth, and boulders were noted within coring from 15.5' depth to 20.5' depth. A third soil boring attempt extended to 19.0' depth.

DENTE ENGINEERING, P.C.	SUBSURFACE LOG B-4		
PROJECT: Grove Road Bridge	**DATE**	START: 10/28/13	FINISH: 10/28/13
LOCATION: Au Sable Forks, New York	**METHODS:** 3 1/4" Hollow Stem Augers, ASTM D1586 Drilling Methods with Auto Hammer		
CLIENT: Essex County DPW			
JOB NUMBER: FDE-13-190	**SURFACE ELEVATION:** +/- 554.0'		
DRILL TYPE: CME 45C	**CLASSIFICATION:** O.Burns		

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
	1	2	50/.1			50+	FILL: Brown F-C SAND, Little Gravel and
							Concrete (MOIST)
							2.0' of concrete noted
	2	2	9				Grades Some Slag, trace glass, plastic, and
				5	4	14	wood
5'	3	1	8				NO RECOVERY: boulders noted
				8	30	16	Steel noted at 6.8' depth
	4	50/.4				50+	NO RECOVERY
	5	6	7				Grades Dark Brown, Little Coal
10'				15	20	22	Grades Some Gravel, trace glass
	6	11	5				**(MOIST, FIRM AND VERY COMPACT)**
				31	12	36	- - - - - - - - - - - - - - - -
							Brown F-C SAND and GRAVEL, Little Silt,
							boulders noted
15'	7	10	50/.4			50+	
							(WET, VERY COMPACT)
20'							
							End of boring 20.0' depth.
							Driller notes several prior attempts were
							made to install the soil boring; the first
							extended to 15.0' depth with 5.0' of coring
25'							in boulders, the second to 6.8' depth when
							steel was encountered, and the third to 12.8'
							depth when a boulder was noted from 12.8'
							to 14.3' depth.
30'							

Grove Road Bridge

Au Sable Forks, NY

Moisture Content Results - ASTM D2216

Boring No.	B-1	B-1	B-1	B-1		
Sample No.	779/S1	780/S4	781/S6	782/S9		
Sample Depth	1'-3'	15'-17'	25'-27'	25'-27'		
Tare Weight	234.80	298.60	297.80	298.00		
W_S + Tare	614.40	768.10	567.60	660.20		
W_D + Tare	601.44	716.82	529.14	633.33		
W_{WATER}	12.96	51.28	38.46	26.87		
$W_{DRY\ SOIL}$	366.64	418.22	231.34	335.33		
% Moisture (W_W / W_D)	3.5	12.3	16.6	8.0		

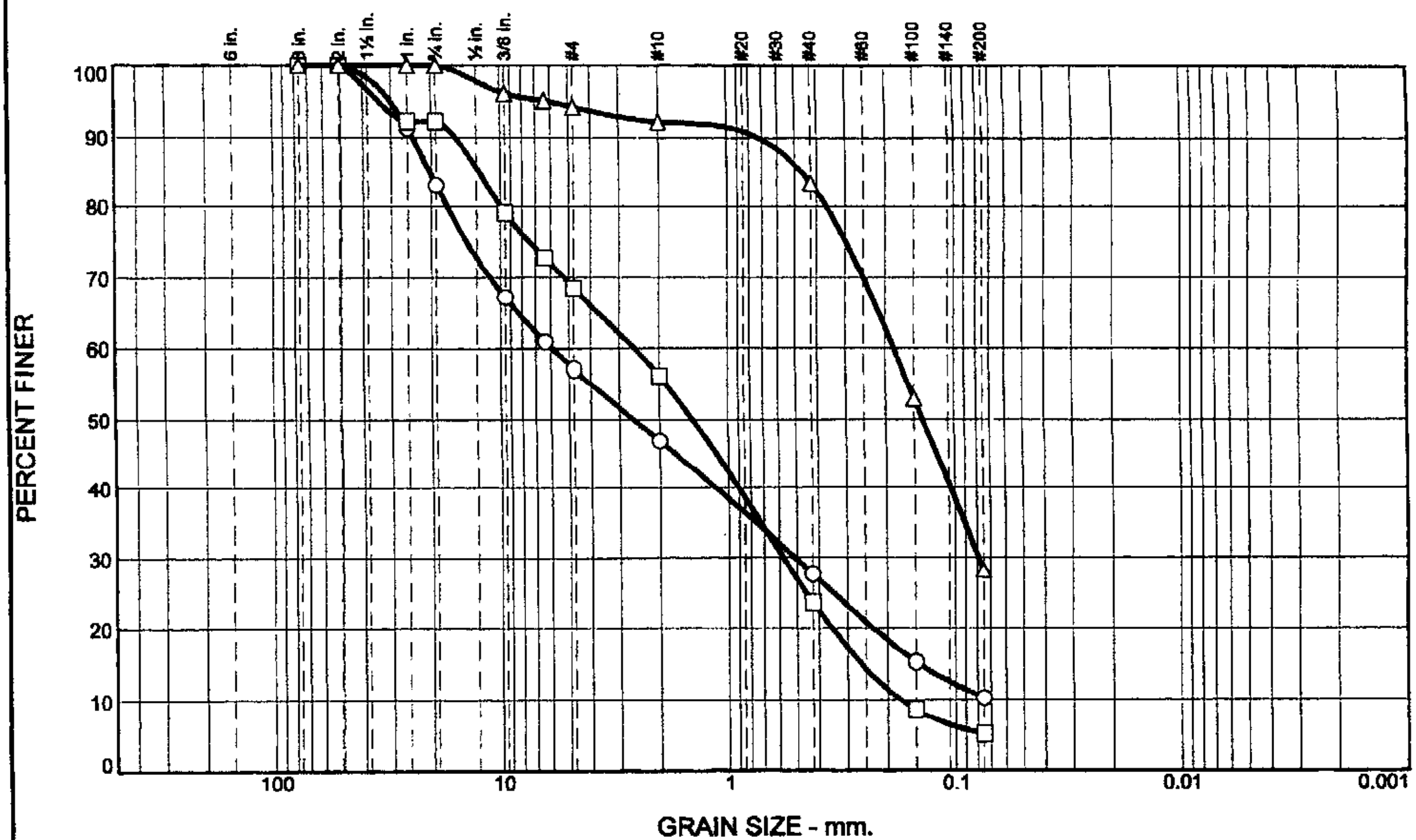
Boring No.						
Sample No.						
Sample Depth						
Tare Weight						
W_S + Tare						
W_D + Tare						
W_{WATER}						
$W_{DRY\ SOIL}$						
% Moisture (W_W / W_D)						

Boring No.						
Sample No.						
Sample Depth						
Tare Weight						
W_S + Tare						
W_D + Tare						
W_{WATER}						
$W_{DRY\ SOIL}$						
% Moisture (W_W / W_D)						

DENTE ENGINEERING
594 Broadway
Watervliet, NY 12189
Ph. 518-266-0310
Fax 518-266-9238

Client: Essex Co DPW
File No. FDE-12-166
Date: September 10, 2012

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	42.8	46.9	10.3		SP-SM	A-1-a	NP	NP
□	0.0	31.5	63.2	5.3		SP-SM	A-1-b	NP	NP
Δ	0.0	5.7	66.2	28.1		SM	A-2-4(0)	NP	NP

SIEVE inches size	PERCENT FINER ○	□	Δ
3	100.0	100.0	100.0
2	100.0	100.0	100.0
1	91.4	92.3	100.0
.75	83.1	92.3	100.0
.375	67.2	79.2	96.1
.25	61.0	73.0	95.1
	GRAIN SIZE		
D_{60}	5.9163	2.5753	0.1837
D_{30}	0.5114	0.5775	0.0790
D_{10}		0.1752	
	COEFFICIENTS		
C_c		0.74	
C_u		14.70	

SIEVE number size	PERCENT FINER ○	□	Δ
#4	57.2	68.5	94.3
#10	46.8	56.1	92.2
#40	27.6	23.6	83.4
#100	15.3	8.6	53.0
#200	10.3	5.3	28.1

Material Description

○ coarse to fine SAND and GRAVEL, little Silt

□ coarse to fine SAND, some Gravel, trace Silt

Δ coarse to fine SAND, some Silt, trace Gravel

REMARKS:

○ Per ASTM D422 Washed

□ Per ASTM D422 Washed

Δ Per ASTM D422 Washed

○ Source of Sample: Boring B-1 Depth: 1.0'-3.0' Sample Number: 779: B-1/S1
□ Source of Sample: Boring B-1 Depth: 15.0'-17.0' Sample Number: 780: B-1/S4
Δ Source of Sample: Boring B-1 Depth: 25.0'-27.0' Sample Number: 781: B-1/S6

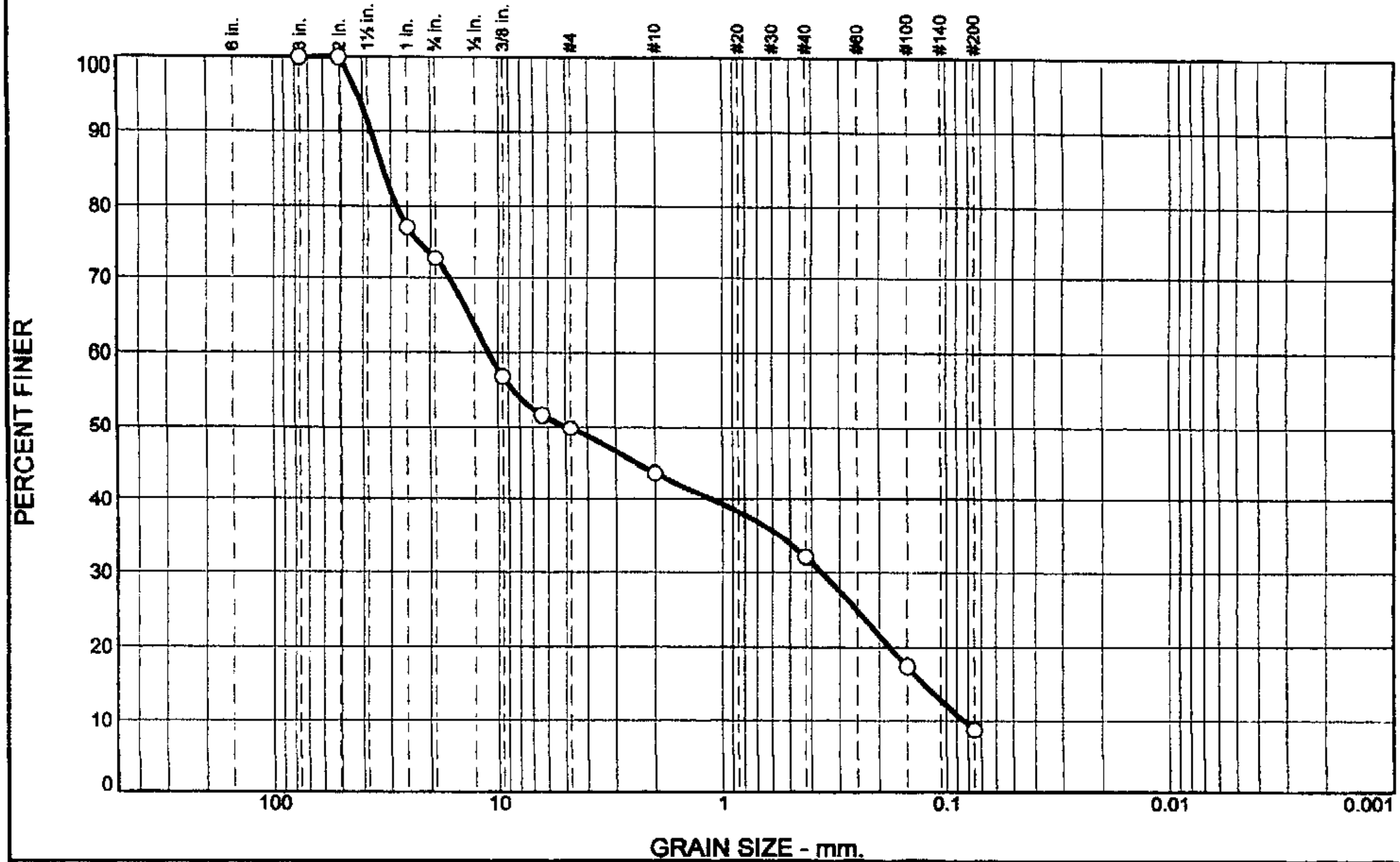
EVERGREEN TESTING, INC.
Waterviiet, NY

Client: Essex Co DPW
Project: Grove Road Bridge
Au Sable Forks, NY
Project No.: FDE-12-166

Figure 779-781

Tested By: EM **Checked By:** OB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	27.4	22.9	6.1	11.5	23.4	8.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1	77.0		
.75	72.6		
.375	56.8		
.25	51.5		
#4	49.7		
#10	43.6		
#40	32.1		
#100	17.4		
#200	8.7		

* (no specification provided)

Material Description

GRAVEL and coarse to fine SAND, trace Silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 36.8325 D_{85}= 32.4841 D_{60}= 11.0069
D_{50}= 5.0041 D_{30}= 0.3597 D_{15}= 0.1258
D_{10}= 0.0837 C_u= 131.43 C_c= 0.14

Classification

USCS= GP-GM AASHTO= A-1-b

Remarks

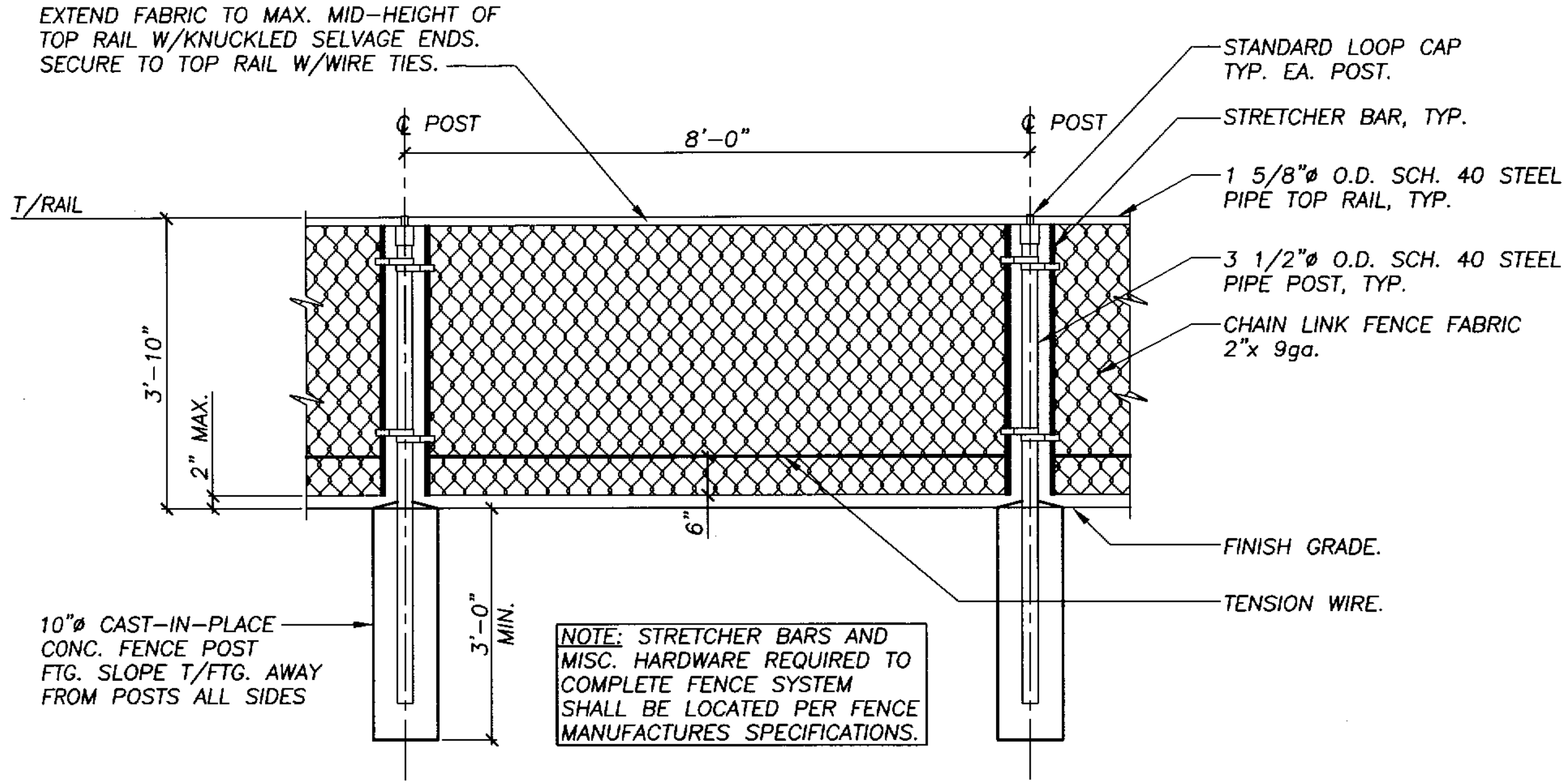
Per ASTM D422 Washed

Source of Sample: Boring B-1 **Depth:** 40.0'-42.0'
Sample Number: 782: B-1/S9 **Date:** 9-10-12

EVERGREEN TESTING, INC.
Watervliet, NY

Client: Essex Co DPW
Project: Grove Road Bridge
Au Sable Forks, NY
Project No: FDE-12-166 **Figure** 782

Tested By: EM **Checked By:** OB



TYPICAL PEDESTRIAN FENCE DETAIL

N.T.S.