



ADDENDUM NO. 2

Greater New Haven Water Pollution Control Authority
East Haven Pump Station Resiliency Implementation
Project No. SSF 2013-05

TO: ALL PLAN HOLDERS
DATE: April 21, 2017

This addendum shall be attached to the Contract Documents by each bidder. Each bidder shall acknowledge receipt of this Addendum by entering the Addendum number and date received in the space provided on **Page 00402-2 of the Bid Form**.

A. RECEIPT OF BIDS:

Project Schedule as indicated in the Advertisement for Bids shall be modified as follows:

The deadline to submit General Bids is **Wednesday, May 17, 2017** at 11:00 AM at the Office of the Director of Finance and Administration of the GNHWPCA located at 260 East Street, New Haven, CT 06511. The deadline to submit questions will be **Friday, April 28, 2017**.

B. RESPONSES TO BIDDER'S QUESTIONS

1. **Question:** The structural schedule has bearing capacity of the piles and minimum embedment depth. There is no geotechnical information provided with the documents, and no unit price for potential pile length (S-601). Can the bid form be modified to allow for a unit price length of driven pile? Is there geotechnical information that could be provided?

Answer: A revised bid form will be released prior to the bid opening with Addendum No. 3 which will include unit pricing for driven piles. See attached documentation (Attachment B) for complete boring logs.

2. **Question:** Should the structural steel fabrications be galvanized?

Answer: All structural steel shall be galvanized in accordance with Sheet S-601.

3. **Question:** Can the electrical, HVAC, architectural features and other appurtenances be field installed (Section 03430)?

Answer: All internal electrical equipment, including generators, automatic transfer switch, control panels, conduit, and wiring shall be installed by the Precast Supplier. All penetrations required for louvers, glass block windows, light fixtures, etc. shall also be made by the Precast Supplier. Equipment installed on the building which may not be adequately secured for transportation (including generator exhaust silencers, exterior lighting, and unit heaters) may be field installed. The Contractor may also install exterior architectural finishes (siding, roofing, etc.) in the field.

4. **Question:** Should the required step/load report be submitted w/ the Contractors bid (Section 16620)?

Answer: Yes, submit the required step/load report with supporting documentation accompanying the bid.

5. **Question:** Should Pump Station gables be clad with Azek beadboard (available 5/8" x 4" or 1/2" x 6") per drawing C-102, or 1" x 4' Azek sheet per Section 03430 2.01.D?

Answer: Provide the prefabricated building with 1" x 4" Azek sheet in accordance with Specification Section 03430-2.01-D. Verify selected finishes through the submittal process prior to fabrication.

6. **Question:** Should Pump Station entry doors be sized 6068 per drawing C-102, or 6070 per Section 03430 2.02?

Answer: Provide building entry doors size in accordance with Specification Section 03430-2.02.

7. **Question:** Should Pump Station entry doors be equipped with a deadbolt and pull handle per drawing C-102, or Schlage Extra Duty mortise lock per Section 03430 2.02?

Answer: Provide building entry doors with mortised locks in accordance with Specification Section 03430-2.02-F.

8. **Question:** Per Section 03430 2.01,F. buildings shall not be insulated. Per CT adopted IECC (International Energy Conservation Code) 2012, "insulation is required in all buildings with conditioned space." The specification for heat forces compliance with above code.

Answer: Provide the precast building with adequate insulation to comply with the IECC. At a minimum, the walls will have 2.5" of rigid insulation with a minimum density of 1.6 PCF and a maximum flame spread and smoke developed value of 75 and 450 respectively. The insulation shall be protected with a factory-installed FRP panel system. Mineral fiber (glass or slag) blanket insulation shall be provided with maximum flame spread and smoke developed values of 25 and 50 respectively, where required. Exposed insulation that is not protected by architectural features shall be protected by a factory-installed FRP panel system.

9. **Question:** Payment per schedule of values. I assume as reference in Article 14, that payments per schedule of values would include the prefabricated pumps station buildings. These building would have to be essentially completed before site work commences and incur a considerable amount of cost.

Answer: Payment for materials and equipment stored off-site will not be made except for the prefabricated building materials. The Contractor must submit proof of complete fabrication (photos, invoices, etc.) and a written statement certifying that the Contractor has assumed responsibility of the equipment from the Manufacturer, and the equipment is securely stored in accordance with Manufacturer recommendations. This documentation shall be provided with the draft pay requisition.

10. **Question:** The Cosey Beach Avenue Pump Design Criteria states that the minimum solids sphere passing size is 3 inches. This is not indicated for the three other pump stations. Should it be assumed that the pumps to be provided for the other stations do not need to pass a 3-inch spherical solid or do all pumps for all four pump stations need to pass a 3-inch spherical solid?

Answer: All pumps shall comply with TR-16 guidelines, including the ability to pass a 3-inch diameter sphere.

11. **Question:** The fees charged by the electrical company for the new electrical service to each site are unknown at bid time. Can an allowance be added to the bid form for fees charged by the utility company to install the new service?

Answer: A revised bid form will be released prior to the bid opening with Addendum No. 3 which will include an allowance for the new electrical services at each site. All other utility costs needed for temporary disconnection / reconnection of power lines associated with the transportation and placement of the precast structure and other items shall be included in the Contractor's bid.

12. **Question:** Traffic controls will be needed to install the bypass pipe and doing the pipe liner. Can an allowance be added to the bid form for traffic controls?

Answer: A revised bid form will be released prior to the bid opening with Addendum No. 3 which will include an allowance for the necessary traffic control during the installation of the bypass piping. Traffic control costs associated with the transport of the precast structure or any other item shall be included in the Contractor's bid.

13. **Question:** As noted in Addendum # 1, there are a few hazardous materials at each pump station. Is the contractor required to abate each station before the start of demo of each station?

Answer: The Contractor is responsible for demolition of each station including any abatement requirements. Additional information will be provided with Addendum No. 3 prior to the bid opening.

14. **Question:** Can site borings be provided for each pump station location where the new footing piles are being installed?

Answer: Site boring logs are attached (Attachment B).

15. **Question:** There is no specification for the requirements of the installation of the building footing piles. Can a specification section be added? If we encounter unsuitable materials during the installation of the piles, who is responsible to determine that the piles meet the loading requirements? Are there testing and vibration monitoring requirements for the installation of the piles?

Answer: Observation of pile installation by an independent qualified testing agency shall be provided by the Contractor. The testing agency shall document recommended ground vibration level limits based on structures in the vicinity, and provide documentation at the completion of Work to verify compliance. The testing agency shall additionally confirm adequate pile capacity with Pile Dynamic Analyses (one per site) in accordance with ASTM D4945. Approval of the agency as qualified and independent shall be at the discretion of the Engineer, and recommended ground vibration level limitations shall be approved in writing by the Engineer prior to the commencement of the Work.

16. **Question:** To keep the cost of some of the materials and structures for the four stations down, much of the equipment for all four stations will be built at the same time. At the pre bid meeting it was stated there were to be no payment for material stored off site, but article 14 on page 00700-35 allows for progress payments. Please clarify. Because of limited site storage space, is there an area in town where the materials can be stored?

Answer: Payment for materials and equipment stored off-site will not be made except for the precast building and equipment installed by the Precast Supplier. The Contractor must submit proof of complete fabrication (photos, invoices, etc.) and a statement certifying that the Contractor has assumed responsibility of the equipment from the Manufacturer, and the equipment is securely stored in accordance with Manufacturer recommendations. This documentation shall be provided with the draft pay requisition. We cannot provide storage in East Haven, but it may be possible to provide storage at the East Shore Water Pollution Abatement Facility. The Contractor may elect to provide off-site storage at no additional cost to the Owner.

17. **Question:** There are no details of the construction of the existing pump station structures, can as-built drawings be provided of the existing pump station structures?

Answer: See Attachment C. The Contractor shall be responsible for field verifying the accuracy of all relevant details provided in the record drawings.

18. **Question:** At the prebid meeting it was stated that only two pump stations were to be under bypass pumping at one time. Can we start construction at all four pump station sites?

Answer: The Contractor may perform Work at all four stations simultaneously if the Contractor has adequate resources available to do so. However, the Contractor may not perform Work requiring bypass pumping at more than two (2) stations at any one time.

19. **Question:** On all four of the existing pump station sites there are existing trees and landscaping that is not shown on the drawings, that need to be removed to do the work, is the contractor responsible to replace the existing landscaping, if it needs to be removed?

Answer: The Contractor shall remove any on-site landscaping that need to be removed at no additional cost to the Owner, and the Contractor shall be responsible for site restoration prior to project close-out. A revised bid form will be released prior to the bid opening with Addendum No. 3 which will include an allowance for landscape planting at each site.

20. **Question:** Are the new building support steel, steel deck and stairs fabricated in a steel fabrication shop and field painted? Are the new concrete piles field painted as shown on drawing C-202?

Answer: All building steel shall be hot dip galvanized and touched-up with zinc rich paint in accordance with Sheet S-601. All concrete surfaces shall be sealed in accordance with Section 03320.

21. **Question:** Is the town of East Haven waiving the building permit fees for this project?

Answer: At this time, the building permit fees for this project will not be waived and the Contractor shall include the cost of these in their bid.

22. **Question:** In specification section 13420 "Instrumentation" Section 2.04 B Tri Gas Monitor, can a specification and data sheet be provided on this equipment item?

Answer: The tri-gas monitor is being eliminated from the design due to changes in space classification.

23. **Question:** On drawing S-103 a note pointing to the new hatch requests a stainless steel hatch, but the hatch specification on page 05500-9 is for aluminum hatches, please clarify? Will the hatches for the complete project have to be flood-tight hatches?

Answer: All provided hatches are to be constructed from stainless steel. The hatches are not required to be flood tight, however the hatches shall be provided with neoprene gaskets to minimize water intrusion.

24. **Question:** Space at the Meadow Street pump station site is very limited and may need very costly construction procedures to complete the work, can the work for this station be bid as a separate bid item?

Answer: A revised bid form will be released prior to the bid opening with Addendum No. 3 which will include separate pricing for specific Work by location.

25. **Question:** Is the GC responsible to test for PCB's?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

26. **Question:** Is there a weight limit on the culverts on Farview Road?

Answer: Currently there are no known or posted street weights for Farview Road and/or its culverts. Any new information will be provided with Addendum No. 3 prior to the bid opening.

27. **Question:** Where does the Minor Rd PS discharge piping terminate?

Answer: The Minor Road Pump Station force main discharges on Beach Avenue as shown on the drawings that were included as part of Addendum No. 1.

28. **Question:** Where does the Meadow St PS discharge piping terminate?

Answer: The Meadow Street Pump Station force main discharges at the intersection of Meadow Street and Short Beach Road as shown on the drawings that were included as part of Addendum No. 1.

29. **Question:** Are there Underground conduits to the 2 new Flow Meters?

Answer: Yes, ¾" conduits shall be provided as indicated on the instrumentation and control riser diagrams shown on Contract Drawings E-104 and E-303.

30. **Question:** Is there a connection detail between the concrete column and precast pile?

Answer: Concrete pile and column connection requirements are outlined on Sheet S-601. This includes a requirement to submit a splicing method for review by the Engineer.

31. **Question:** Are there noise restrictions in regards to driving piles?

Answer: The noise control specified in Section 01001-3.03-B does not apply to pile driving as long as the piles are driven during normal business hours.

32. **Question:** Will the contractor be required to monitor surrounding houses while driving piles?

Answer: Observation of pile installation by an independent qualified testing agency shall be provided by the Contractor. The testing agency shall document recommended ground vibration level limits based on structures in the vicinity, and provide documentation at the completion of Work to verify compliance. Approval of the agency as qualified and independent shall be at the discretion of the Engineer, and recommended ground vibration level limitations shall be approved in writing by the Engineer prior to the commencement of the Work.

33. **Question:** Where are the contractor's staging areas at each pump station?

Answer: The staging areas are to be kept within the property limits at each station.

34. **Question:** What are the weights of each pre-cast pump station?

Answer: The exact weight depends upon the precast manufacturer. The buildings shown on the drawings weigh between 58,000 and 72,000 pounds, excluding installed equipment. Fully fueled generators are estimated to weigh between 4,800 and 9,400 lbs.

35. **Question:** At the Minor Rd. PS, where is the existing water main that we connect the new yard hydrant to?

Answer: The approximate location of the water meter is as shown on Contract Drawing C-401. The exact location of the water main shall be determined in the field by the Contractor.

36. **Question:** At the Meadow St. PS, where is the existing water main that we connect the new yard hydrant to?

Answer: The approximate location of the water meter is as shown on the Contract Drawing C-301. The exact location of the water main shall be determined in the field by the Contractor.

37. **Question:** At the Cosey Beach St. PS, where is the existing water main that we connect the new yard hydrant to?

Answer: The approximate location of the water meter is as shown on the Contract Drawing C-201. The exact location of the water main shall be determined in the field by the Contractor.

38. **Question:** At the Farview Rd. PS, where is the existing water main that we connect the new yard hydrant to?

Answer: The approximate location of the water meter is as shown on the Contract Drawing C-101. The exact location of the water main shall be determined in the field by the Contractor.

39. **Question:** In regards to the new electrical services, United Illuminating will not provide an estimate until a CR # is pulled, can an allowance for utility fees be added?

Answer: The GNHWPCA will pay the United Illuminating permit fee directly. A revised bid form will be released prior to the bid opening with Addendum No. 3.

40. **Question:** In reference to Section 03430 in addition to the complete electrical and HVAC system please confirm that the generator and carpentry must be provided by the precast concrete manufacturer?

Answer: Refer to the response to Question No. 3.

41. **Question:** Do bid items 4-12 include labor and material or material only?

Answer: Bid items 4-12 include the labor and materials to furnish and install these items. A revised bid form will be released prior to the bid opening with Addendum No. 3.

42. **Question:** In reference to section 01001 - is professional digital video recording applicable for this project?

Answer: Yes

43. **Question:** In reference to Section 01001 3.03 B. Noise Control, please provide clarification on how noise attenuation can be achieved during pile driving?

Answer: The noise control specified in Section 01001-3.03-B does not need to be followed as long as the piles are driven during normal business hours.

44. **Question:** How many gallons of fuel should we assume has to be disposed of at each pump station?

Answer: Anticipated fuel quantities at the start of construction are not known at this time. Additional information will be provided with Addendum No. 3 prior to the bid opening.

45. **Question:** In reference to Minor Rd and Cosey Beach Ave pump stations, is there a detail for the wet well repair?

Answer: No, but the Contractor shall use the products specified in Section 03105 and will be required to follow the manufacturer's instructions for making repairs.

46. **Question:** In reference to bid item 3, what depth should we assume in our unit pricing? Typically there are separate bid items for depth up to 1.5" without exposed rebar and beyond 1.5" with exposed rebar.

Answer: A revised bid form will be issued as part of Addendum No.3 to include both types of repair.

47. **Question:** In reference to Section 01580, are the listed flows average or peak? Please provide both average and peak flows.

Answer: The flows listed are the capacities of each pump station. The pumps are run at constant speed, so average flowrates are not available.

48. **Question:** In reference to Section 09900, are the lower level ceilings, walls, floors and interior stairs of the Farview Road PS to be prepped and painted?

Answer: Yes, in accordance with Section 09900.

49. **Question:** What is the dimension of the new dry well hatch at the Farview Road PS?

Answer: The existing opening is approximately 30-1/2" x 77-1/2". The Contractor shall verify rough opening dimensions prior to hatch fabrication.

50. **Question:** In reference to Section 11390 will exfiltration and vacuum testing be required for this project?

Answer: The Contractor shall complete and document all manhole testing in accordance with the specifications. Contractor will not be required to perform both exfiltration and vacuum testing under normal conditions if either test is passed successfully at each structure installation. Per the specifications, Contractor may perform vacuum testing in lieu of exfiltration testing, in accordance with ASTM C1244.

51. **Question:** In reference to Section 13460 2.01 H, is there a special form to be filled out and submitted with our bid?

Answer: There is not a special form to be filled out. The Contractor shall provide a written statement specifically addressing conformance with each requirement in Specification 13460 2.01 H. The statement shall be provided on the vendor's letterhead, as specified. Note that this requirement shall also be satisfied for the quadruplex control panels as specified in Section 13450-2.01-H.

52. **Question:** Please clarify if concrete encasement is required in all duct banks or only those under roadways?

Answer: Sand-encased /concrete capped duct banks shall be provided for all buried conduits.

53. **Question:** In reference to Section 16116, 3.01 G can the contractor spread red concrete dye after concrete is placed in trench?

Answer: The Contractor may use liquid or dry cement pigment. However, if the Contractor elects to apply the pigment after the concrete is placed then the Contractor will assume responsibility for applying an adequate quantity of pigment to ensure complete coverage over the entire surface of the concrete. Red pigment that is poorly dispersed will not be acceptable.

54. **Question:** In reference to Section 16620, is the contractor responsible to top off the generator fuel tanks after the 4 hr load bank test?

Answer: The Contractor shall provide a full tank of fuel prior to start-up testing in accordance with Section 16620. The Contractor will not be required to refuel the generator after start-up testing is complete and successful. If start-up testing is not deemed acceptable by the Engineer for any reason, the generator shall be refueled to provide a full tank at the start of each subsequent retest.

55. **Question:** Are the existing pump station floors, which will eventually be exposed after the building demolition to be prepped and painted?

Answer: Remaining concrete pads shall be painted in accordance with Section 09900. Color selection shall match existing grey paint; verify paint color selection with Owner or Engineer prior to procurement.

56. **Question:** Are any soil borings available?

Answer: See Attachment B for complete boring logs.

57. **Question:** Regarding the (Power) of the Precast Buildings please confirm the Meter as per the Utility Company Standard will be @ 5' to center of the Utility Meter aff or grade and not as shown in Plan E-102?

Answer: The meter shall be installed 5-feet aff of the new precast structure. This is as shown on E-302 and is in accordance with United Illuminating's requirements.

58. **Question:** As per specification section 03430 (Precast Buildings) Summary A. 1 states 'The buildings shall include all of the Electrical.....etc. Will all of the items be connected and wired?

Answer: All internal electrical equipment shall be pre-wired by the Manufacturer, as feasible. Equipment installed on the building's interior which may not be adequately secured for transportation (unit heaters) may be field installed and wired. The Contractor may also elect to install exterior electrical equipment (exterior lighting, antennae, etc.) in the field.

59. **Question:** Is there any loose Electrical of any kind with the Precast building?

Answer: There shall be no loose electrical equipment in the structure at the completion of the Work. However, equipment installed on the building's interior, such as the unit heater, must be adequately secured during transportation.

60. **Question:** Please confirm we furnish the Meter Socket only in regards to the Distribution System?

Answer: Additional information regarding the electrical service and limits of utility responsibility will be provided with Addendum No. 3 prior to the bid opening.

61. **Question:** In regard to the 'Generator' & 'ATS'. Is the ATS already installed and prewired?

Answer: The Manufacturer shall provide the ATS and prewire it to the fullest extent feasible.

62. **Question:** Is the Generator part of the precast building package? Or it will be purchased and installed by others?

Answer: The Precast Supplier shall provide the generator, and prewire and plumb it to the fullest extent feasible.

63. **Question:** What is the lead time of the Precast buildings?

Answer: The Precast Supplier typically requires approximately 2 weeks to prepare a project-specific submittal package, and delivery is typically 8 to 10 weeks following receipt of submittal approval. Actual lead times may vary depending on manufacturing schedules, and equipment availability.

64. **Question:** Is there an actual list of what is shown in the Precast Building that we need to furnish? For example the Plans show a lighting schedule but I am told we do need to supply. Then you see a note of a H/O/A to control the exterior lights as if to furnish it and shown mounted on the inside?

Answer: The Contractor shall assume responsibility for coordinating the furnishing and installation of equipment between subcontractors and the Precast Supplier. The Precast Supplier shall provide all electrical equipment pre-wired to the extent that is feasible and practical. Additionally, the Manufacturer shall provide a submittal package including all equipment furnished and installed in the structure. It is assumed that the Precast Supplier will provide all equipment installed within the

precast structure, and the Electrical Contractor will provide all additional electrical and instrumentation equipment.

65. **Question:** Are the Control Pump Panels at the Wells provided by others or by us?

Answer: The Contractor shall assume responsibility for coordinating the furnishing and installation of equipment between subcontractors and the Precast Supplier. It is assumed that the Electrical Contractor will provide all electrical equipment not mounted to the precast structure, including the local controls.

66. **Question:** Does the Controls Vendor furnish the Meltric Receptacles?

Answer: The Contractor shall assume responsibility for coordinating the furnishing and installation of equipment between subcontractors and the Manufacturer. It is assumed that the Electrical Contractor will provide all electrical equipment not mounted to the precast structure, including the local disconnects.

67. **Question:** On drawing M-401 Minor Road Pump Station, there is a note on the drawing pointing to the force main "to provide manhole with flow meter and pressure gauge." But on the site drawing, C-401, there is no indication to provide the flow meter manhole. Please clarify, is a flow meter manhole needed for Minor Rd P.S.?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

68. **Question:** As noted on the site drawings for all four pump stations, each station gets a new water meter and yard hydrant.

- a. Can a plumbing schematic be added to the drawings for the water line?
- b. Will the water line need a backflow preventer?
- c. What size water service is needed at each station?
- d. If a back flow preventer is needed, do we mount it in the existing valve vault?
- e. Will the water meter and meter vault be provided at no cost from the water company?
- f. Can an allowance be added to the bid form for fees charged by the water company for new services?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

69. **Question:** As noted on the site drawings for all four pump stations, each station gets a new Azek hand rail around the existing wet well slab.

- a. There are many types and manufacturers of Azek handrail systems at all different costs. Can we be provided with a name of a manufacturer and catalog or model number for the handrail system needed at each station?
- b. Each station has a note to provide a self-closing lockable gate (see spec. 05500) (specification section 05500 is for Misc. Metal.) Are we to provide an Azek handrail system with a metal gate? What size gate do we provide? Can we be provided with a name of a manufacturer and catalog or model number for the gate system needed at each station?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

70. **Question:** As noted on drawing S-601, at all four pump stations the precast electrical building is to be supported by precast concrete piles. Can a name of a manufacturer of this type of concrete pile system shown on the drawings be provided? Can we provide a system other than precast concrete system piles to support the structure?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

71. **Question:** Data Sheet 2.04A pages are labeled 1 of 1 and then 2 of 4, 3 of 4, and 4 of 4. Are we missing any parts in this section?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

72. **Question:** Data Sheet 2.04B for the Tri-Gas Monitor is not included in the specifications. Is it no longer needed on this project?

Answer: The tri-gas monitor is being eliminated from the design due to changes in space classification.

73. **Question:** Data Sheet 2.05A for the Pressure Transmitters is not included in the specifications. Is it no longer needed on this project?

Answer: Additional information will be provided with Addendum No. 3 prior to the bid opening.

C. ADDENDUM NO. 2 ATTACHMENTS

1. **Attachment A.** The Contractor shall provide a project sign at each pump station. Each sign shall be 4-feet x 8-feet and constructed from APA Rated A-B Exterior Grade Plywood with graphics and text as indicated in Attachment A.
2. **Attachment B.** The geotechnical report which includes boring locations and logs is as indicated in Attachment B.
3. **Attachment C.** The record drawings of each pumping station are included in Attachment C.
4. **Attachment D.** The minutes from the non-mandatory prebid meeting that was held on April 12, 2017 are included as Attachment D.
5. **Attachment E.** The sign-in sheet from the non-mandatory prebid meeting that was held on April 12, 2017 is included as Attachment E.

- END OF ADDENDUM NO.2 -

**ADDENDUM NO. 2 ISSUED BY:
WOODARD & CURRAN**

Michael J. Burns, PE
Project Manager

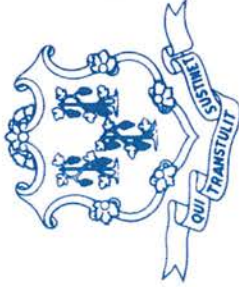
Attachment A

Project Sign

East Haven Pump Station Resiliency Implementation

Project Cost: \$X,XXX,XXX

Financed by a 75% Grant from the State of Connecticut Department of Emergency Management Services & Public Protection Division of Emergency Management & Homeland Security



Contractor

Logo

Engineer



Address

213 Court Street, 4th Floor
Middletown, CT 06457

Attachment B
Geotechnical Report

Revised Geotechnical Engineering Report

Proposed Sanitary Sewer Pump Stations
Minor Road, Fairview Road, Cosey Beach Avenue, and Meadow Street
East Haven, Connecticut

January 12, 2017
Terracon Project No. J2165055

Prepared for:

Woodard & Curran, Inc.
Cheshire, Connecticut

Prepared by:

Terracon Consultants, Inc.
Rocky Hill, Connecticut

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

January 12, 2017



Woodard & Curran, Inc.
1520 Highland Avenue
Cheshire, CT 06410

Attn: Mr. Michael J. Burns, P.E.
P: (203) 271 0379
F: (203) 271 7952
E: mburns@woodardcurran.com

Re: Revised Geotechnical Engineering Report
Proposed Sanitary Sewer Pump Stations
East Haven, Connecticut
Terracon Project No. J2165055

Dear Mr. Burns:

Terracon Consultants, Inc. (Terracon) is submitting, herewith, the results of our geotechnical evaluation for the above-referenced project. The purpose of this evaluation was to obtain information on subsurface conditions at the sites and to develop geotechnical parameters that will assist in the design and construction of foundations for the four proposed Greater New Haven Water Pollution Control Authority (GNHWPCA) pump stations. Terracon previously issued a Geotechnical Report dated May 4, 2016. An environmental assessment was not part of the assignment.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

A handwritten signature in blue ink, appearing to read 'C. Rice', is written over a light blue circular stamp.

Christian B. Rice, E.I.T.
Staff Geotechnical Engineer

A handwritten signature in blue ink, appearing to read 'S. Lanne', is written over a light blue circular stamp.

Stephen C. Lanne, P.E.
Senior Geotechnical Engineer

/scl/J2165055

Attachment

Terracon Consultants, Inc. 201 Hammer Mill Road Rocky Hill, Connecticut 06067
P (860) 721 1900 F (860) 721 1939 terracon.com

Environmental

Facilities

Geotechnical

Materials

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EXECUTIVE SUMMARY

A geotechnical engineering report has been completed for the proposed sanitary sewer pump stations to be located on Minor Road, Fairview Road, Cosey Beach Avenue, and Meadow Street in East Haven, Connecticut. Four soil borings (B-1 through B-4) were drilled, one at each site, to depths of about 21.5 to 27 feet below existing grade to provide geotechnical information.

Site subsurface conditions at the sites generally consist of about 5 to 9 feet of fill over poorly graded sand (glaciofluvial deposit). Peat was encountered between the fill and glaciofluvial deposit at the Minor Road and Fairview Road sites. The following geotechnical considerations for project design and construction were identified and are discussed in the report:

- The proposed precast buildings may be supported on pile foundations deriving support from friction and end-bearing in the native glaciofluvial deposit. We understand the owner prefers to use precast concrete piles.
- Approximately 3 to 4 feet of peat was encountered at the Minor Road and Fairview Road sites. Possible further degradation of the organic material may result in consolidation of the marine deposit, resulting in downdrag load on the piles, as well as ground surface settlement.
- The site is judged to be seismic Site Class "D".
- Groundwater was encountered at depths ranging from about 4 to 7.5 feet below the existing grade during the time of the explorations. Groundwater level will likely vary with tidal fluctuation.
- Close monitoring of the construction operations discussed herein will be critical in achieving subgrade support. We therefore recommend that Terracon be retained to monitor this portion of the work.

Close monitoring of the construction operations discussed herein will be critical in achieving foundation support. We therefore recommend that Terracon be retained to monitor this portion of the work.

This summary should be used in conjunction with the entire report for design purposes. Details are not included or fully developed in this summary; the report must be read in its entirety for a comprehensive understanding of the information contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

**REVISED GEOTECHNICAL ENGINEERING REPORT
PROPOSED SANITARY SEWER PUMP STATIONS
MINOR ROAD, FAIRVIEW ROAD, COSEY BEACH AVENUE, AND
MEADOW STREET
EAST HAVEN, CONNECTICUT
Terracon Project No. J2165055
January 12, 2017**

1.0 INTRODUCTION

A geotechnical engineering report has been completed for the proposed sanitary sewer pump stations to be located on Minor Road, Fairview Road, Cosey Beach Avenue, and Meadow Street in East Haven, Connecticut. Four soil borings (B-1 through B-4) were drilled, one at each site, to depths of about 21.5 to 27 feet below existing grade to provide geotechnical information. Logs of the test borings, along with a Site Location Map (Exhibit A-1) and Exploration Location Diagrams (Exhibits A-2 and A-3), are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- earthwork
- foundation design and construction
- seismic considerations

2.0 PROJECT INFORMATION

Our understanding of the project is based on review of the following documents that you provided:

- Request for Proposal by Woodard & Curran of Cheshire, Connecticut, dated September 11, 2015.
- Drawings prepared by Woodard & Curran,
 - “*Cosey Beach Pump Station Proposed Site Plan Layout*”, Sheet No. C-01, dated July 2015.
 - “*Fairview Pump Station Proposed Site Plan Layout*”, Sheet No. C-02, dated July 2015.
 - “*Meadow Street Pumping Station Site Plan*”, Sheet No. C-03, dated July 2015.
 - “*Minor Road Pump Station Proposed Site Plan Layout*”, Sheet No. C-03, dated July 2015.

2.1 Project Description

Item	Description
Construction	The project consists of the construction of new sanitary sewer pumping stations. Pumping stations are expected to be precast structures installed on steel platforms elevated about 7 feet above existing grade.
Estimated Loading	Dead Load: About 80,000 pounds Live Load: To be determined Lateral Load: To be determined
Grading	No change to finished grade is expected the sites.

2.2 Site Location and Description

Item	Description
Location	Four existing sanitary sewer pumping stations located on Cosey Beach Avenue, Fairview Road, Meadow Street, and Minor Road in East Haven, Connecticut.
Existing improvements	Sanitary sewer pumping stations.

3.0 SUBSURFACE EXPLORATIONS AND CONDITIONS

3.1 Typical Profile

Based on the results of the borings and observations at the time of drilling, subsurface conditions on the project sites can be generalized as follows:

Minor Road (Site 1, B-1)

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered ¹	Consistency / Relative Density
Fill	5	Poorly graded sand, with silt and gravel, red-brown	Loose to very dense
Peat	9	Sandy peat (PT), brown	Medium stiff to stiff
Glaciofluvial Deposit	>27	Poorly graded sand (SP), trace to with silt, to sandy silt (ML), brown	Dense

1. Topsoil (approximately 2 inches in thickness) was encountered at the ground surface.

Fairview Road (Site 2, B-2)

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered ¹	Consistency / Relative Density
Fill	5	Poorly graded sand, with silt and gravel, brown	Medium dense
Peat	8	Sandy peat (PT), brown	Medium stiff to stiff
Glaciofluvial Deposit	>27	Poorly graded sand (SP), trace to with silt, brown	Medium dense to very dense

1. Bituminous concrete (about 2 inches in thickness) was encountered at the surface.

Cosey Beach Avenue (Site 3, B-3)

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered ^{1, 2}	Consistency / Relative Density
Fill	9	Poorly graded sand, with silt and gravel, brown	Medium dense to dense
Upper Glaciofluvial Deposit	15	Poorly graded sand (SP), brown	Medium dense
Lower Glaciofluvial Deposit	21.5	Poorly graded sand (SP), with gravel	Medium dense to dense

1. Topsoil (about 2 inches in thickness) was encountered at the surface of the boring.
2. Auger refusal, on a probable boulder, was encountered at 21.5 feet.

Meadow Street (Site 4, B-4)

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered ¹	Consistency / Relative Density
Fill	7	Poorly graded sand, with silt and gravel, occasional cobbles, brown	Medium dense to very dense
Upper Glaciofluvial Deposit	15	Poorly graded sand (SP), trace silt and gravel, brown	Medium dense
Lower Glaciofluvial Deposit	>25	Poorly graded sand (SP), with silt and gravel to silty sand (SM), occasional cobbles, brown	Dense to very dense

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered ¹	Consistency / Relative Density
3. Bituminous concrete (about 2 inches in thickness) was encountered at the surface of the boring.			

The *Surficial Materials Map of Connecticut (1992)*, prepared by the USGS, identifies the soil at the sites as man-made fill, with glaciofluvial deposits. The *Bedrock Geological Map of Connecticut (1985)* identifies the bedrock in the vicinity of the sites, at depth, as granitic gneiss. Bedrock was not encountered in the explorations.

Conditions encountered at each exploration location are indicated on the individual exploration logs in Appendix A of this report. Stratification boundaries on the exploration logs represent the approximate location of changes in soil types; *in situ*, the transition between materials may be gradual. Further details of the explorations can be found on the exploration logs.

3.2 Groundwater

Groundwater was measured at depths ranging from about 4 and 7.5 feet below the existing grade at the time of the explorations. Groundwater level variation will occur primarily because of tidal fluctuation and also because of seasonal variations in the amount of rainfall, runoff, and other factors. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Site	Boring	Depth to Groundwater while drilling (feet)
Minor Road	B-1	4
Fairview Road	B-2	5
Cosey Beach Avenue	B-3	5
Meadow Street	B-4	7.5

3.3 Laboratory Testing

The following laboratory testing was performed on representative soil samples from the sites:

- Eight grain size distributions (ASTM D422)
- Eight moisture content determinations (ASTM D2216)
- Four corrosivity tests consisting of:
 - pH Analysis (ASTM D4972)
 - Soil resistivity (ASTM G57)
 - Sulfide (EPA SM4500)
 - Sulfate concentrations (ASTM D516)

- Chloride concentrations (ASTM D512)
- Oxidation-Reduction potential (APHA SM2580B)

The results of the moisture contents are presented on the boring logs in Appendix A. The results of the grain size distributions are presented in Appendix B. The results of the corrosivity testing are tabulated below:

	B-1 (0 to 3 feet)	B-2 (0 to 3 feet)	B-3 (0 to 3 feet)	B-4 (0 to 3 feet)
pH	7.0	6.7	6.8	7.5
Resistivity (saturated) (Ω-cm)	28,925	36,155	795	15,500
Sulfide (mg/kg)	ND	ND	ND	ND
Sulfate (mg/kg)	ND	640	ND	ND
Chloride (mg/kg)	ND	950	ND	ND
Oxidation-Reduction Potential (mV)	330	380	285	290

ND = Not Detected

These test results are provided to assist in determining the type and degree of corrosion protection that may be required. We recommend that a certified corrosion engineer be employed to determine the need for corrosion protection and to design appropriate protective measures, if required.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Based on the subsurface conditions encountered in the borings and the configuration of the proposed construction, we recommend the precast buildings and steel framing be supported by driven piles. Design recommendations for precast concrete piles, the owner’s preferred pile type, are presented in the following sections.

Up to about 3 to 4 of peat was encountered at a depth of about 5 feet below existing grade at the Minor Road and Fairview Road sites. Future degradation of the organic material may result in consolidation of the peat and settlement of the overlying fill. Therefore, piles should be designed for possible downdrag forces and ground surface settlement should be expected at sites where peat was encountered.

4.2 Foundation Recommendations

The proposed precast pump station structures may be supported on driven precast concrete pile foundations. The piles should be designed to develop the required load carrying capacity from friction and end-bearing in the native glaciofluvial deposit. Design and construction of the piles should be in accordance with the following documents.

- CTDOT Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented Form 816, January 2010, as modified by Special Provision 702XXXA – Driven Piles
- FHWA publication – HI 97-013 – Design and Construction of Driven Pile Foundations
- The American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications, Fifth Edition, 2010.

Design and construction recommendations for driven concrete pile foundations are presented in the following paragraphs and tables.

4.3.1 Driven Pile Design Recommendations

Description	Value
Resistance Factors	
Service Limit States ¹	1.0
<u>Strength Limit States</u>	
Nominal Pile Axial Resistance – Geotechnical ²	0.65 (min 2% PDA testing) 0.45 (static analysis only)
Nominal Pile Lateral Resistance – Geotechnical ²	1.0
Recommended downdrag load ³	2.5 kips
Angle of Internal Friction	
Existing Fill	30 degrees
Peat	15 degrees
Glaciofluvial Deposit	32 degrees
Pile to soil friction (d)	
Existing Fill	Ignore
Peat	Ignore
Glaciofluvial Deposit	24 degrees
P-Y modulus ⁴	
Existing Fill	90 pci (above water level) 60 pci (below water level)
Peat	20 pci (below water level)
Glaciofluvial Deposit	60 pci (below water level)

Description	Value
Cohesion	
All soils	Ignore
Estimated <i>In-situ</i> Soil Unit Weight	
Existing Fill	110 pcf (above water level) 48 pcf (below water level)
Peat	28 pcf (below water level)
Glaciofluvial Deposit	58 pcf (below water level)
<ol style="list-style-type: none"> 1. AASHTO Article 10.5.5.1 2. AASHTO Article 10.5.5.2.3 3. Applicable for Minor Road – Site 1 and Fairview Road – Site 2, where peat was encountered. 4. For use with LPile computer program. 	

Prior to construction, we recommend pile driving criteria be established by conducting a specific Wave Equation Analysis based on the expected soil conditions and pile driving equipment. During construction, Pile Dynamic Analysis (PDA) should be performed in accordance with ASTM D4945 to confirm or modify, as necessary, the pile driving criteria and to check the required pile capacities are achieved. Provided PDA testing is conducted and required capacity is confirmed, static pile load testing is not required.

Based on the estimated building load provided and assumed minimum of four piles per structure, we estimate the piles will be required to support a total vertical load of about 15 tons each. The estimated pile length required to achieve factored design capacity is about 20 to 25 feet, assuming a nominal 12-inch wide pile. The piles will be required to resist lateral loads. Precast concrete piles projecting above grade may require bracing to provide adequate rigidity and resistance to lateral loading.

Based on anticipated soil conditions, pile design should include settlement assessment (service limit state) from proposed structure loading and downdrag (at the Minor Road and Fairview Road sites). Possible further degradation of organic material may cause consolidation of the peat. The resulting settlement of the peat and overlying soils will impart downward forces on the piles.

4.3.2 Driven Pile Construction Considerations

The pile driving method should be submitted for review by the geotechnical engineer, prior to mobilization of equipment. Piles are required to be installed vertically and along a straight line within specified tolerances in order to fit the frame. The subgrade soil will likely become disturbed as a result of the pile installation procedures. The contractor should take these aspects into account in their proposed driving method(s).

Precast concrete piles are high displacement piles not typically used in sandy soils. Pre-augering or other methods may be required to advance the piles.

Limitations to ground vibration levels should be established prior to pile installation. Ground vibrations should be monitored during installation of piles. Observation of pile installation by a qualified testing agency should be conducted, so that established driving criteria and/or installation depth is achieved.

4.4 Seismic Considerations

Description	Value
Code Used ¹	Connecticut State Building Code (CBC)
Site Class ²	D
Maximum considered earthquake ground motions (5 percent damping)	0.061g (1.0 second spectral response acceleration)
	0.238g (0.2 second spectral response acceleration)
Seismic Design Category	B
Liquefaction potential in event of an earthquake	Not susceptible

1. The CBC incorporates the Seismic Design Category approach from the 2003 International Building Code.
2. The CBC uses a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope requested does not include a 100-foot soil profile determination; the borings performed for this report extended to a maximum depth of about 27 feet. However, we expect soil at least as dense as encountered above 27 feet will extend to 100 feet.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications, so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

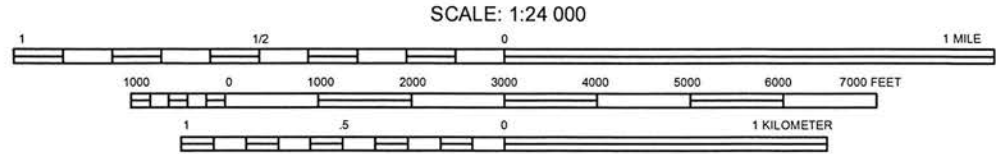
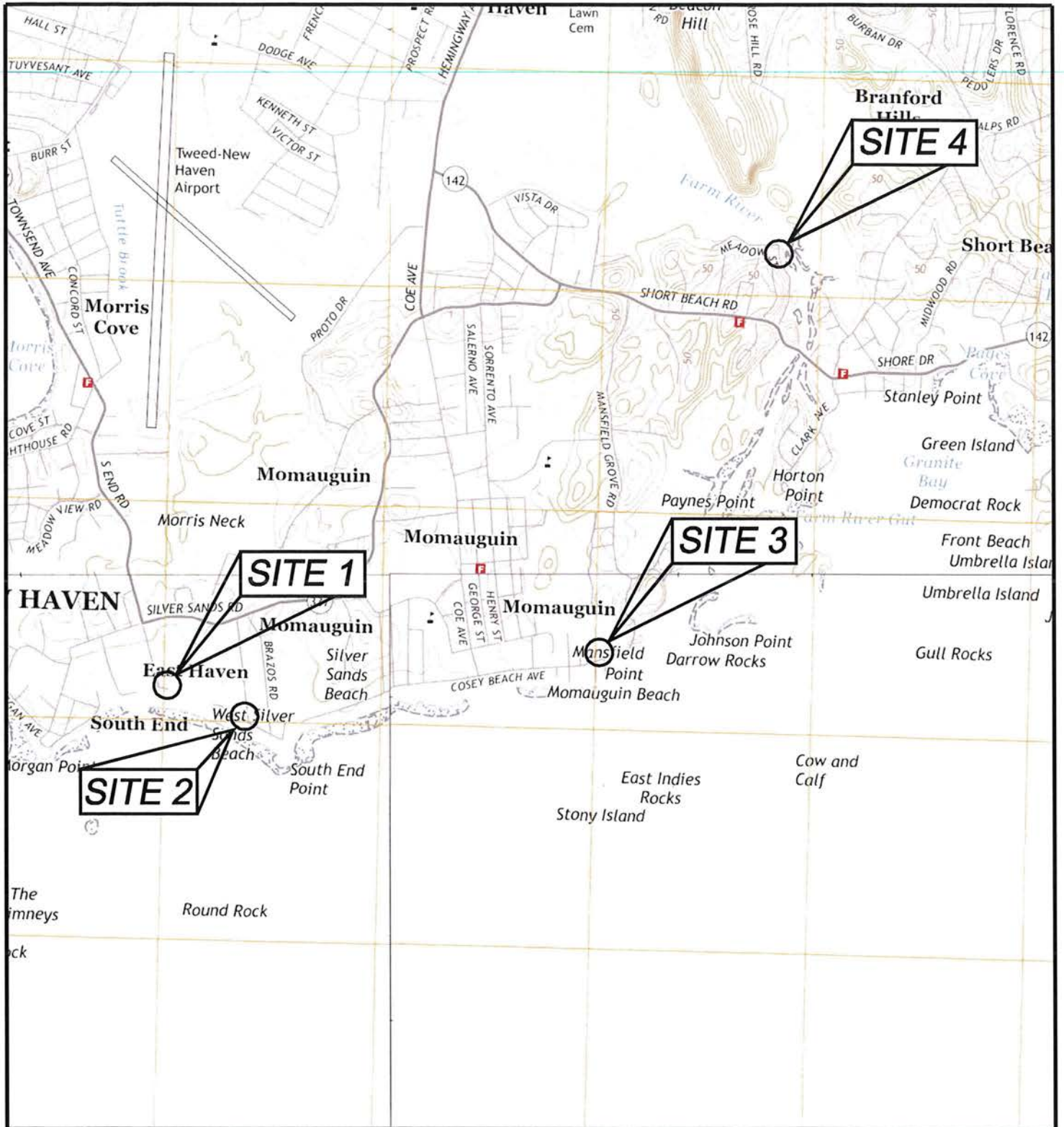
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the sites, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we

should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing

APPENDIX A
FIELD EXPLORATION



CONTOUR INTERVAL 10 FEET
 NORTH AMERICAN VERTICAL DATUM OF 1988



Project Mng:	SCL
Drawn By:	SCL
Checked By:	RWM
Approved By:	RWM

Project No.	J2165055
Quadrangles:	BRANFORD OE S, CT-NY 2015 BRANFORD, CT 2015 NEW HAVEN, CT 2015 WOODMONT, CT 2015
File No.	J2165055.dwg
Date:	May 2016

Terracon
 Consulting Engineers and Scientists

201 Hammer Mill Road Rocky Hill, CT 06067
 PH. (860)721-1900 FAX. (860)721-1939

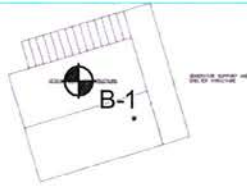
SITE LOCATION MAP

PROPOSED SANITARY SEWER PUMP STATIONS
 MINOR ROAD, FAIRVIEW ROAD, COSEY BEACH AVENUE, AND MEADOW STREET
 EAST HAVEN, CONNECTICUT

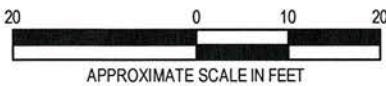
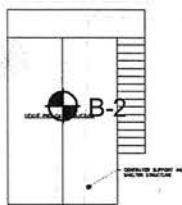
EXHIBIT

A-1

MINOR ROAD - SITE 1



FAIRVIEW ROAD - SITE 2



LEGEND

B-1 TEST BORING LOCATION (TYP)

NOTES:

1. THIS DIAGRAM WAS PREPARED BASED ON PLANS BY WOODARD & CURRAN OF ENFIELD, CONNECTICUT, SHEET NOS. C-03 (MINOR ROAD SITE) AND C-02 (FAIRVIEW ROAD SITE), DATED JULY 2015.
- 2.
3. THE TEST BORINGS B-1 AND B-2 WERE ADVANCED ON MARCH 15, 2016 UNDER THE DIRECTION OF TERRACON WITH EQUIPMENT OWNED AND OPERATED BY NEW ENGLAND BORING CONTRACTORS OF GLASTONBURY, CONNECTICUT.
4. THE APPROXIMATE LOCATIONS OF THE EXPLORATIONS WERE TAPED FROM SITE FEATURES. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
5. USE OF THIS DIAGRAM IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATIONS OF THE EXPLORATIONS AND OTHER PERTINENT SITE FEATURES. ANY OTHER USE OF THIS DIAGRAM WITHOUT PERMISSION FROM TERRACON IS PROHIBITED.

Project Mng:	SCL	Project No.	J2165055
Drawn By:	SCL	Scale:	1" = 20'
Checked By:	RWM	File No.	J2165055
Approved By:	RWM	Date:	May 2016

Terracon
Consulting Engineers and Scientists

201 Hammer Mill Road Rocky Hill, CT 06067
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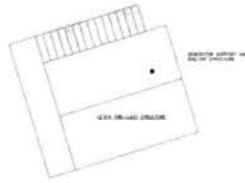
EXPLORATION LOCATION DIAGRAM

PROPOSED SANITARY SEWER PUMP STATIONS
MINOR ROAD, FAIRVIEW ROAD, COSEY BEACH AVENUE, AND MEADOW STREET
EAST HAVEN, CONNECTICUT

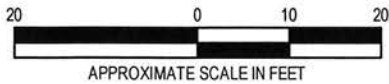
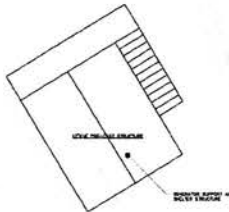
EXHIBIT

A-2

COSEY BEACH AVENUE - SITE 3



MEADOW STREET - SITE 4



LEGEND

B-1 TEST BORING LOCATION (TYP)

NOTES:

1. THIS DIAGRAM WAS PREPARED BASED ON PLANS BY WOODARD & CURRAN OF ENFIELD, CONNECTICUT, SHEET NOS. C-01 (COSEY BEACH AVENUE SITE) AND C-03 (MEADOW STREET SITE), DATED JULY 2015.
2. THE TEST BORINGS B-3 AND B-4 WERE ADVANCED ON MARCH 16, 2016 UNDER THE DIRECTION OF TERRACON WITH EQUIPMENT OWNED AND OPERATED BY NEW ENGLAND BORING CONTRACTORS OF GLASTONBURY, CONNECTICUT.
3. THE APPROXIMATE LOCATIONS OF THE EXPLORATIONS WERE TAPED FROM SITE FEATURES. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. USE OF THIS DIAGRAM IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATIONS OF THE EXPLORATIONS AND OTHER PERTINENT SITE FEATURES. ANY OTHER USE OF THIS DIAGRAM WITHOUT PERMISSION FROM TERRACON IS PROHIBITED.

Project Mgr:	SCL
Drawn By:	SCL
Checked By:	RWM
Approved By:	RWM

Project No.	J2165055
Scale:	1" = 20'
File No.	J2165055
Date:	May 2016

Terracon
 Consulting Engineers and Scientists
 201 Hammer Mill Road Rocky Hill, CT 06067
 PH. (860)721-1900 FAX. (860)721-1939

EXPLORATION LOCATION DIAGRAM

PROPOSED SANITARY SEWER PUMP STATIONS
 MINOR ROAD, FAIRVIEW ROAD, COSEY BEACH AVENUE, AND MEADOW STREET
 EAST HAVEN, CONNECTICUT

EXHIBIT

A-3

Revised Geotechnical Engineering Report

Proposed Sanitary Sewer Pump Stations ■ East Haven, Connecticut

January 12, 2017 ■ Terracon Project No. J2165055



Field Exploration Description

The approximate exploration locations, which are shown on Exhibits A-2 and A-3, were measured by taping from existing features in the field and by estimating right angles. Coordinates were determined by using a hand-held GPS unit. Ground elevations were not available at the time of exploration. The locations of the explorations should be considered accurate only to the degree implied by the method used to define them.

Terracon observed the advancement of four test borings (B-1 through B-4) on March 15 and 16, 2016. The explorations were advanced using an all terrain vehicle (ATV) mounted Diedrich D-50 rotary drill rig owned and operated by New England Boring Contractors of Glastonbury, Connecticut. The borings were advanced using 3¼-inch I.D. hollow-stem augers and terminated in the native glaciofluvial deposit at a depths of about 21.5 to 27 feet.

In the split-barrel sampling procedure, which was used to take soil samples, the number of blows required to advance a standard 2-inch O.D. split-barrel sampler typically the middle 12 inches of the total 24-inch penetration by means of a 140-pound safety hammer with a free fall of 30 inches is the Standard Penetration Test (SPT) resistance value "N". This "N" value is used to estimate the *in-situ* relative density of cohesionless soils and consistency of cohesive soils.

The soil samples were placed in labeled glass jars and taken to our laboratory for further review by a Terracon geotechnical engineer. Information provided on the boring logs attached to this report includes soil descriptions, relative density and/or consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings and existing pavement was repaired using "cold patch", where appropriate, prior to the drill crew leaving the site.

Field logs of the explorations were prepared during drilling by a Terracon field engineer. These logs included visual classifications of the materials encountered during drilling as well as interpretation by our field engineer of the subsurface conditions between samples. Final exploration logs included with this report represent further interpretation by the geotechnical engineer of the field logs and incorporate, where appropriate, modifications based on laboratory classification of the samples.

BORING LOG NO. B-1

PROJECT: Proposed Sanitary Sewer Pump Stations

CLIENT: Woodard & Curran, Inc.
Cheshire, Connecticut

SITE: Minor Road
East Haven, Connecticut

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 41.2454° Longitude: -72.8873°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
0.2	TOPSOIL						
	FILL - POORLY GRADED SAND WITH SILT AND GRAVEL , brown, loose, (FILL)				12	2-4-5-5 N=9	
					3	6-52	
			▽				
5.0	SANDY PEAT (PT) , brown, medium stiff to stiff	5			22	4-4-6-6 N=10	
					20	3-3-4-4 N=7	206
9.0	POORLY GRADED SAND (SP) TO SANDY SILT (ML) , trace to with silt, brown, dense, (GLACIOFLUVIAL DEPOSIT)	10			18	6-10-22-28 N=32	
					20	10-16-24-26 N=40	
					20	16-17-20-23 N=37	22
					16	15-20-22-24 N=42	
27.0	Boring Terminated at 27 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples taken with a 2" O.D. split spoon sampler driven by a safety hammer operated by winch and cable.

Advancement Method:
3 1/4-inch inside diameter hollow-stem augers

See Exhibit A-4 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

WATER LEVEL OBSERVATIONS

▽ 4 ft while drilling



Boring Started: 3/15/2016

Boring Completed: 3/15/2016

Drill Rig: Diedrich D-50

Driller: O. Cone

Project No.: J2165055

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. J2165055 B1.GPJ

BORING LOG NO. B-2

PROJECT: Proposed Sanitary Sewer Pump Stations

CLIENT: Woodard & Curran, Inc.
Cheshire, Connecticut

SITE: Fairview Road
East Haven, Connecticut

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 41.2448° Longitude: -72.8833°	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	WATER CONTENT (%)
DEPTH							
0.2	Bituminous Concrete						
	FILL - POORLY GRADED SAND , with silt and gravel, brown, medium dense, (FILL)				16	4-6-8-12 N=14	
5.0			▽		6	8-10-12-14 N=22	8
	PEAT (PT) , brown, medium stiff to stiff				12	1-2-2-2 N=4	
8.0					10	4-5-6-6 N=11	
	POORLY GRADED SAND (SP) , trace to with silt, brown, medium dense to very dense, (GLACIOFLUVIAL DEPOSIT)				18	6-8-8-10 N=16	18
					20	8-10-10-15 N=20	
					18	18-20-22-24 N=42	
					12	22-25-28-30 N=53	
27.0	Boring Terminated at 27 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples taken with a 2" O.D. split spoon sampler driven by a safety hammer operated by winch and cable.

Advancement Method:
3 1/4-inch inside diameter hollow-stem augers

See Exhibit A-4 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and patched with "cold patch" asphalt upon completion.

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
▽ 5 ft while drilling



Boring Started: 3/15/2016	Boring Completed: 3/15/2016
Drill Rig: Diedrich D-50	Driller: O. Cone
Project No.: J2165055	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. J2165055 B2.GPJ

BORING LOG NO. B-3

PROJECT: Proposed Sanitary Sewer Pump Stations

CLIENT: Woodard & Curran, Inc.
Cheshire, Connecticut

SITE: Cosey Beach Avenue
East Haven, Connecticut

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 41.2466° Longitude: -72.8636°	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
DEPTH							
0.2	TOPSOIL						
	FILL - POORLY GRADED SAND WITH SILT AND GRAVEL , brown, medium dense, (FILL)			X	16	2-6-11-15 N=17	
				X	12	10-15-22-28 N=37	7
		5	▽		2	100/6"	
9.0	POORLY GRADED SAND (SP) , brown, medium dense, (UPPER GLACIOFLUVIAL DEPOSIT)						
				X	3	25-10-6-6 N=16	
15.0	POORLY GRADED SAND WITH GRAVEL (SP) , brown, medium dense to dense, (LOWER GLACIOFLUVIAL DEPOSIT)						
				X	12	10-8-8-7 N=16	21
				X	12	22-25-50/6" N=75	
21.5	Auger refusal on probable boulder at 21.5 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples taken with a 2" O.D. split spoon sampler driven by a safety hammer operated by winch and cable.

Advancement Method:
3 1/4-inch inside diameter hollow-stem augers

See Exhibit A-4 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

▽ 5 ft 15 minutes after boring



Boring Started: 3/16/2016
Drill Rig: Diedrich D-50
Project No.: J2165055

Boring Completed: 3/16/2016
Driller: O. Cone
Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. J2165055 B3.GPJ

BORING LOG NO. B-4

PROJECT: Proposed Sanitary Sewer Pump Stations

CLIENT: Woodard & Curran, Inc.
Cheshire, Connecticut

SITE: Meadow Street
East Haven, Connecticut

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 41.265° Longitude: -72.8531°	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
DEPTH							
0.2	FILL - POORLY GRADED SAND WITH SILT AND GRAVEL , brown, medium dense to very dense, (FILL)				12	10-12-14-18 N=26	
					4	46-100/6"	
		5			6	70-10-6-6 N=16	9
7.0	POORLY GRADED SAND (SP) , trace silt and gravel, brown, medium dense, (UPPER GLACIOFLUVIAL DEPOSIT)		▽		10	10-8-6-7 N=14	
		10			14	11-7-7-9 N=14	
		15			18	22-24-31-30 N=55	20
15.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP) to SILTY SAND (SM) brown, dense to very dense, (LOWER GLACIOFLUVIAL DEPOSIT)				16	19-21-24-30 N=45	
		20					
25.1	Sampler refusal on probable boulder at 25.1 Feet	25			0	50/1"	

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples taken with a 2" O.D. split spoon sampler driven by a safety hammer operated by winch and cable.

Advancement Method:
3 1/4-inch inside diameter hollow-stem augers

See Exhibit A-4 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and patched with "cold patch" asphalt upon completion.

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

▽ 7.5 ft 10 minutes after boring



Boring Started: 3/16/2016

Boring Completed: 3/16/2016

Drill Rig: Diedrich D-50

Driller: O. Cone

Project No.: J2165055

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. J2165055 B4.GPJ

APPENDIX B
LABORATORY TESTING

Revised Geotechnical Engineering Report

Proposed Sanitary Sewer Pump Stations ■ East Haven, Connecticut
January 12, 2017 ■ Terracon Project No. J2165055



Laboratory Testing

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and Unified Soil Classification System (USCS) in Appendix C. USCS symbols are also shown. A brief description of the USCS is attached to this report. Classification was generally by visual/manual procedures aided by the results of the laboratory testing.

The following laboratory testing was performed on representative soil samples from the sites:

- Eight grain size distributions (ASTM D422)
- Eight moisture content determinations (ASTM D2216)
- Four corrosivity tests consisting of:
 - pH Analysis (ASTM D4972)
 - Soil resistivity (ASTM G57)
 - Sulfide (EPA SM4500)
 - Sulfate concentrations (ASTM D516)
 - Chloride concentrations (ASTM D512)
 - Oxidation-Reduction potential (APHA SM2580B)

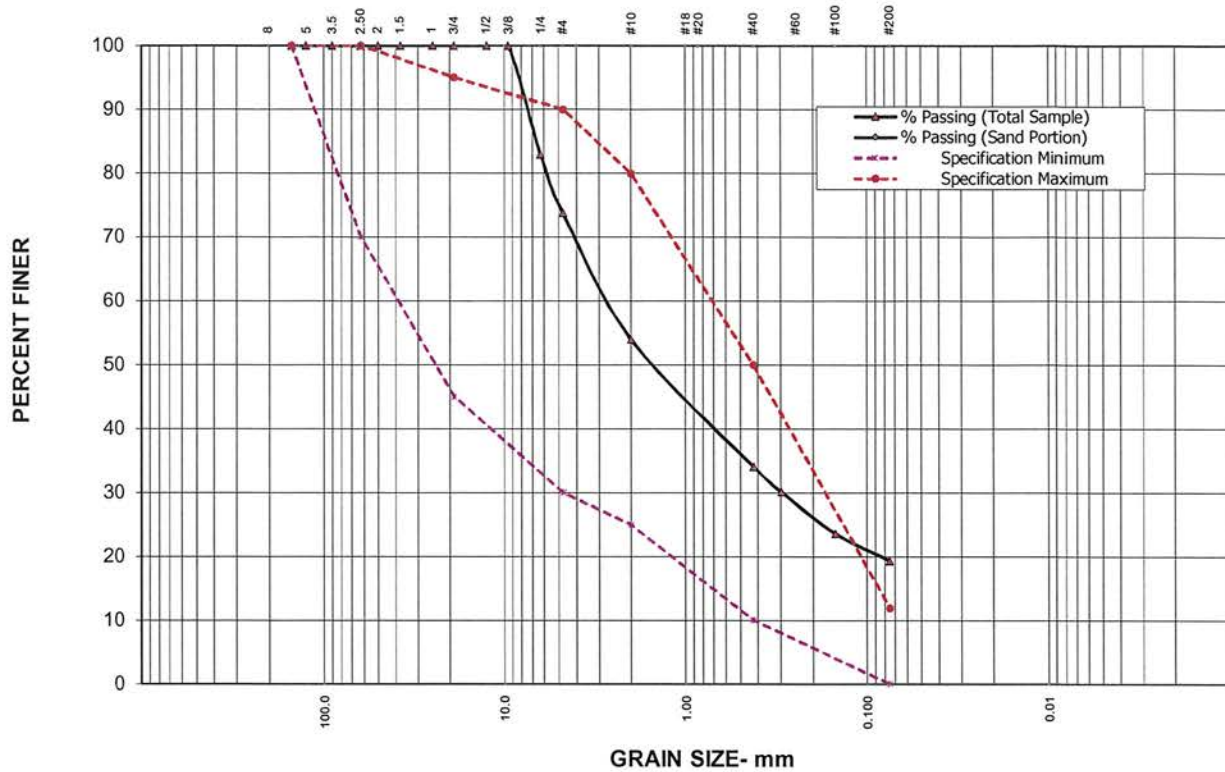
The results of the moisture contents are presented on the boring logs in Appendix A. The results of the grain size distributions are presented in Appendix B. The results of the corrosivity testing are tabulated below:

	B-1 (0 to 3 feet)	B-2 (0 to 3 feet)	B-3 (0 to 3 feet)	B-4 (0 to 3 feet)
pH	7.0	6.7	6.8	7.5
Resistivity (saturated) (Ω-cm)	28,925	36,155	795	15,500
Sulfide (mg/kg)	ND	ND	ND	ND
Sulfate (mg/kg)	ND	640	ND	ND
Chloride (mg/kg)	ND	950	ND	ND
Oxidation-Reduction Potential (mV)	330	380	285	290

ND = Not Detected

GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	26	36.4	36.5	27.1	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			54	
					19.4	

USCS Classification: **Sandy peat, brown (PT)**

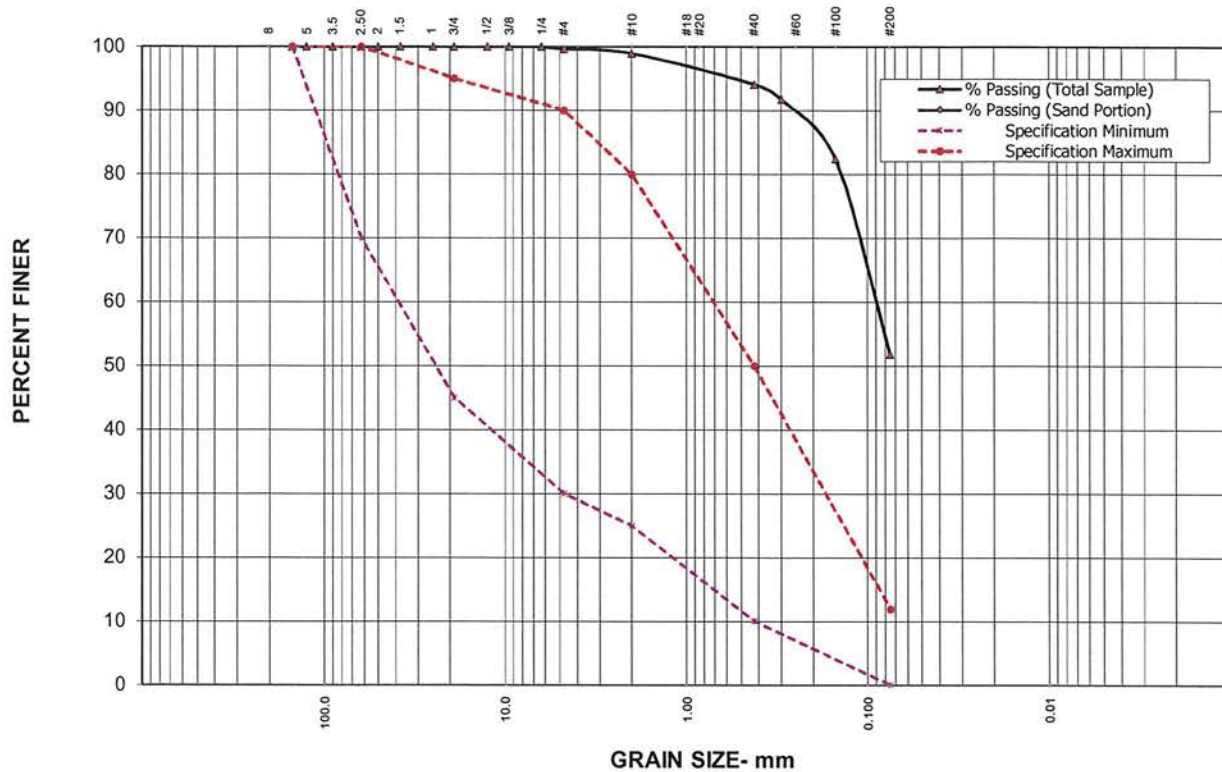
Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	0.00	100.0			
9.5	3/8"	0.00	100.0			
6.3	1/4"	6.41	82.9			
4.75	#4	9.86	73.8		30	90
2.00	#10	17.31	53.9		25	80
0.425	#40	24.77	34.1		10	50
0.300	#50	26.25	30.1			
0.150	#100	28.71	23.6			
0.075	#200	30.30	19.4		0	12

Total Dry Wt. 37.58 g
Moisture Content 206.3 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.001
Source: B-1	Sampled from: 7 to 9 feet	
201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/	Remarks: Sample consisted of primarily organic material Gradation representative of non-organic portion only	
	Tested By: C. Klopfer	Date: 3/31/2016
	Reviewed By: S. Lanne	Date: 4/1/2016

GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	0	1.4	10.1	88.4	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			52	

USCS Classification: **Sandy silt (ML), brown**

Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	0.00	100.0			
9.5	3/8"	0.00	100.0			
6.3	1/4"	0.00	100.0			
4.75	#4	0.70	99.6	99.6	30	90
2.00	#10	2.00	99.0	99.0	25	80
0.425	#40	11.28	94.1	94.1	10	50
0.300	#50	15.88	91.7	91.7		
0.150	#100	33.72	82.4	82.4		
0.075	#200	92.27	51.8	51.8	0	12

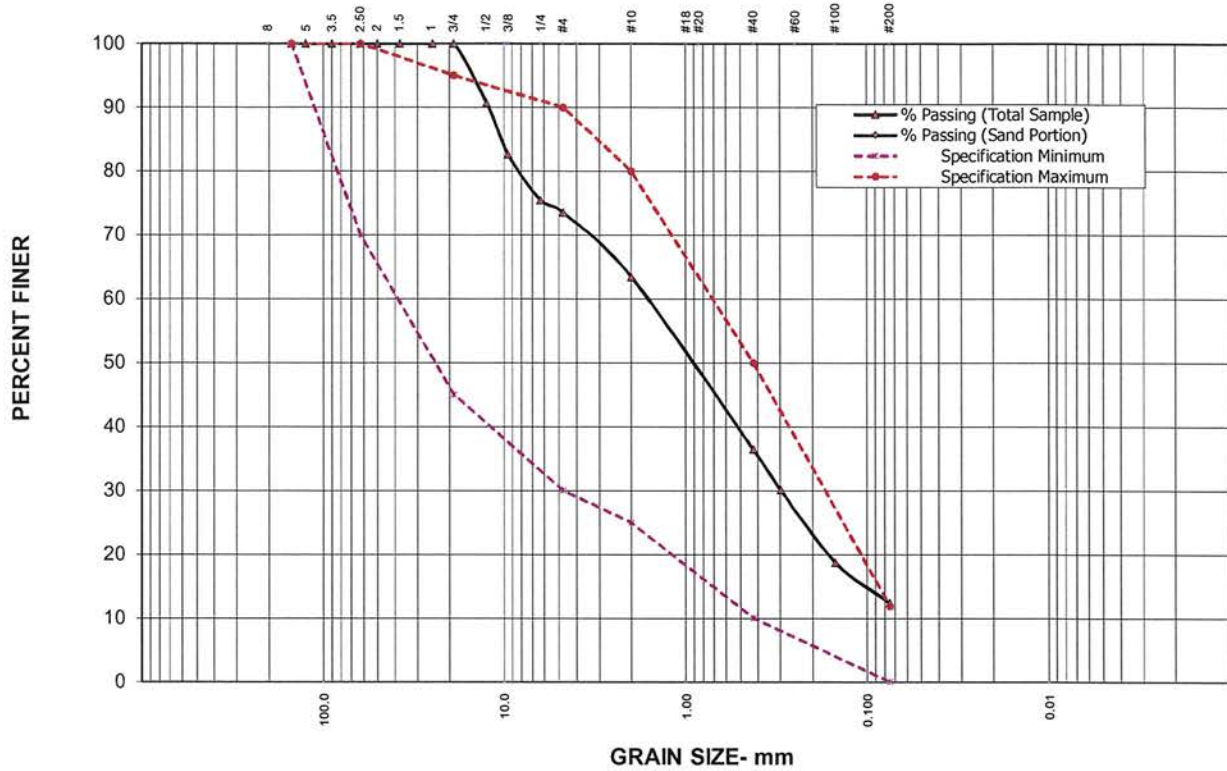
Total Dry Wt. 191.55 g
Moisture Content 21.8 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.002
Source: B-1	Sampled from: 20 to 22 feet	

201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/	Remarks: Tested By: C. Klopfer Date: 3/31/2016 Reviewed By: S. Lanne Date: 4/1/2016
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GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	27	16.5	44.1	39.4	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			12	

USCS Classification: **Poorly graded sand, with silt and gravel, brown (SP)**

Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	10.99	90.7			
9.5	3/8"	20.50	82.6			
6.3	1/4"	29.03	75.4			
4.75	#4	31.26	73.5		30	90
2.00	#10	43.18	63.4		25	80
0.425	#40	75.01	36.5		10	50
0.300	#50	82.53	30.1			
0.150	#100	95.91	18.8			
0.075	#200	103.44	12.4		0	12

Total Dry Wt. 118.09 g
Moisture Content 8.1 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.003
Source: B-2	Sampled from: 3 to 5 feet	

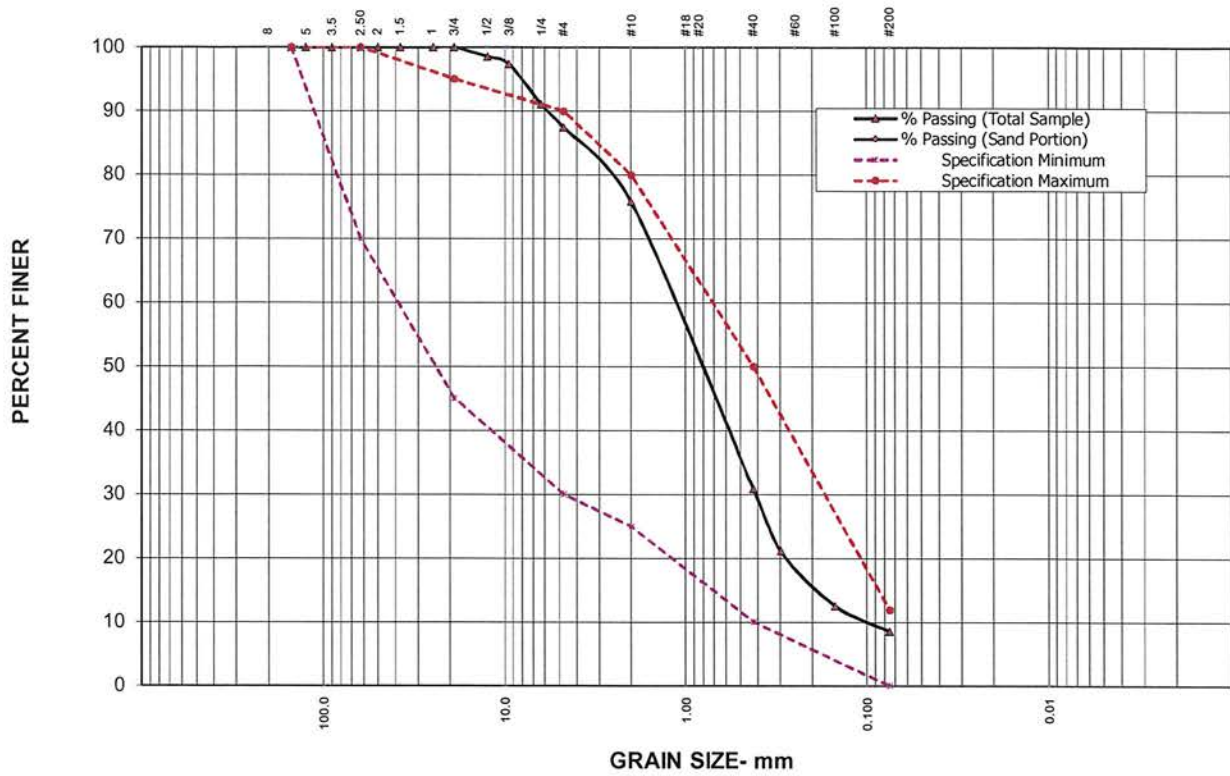
Terracon
 201 Hammer Mill Road
 Rocky Hill, CT 06067
 860-721-1900 (p) 860-721-1939 (f)
<http://www.terracon.com/>

Remarks:

Tested By: C. Klopfer Date: 3/31/2016
 Reviewed By: S. Lanne Date: 4/1/2016

GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	12	14.8	56.9	28.3	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			9	

USCS Classification: Poorly graded sand, brown (SP)

Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	4.38	98.5			
9.5	3/8"	7.95	97.3			
6.3	1/4"	26.61	91.1			
4.75	#4	37.31	87.5		30	90
2.00	#10	72.05	75.8		25	80
0.425	#40	205.61	30.9		10	50
0.300	#50	234.70	21.1			
0.150	#100	260.15	12.6			
0.075	#200	272.05	8.6		0	12

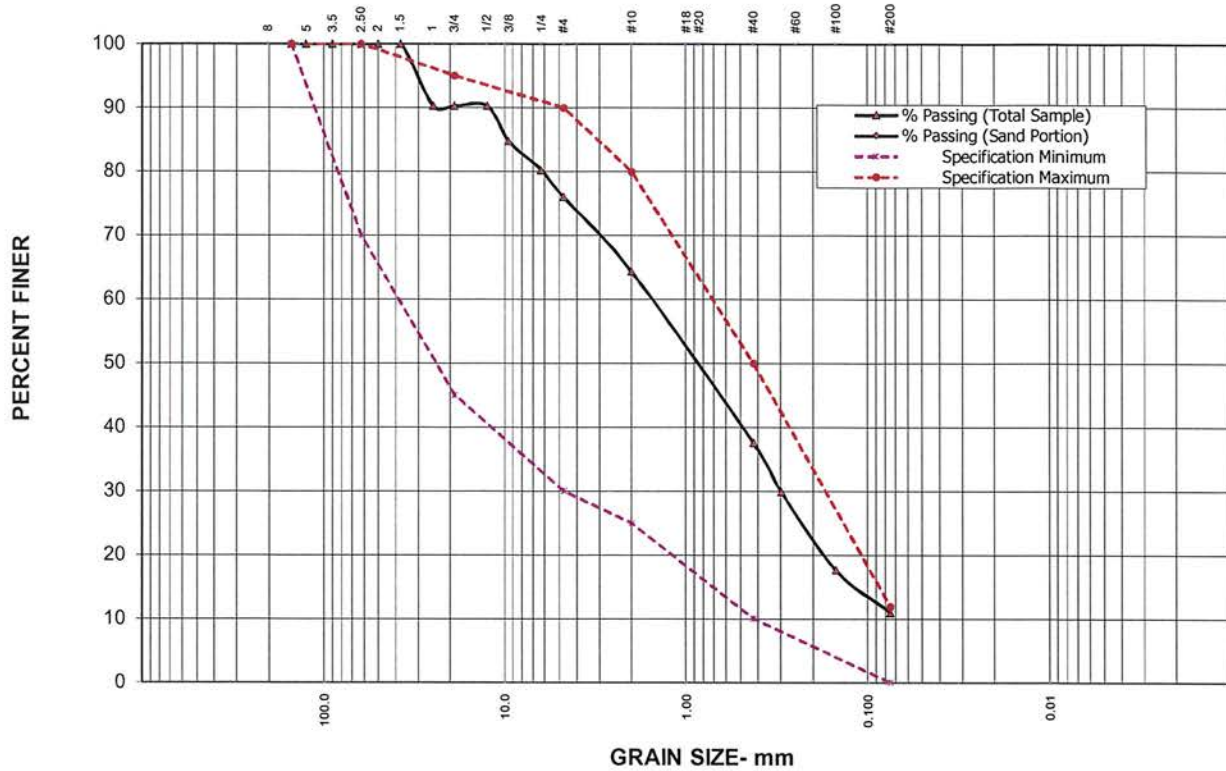
Total Dry Wt. 297.6 g
 Moisture Content 17.5 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.004
Source: B-2	Sampled from: 10 to 12 feet	

<p>201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/</p>	<p>Remarks:</p> <p>Tested By: C. Klopfer Date: 3/31/2016 Reviewed By: S. Lanne Date: 4/1/2016</p>
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GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines
0.0	24	18.0	41.1	40.9	Silt (>0.002mm) Clay (<0.002mm)
		% Sand		65	11

USCS Classification: **Poorly graded sand, with silt and gravel, brown (SP)**

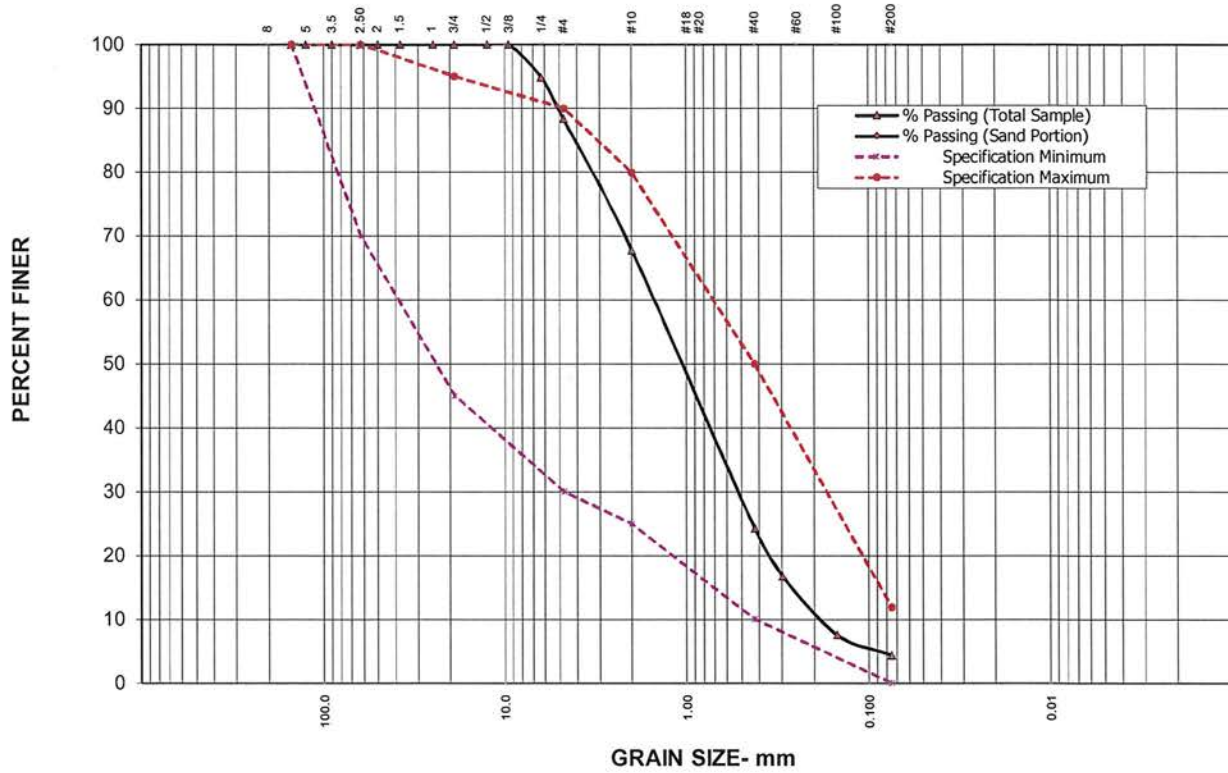
Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	30.71	90.3			
19.0	3/4"	30.71	90.3		45	95
12.5	1/2"	30.71	90.3			
9.5	3/8"	48.17	84.7			
6.3	1/4"	62.37	80.2			
4.75	#4	75.72	76.0		30	90
2.00	#10	112.56	64.3		25	80
0.425	#40	196.96	37.6		10	50
0.300	#50	221.02	30.0			
0.150	#100	259.82	17.7			
0.075	#200	280.84	11.0		0	12
Total Dry Wt.		315.56	g			
Moisture Content		6.5	%			

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.005
Source: B-3	Sampled from: 2 to 4 feet	

<p>201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/</p>	Remarks:	
	Tested By: C. Klopfer	Date: 3/31/2016
	Reviewed By: S. Lanne	Date: 4/1/2016

GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	12	24.5	51.9	23.7	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			4	

USCS Classification: **Poorly graded sand, brown (SP)**

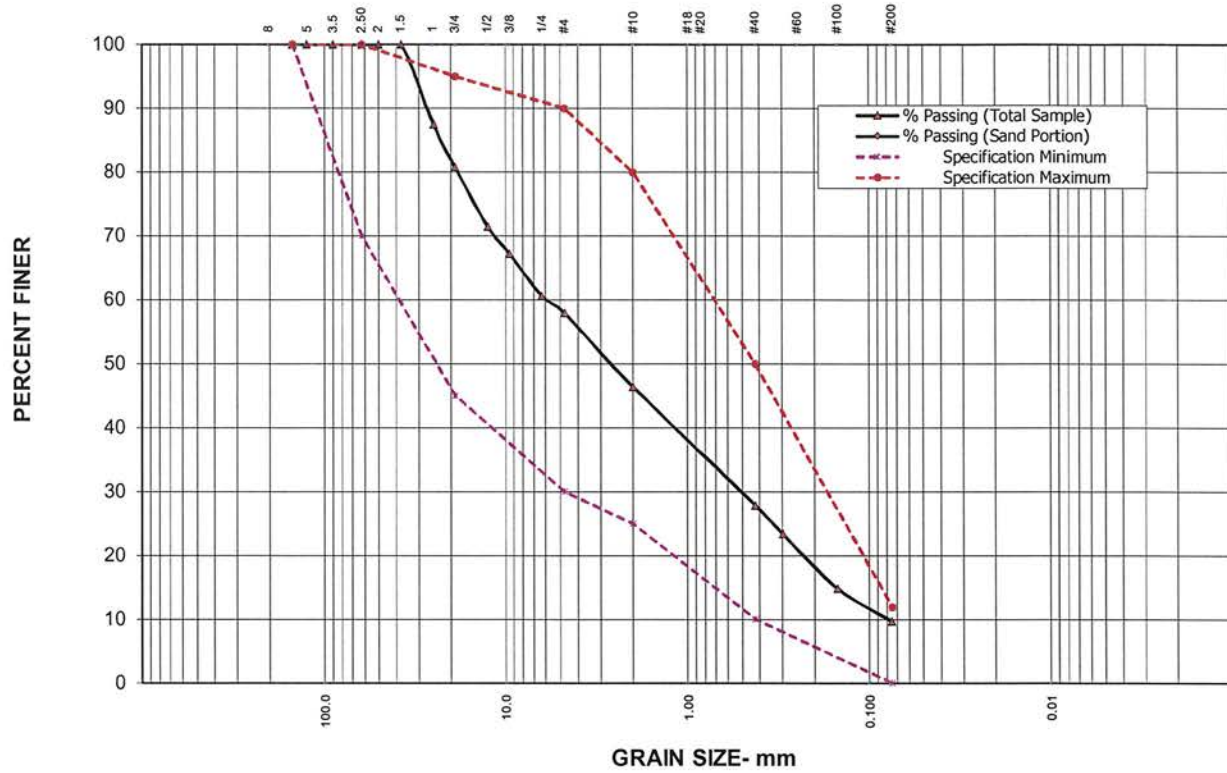
Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0		70	100
62.5	2.5"	0.00	100.0			
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	0.00	100.0			
9.5	3/8"	0.00	100.0			
6.3	1/4"	14.40	94.9			
4.75	#4	32.81	88.3		30	90
2.00	#10	90.64	67.8		25	80
0.425	#40	213.18	24.3		10	50
0.300	#50	234.10	16.8			
0.150	#100	260.21	7.6			
0.075	#200	269.10	4.4		0	12
Total Dry Wt.		281.53	g			
Moisture Content		20.7	%			

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.006
Source: B-3	Sampled from: 15 to 17 feet	

<p style="margin: 0;">201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/</p>	<p>Remarks:</p> <p>Tested By: C. Klopfer Date: 3/31/2016 Reviewed By: S. Lanne Date: 4/1/2016</p>
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GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	42	24.0	38.3	37.7	Silt (>0.002mm)	Clay (<0.002mm)
				% Sand	10	

USCS Classification: Poorly graded sand, with silt and gravel, brown (SP)

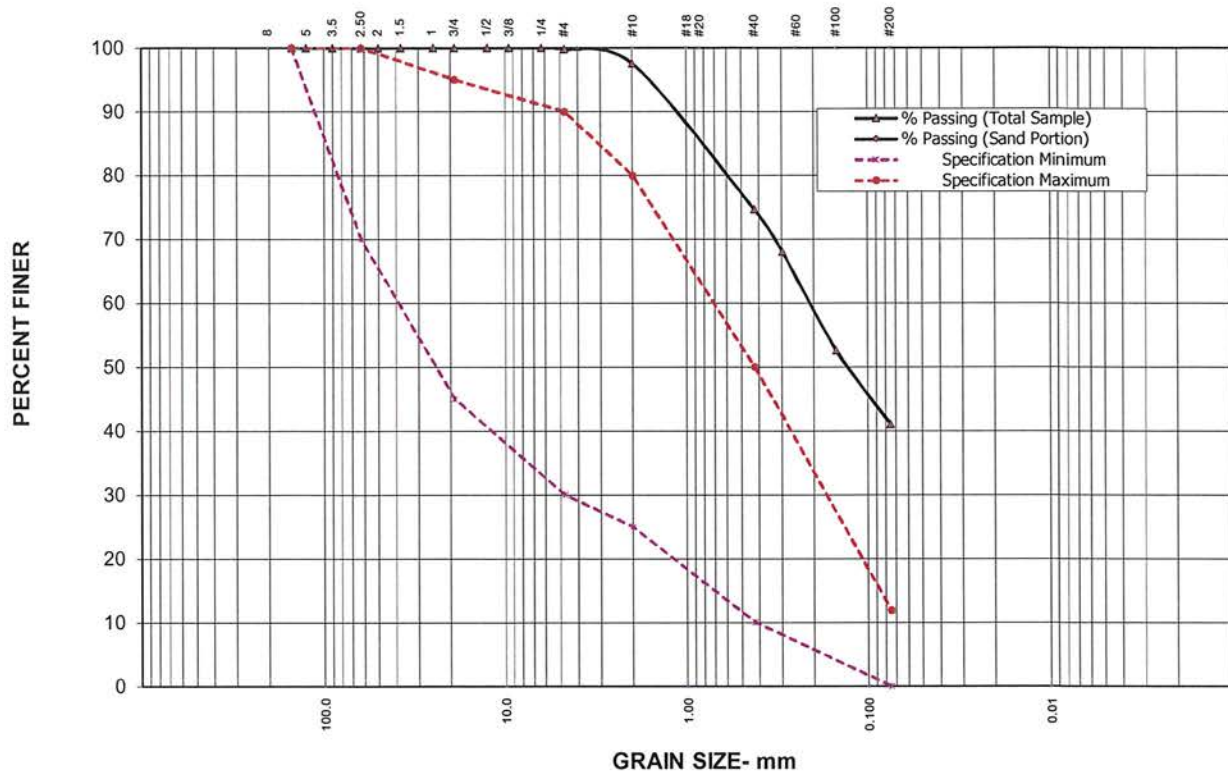
Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0		70	100
62.5	2.5"	0.00	100.0			
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	29.71	87.4			
19.0	3/4"	45.56	80.7		45	95
12.5	1/2"	67.59	71.4			
9.5	3/8"	77.65	67.2			
6.3	1/4"	93.26	60.6			
4.75	#4	99.48	57.9		30	90
2.00	#10	126.84	46.4		25	80
0.425	#40	170.56	27.9		10	50
0.300	#50	181.17	23.4			
0.150	#100	201.33	14.9			
0.075	#200	213.54	9.7		0	12

Total Dry Wt. 236.51 g
Moisture Content 8.9 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.007
Source: B-4	Sampled from: 5 to 7 feet	
201 Hammer Mill Road Rocky Hill, CT 06067 860-721-1900 (p) 860-721-1939 (f) http://www.terracon.com/	Remarks: Tested By: C. Klopfer Date: 3/31/2016 Reviewed By: S. Lanne Date: 4/1/2016	

GRAIN SIZE DISTRIBUTION TEST REPORT

ASTM TEST METHODS: D422



% Cobbles	% Gravel	Coarse	Medium	Fine	% Fines	
0.0	0	3.8	39.0	57.2	Silt (>0.002mm)	Clay (<0.002mm)
		% Sand			41	

USCS Classification: **Silty sand, brown (SM)**

Sieve Size (mm)	U.S. Sieve Size (in.)	Cumulative Wt. Retained	% Passing (Total Sample)	% Passing (Sand Portion)	Specification Minimum	Specification Maximum
150.0	6"	0.00	100.0		100	100
125.0	5"	0.00	100.0			
90.0	3.5"	0.00	100.0			
62.5	2.5"	0.00	100.0		70	100
50.0	2"	0.00	100.0			
37.5	1.5"	0.00	100.0			
25.0	1"	0.00	100.0			
19.0	3/4"	0.00	100.0		45	95
12.5	1/2"	0.00	100.0			
9.5	3/8"	0.00	100.0			
6.3	1/4"	0.00	100.0			
4.75	#4	0.42	99.8		30	90
2.00	#10	5.10	97.6		25	80
0.425	#40	52.80	74.7		10	50
0.300	#50	66.46	68.1			
0.150	#100	98.67	52.6			
0.075	#200	122.81	41.0		0	12

Total Dry Wt. 208.31 g
Moisture Content 19.7 %

Project: Proposed Sanitary Sewer Pump Stations	Project No.: J2165055	Date: 4/1/2016
City: East Haven, Connecticut	Specification: Terracon Structural Fill	Report No: J2165055.008
Source: B-4	Sampled from: 15 to 17 feet	

Terracon
 201 Hammer Mill Road
 Rocky Hill, CT 06067
 860-721-1900 (p) 860-721-1939 (f)
<http://www.terracon.com/>












Remarks:

Tested By: C. Klopfer Date: 3/31/2016
 Reviewed By: S. Lanne Date: 4/1/2016

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING			WATER LEVEL		Water Initially Encountered	FIELD TESTS	(HP) Hand Penetrometer	
	Auger	Split Spoon			Water Level After a Specified Period of Time		(T) Torvane	
					Water Level After a Specified Period of Time		(b/f) Standard Penetration Test (blows per foot)	
	Shelby Tube	Macro Core		Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.			(PID) Photo-Ionization Detector	
							(OVA) Organic Vapor Analyzer	
Ring Sampler	Rock Core							
								
Grab Sample	No Recovery							

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS	RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
	Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.
	Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
	Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
	Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
	Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
	Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42	

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

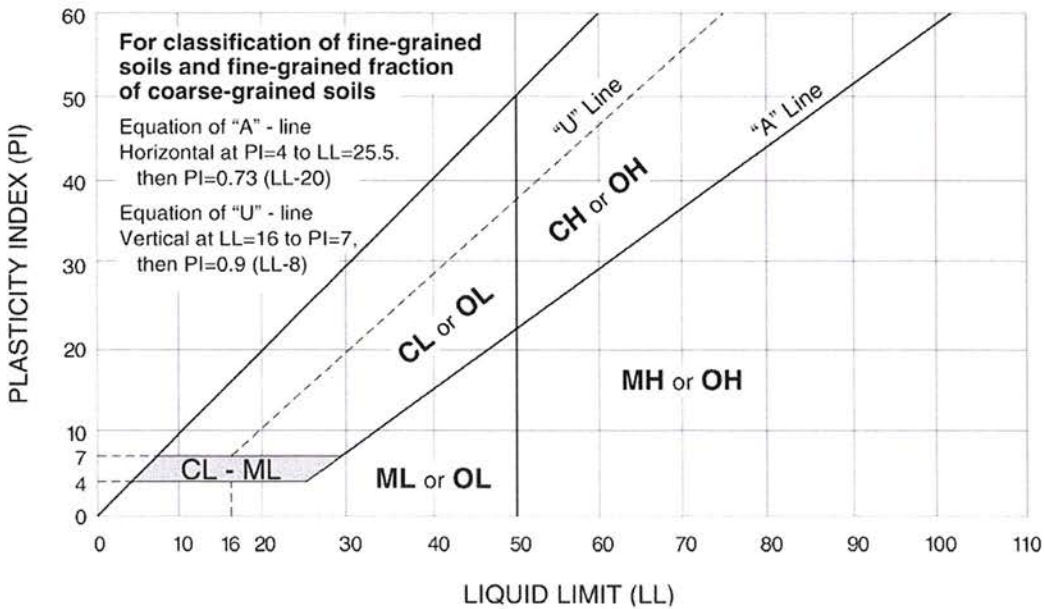
PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$ $Cu < 4$ and/or $1 > Cc > 3^E$	GW	Well-graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH Fines classify as CL or CH	GP	Poorly graded gravel ^F
		Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$ $Cu < 6$ and/or $1 > Cc > 3^E$	GM
	Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Silts and Clays: Liquid limit less than 50	Inorganic: PI > 7 and plots on or above "A" line ^J PI < 4 or plots below "A" line ^J	SW	Well-graded sand ^I	
	Silts and Clays: Liquid limit 50 or more	Inorganic: PI plots on or above "A" line PI plots below "A" line	SP	Poorly graded sand ^I	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Organic: Liquid limit - oven dried Liquid limit - not dried	< 0.75	SM	Silty sand ^{G,H,I}
		Inorganic: PI plots on or above "A" line PI plots below "A" line	SC	Clayey sand ^{G,H,I}	
		Organic: Liquid limit - oven dried Liquid limit - not dried	< 0.75	CL	Lean clay ^{K,L,M}
	Silts and Clays: Liquid limit 50 or more	Inorganic: PI plots on or above "A" line PI plots below "A" line	ML	Silt ^{K,L,M}	
	Organic: Liquid limit - oven dried Liquid limit - not dried	< 0.75	OL	Organic clay ^{K,L,M,N} Organic silt ^{K,L,M,O}	
	Organic: Liquid limit - oven dried Liquid limit - not dried	< 0.75	OH	Organic silt ^{K,L,M,Q} Organic clay ^{K,L,M,P}	
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

- ^A Based on the material passing the 3-inch (75-mm) sieve
- ^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- ^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
- ^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay
- ^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- ^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.
- ^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
- ^H If fines are organic, add "with organic fines" to group name.
- ^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
- ^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
- ^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
- ^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.
- ^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.
- ^N $PI \geq 4$ and plots on or above "A" line.
- ^O $PI < 4$ or plots below "A" line.
- ^P PI plots on or above "A" line.
- ^Q PI plots below "A" line.

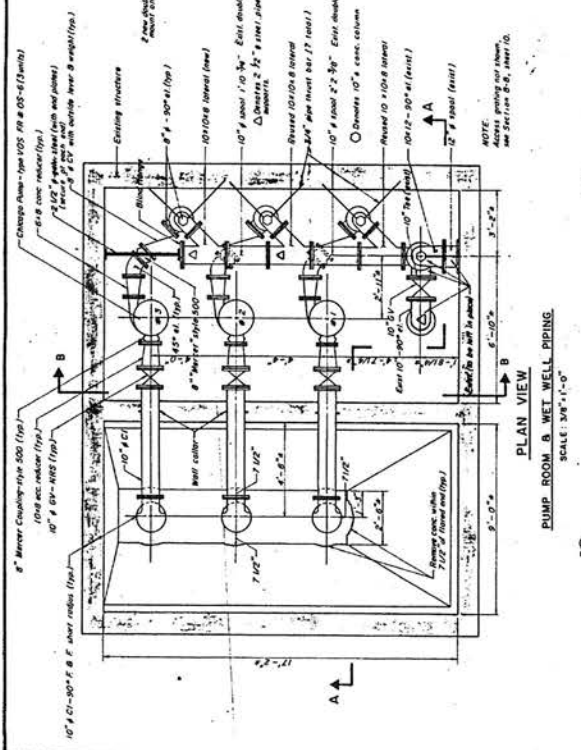


Attachment C
Record Drawings

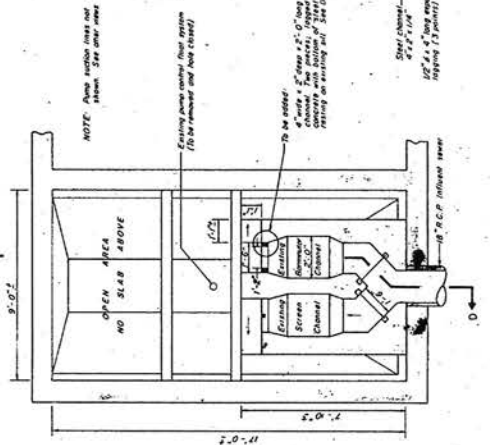
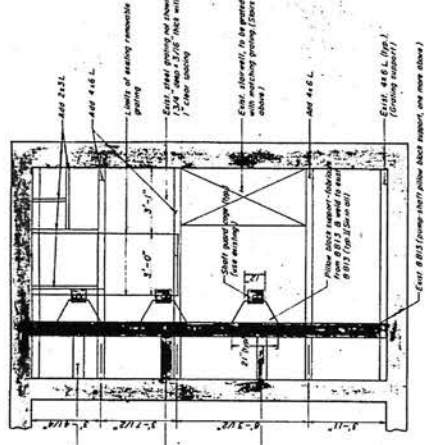
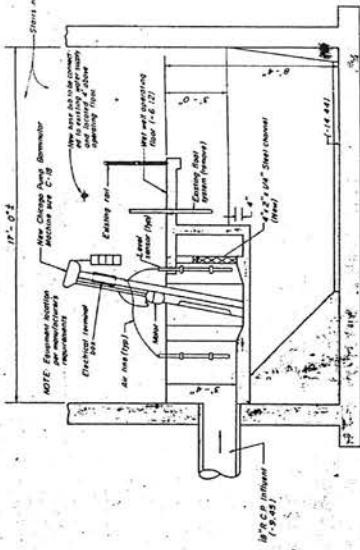
AS BUILT - JULY 1982

PROPOSED SANITARY SEWERS MORGAN POINT / RIVERSIDE AREA
MODIFICATIONS TO FAIRVIEW PUMP STATION MECHANICAL SECTIONS AND DETAILS
CARDINAL ENGINEERING ASSOCIATES INC. CONSULTING ENGINEERS
99 COLONY ST. MERRIFIELD, OHIO
DATE: APRIL, 1979
PROJECT NO. 273
DRAWING NO. 529
SHEET 9

CONTRACT NO. 7-4



SECTION D-D
SCALE: 3/8" = 1'-0"

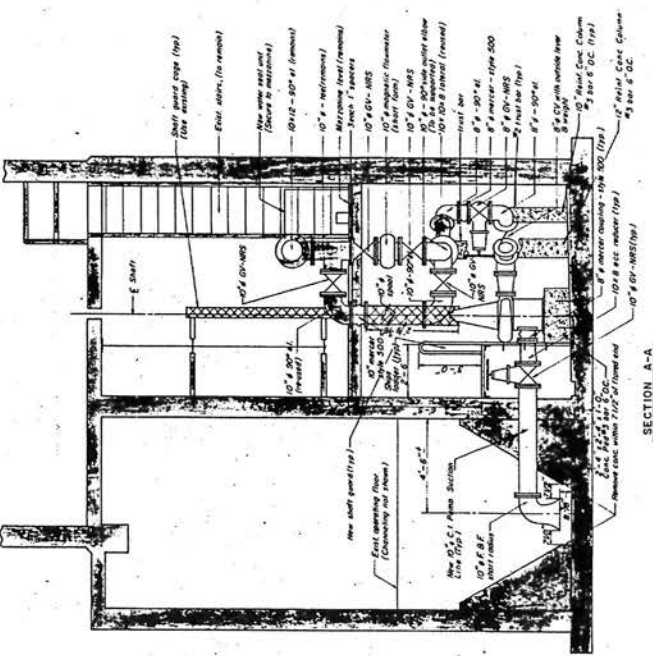


PLAN VIEW
MEZZANINE LEVEL - PUMP ROOM
SCALE: 3/8" = 1'-0"

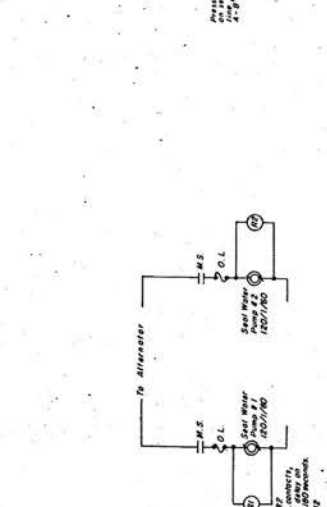
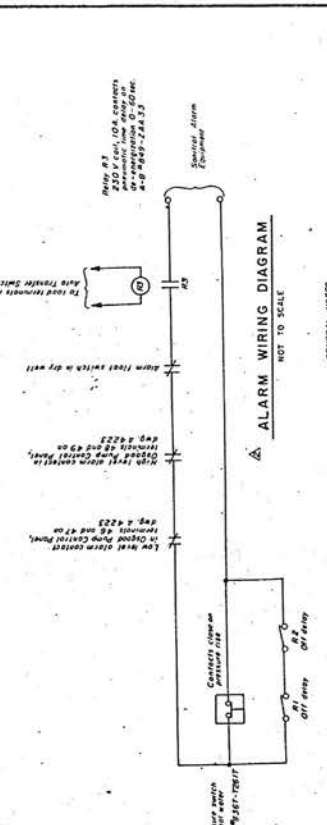
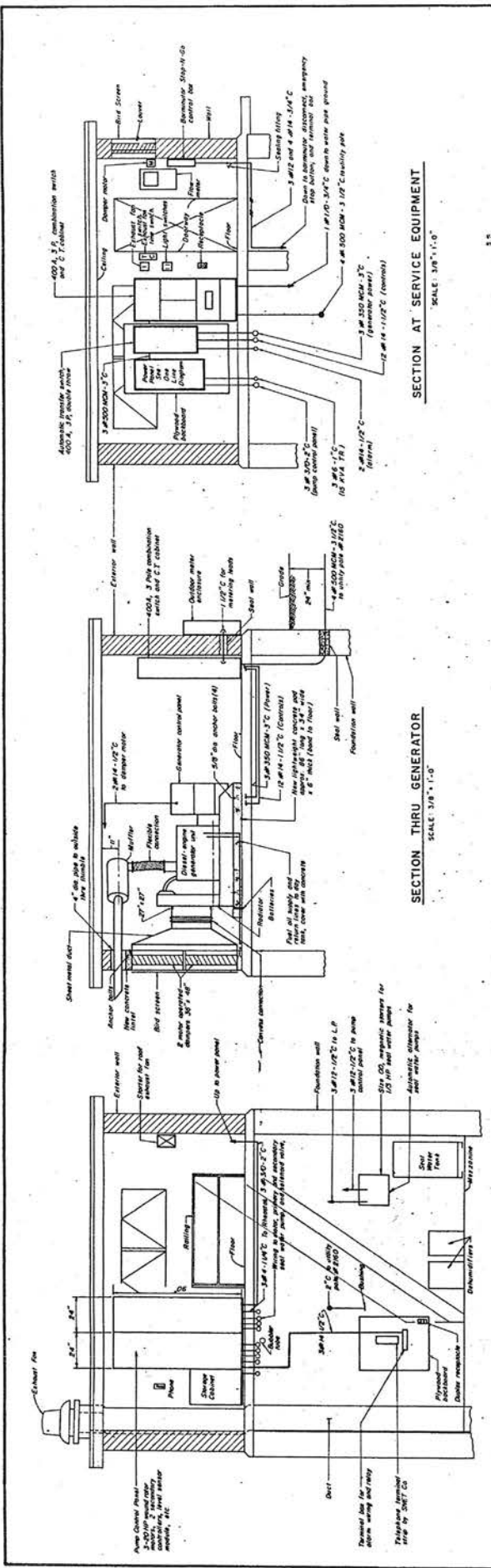
PLAN VIEW
DETAIL A
NOT TO SCALE

- NOTES
1. Field dimensions to be verified
 2. Existing electrical and small diameter piping not shown
 3. Showed areas where existing structure and equipment typical

NO.	DESCRIPTION	DATE
1	REVISION	



SECTION A-A
SCALE: 3/8" = 1'-0"



AS BUILT - JULY 1982

TOWN OF EAST HAVEN
PROPOSED SANITARY SEWERS
MORGAN POINT / RIVERSIDE AREA
MODIFICATIONS TO FAIRVIEW PUMPING STATION
ELECTRICAL SECTIONS AND DETAILS

REVISION		DESCRIPTION		DATE	
1	AS BUILT	AS BUILT	AS BUILT	07/15/82	13

CARDINAL ENGINEERING ASSOCIATES INC
CONSULTING ENGINEERS
98 COLONY ST
MIDDLETOWN, CT 06457
PHONE (860) 344-1123
TELETYPE (860) 344-1123
FACSIMILE (860) 344-1123
ADDRESS: A. J. M. CARDINAL
PROJECT NO. 82-005

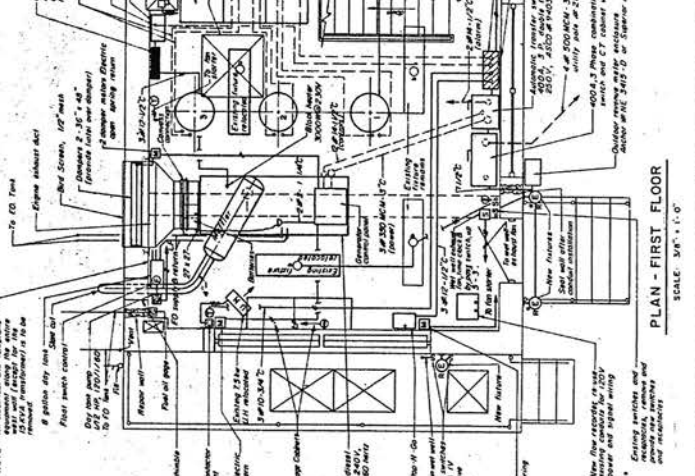
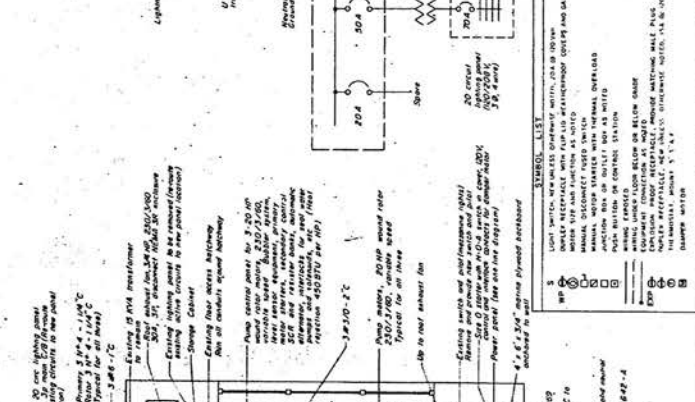
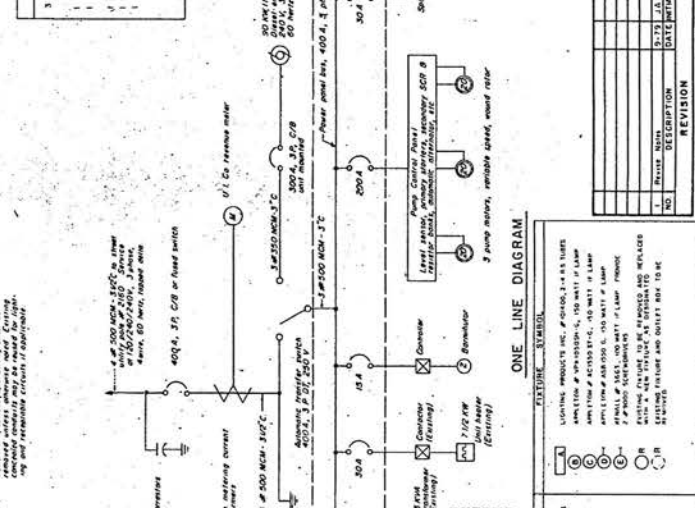
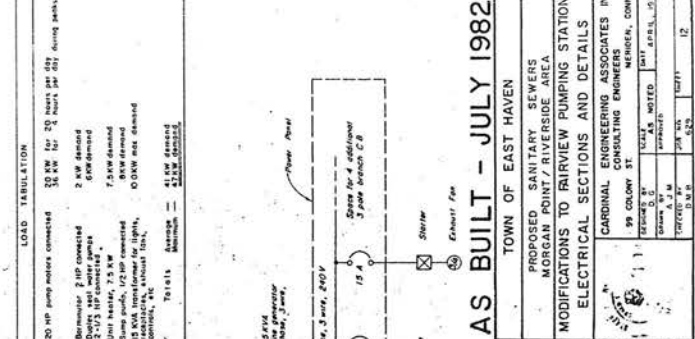
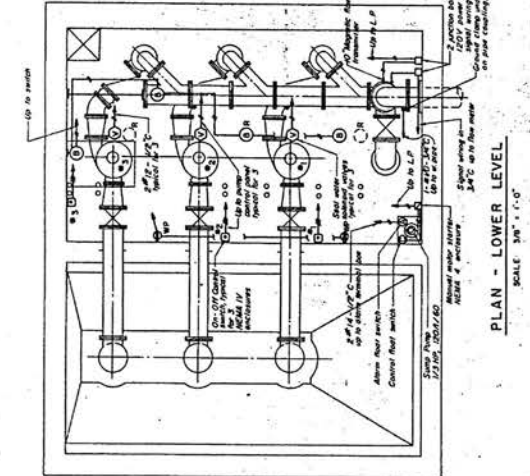
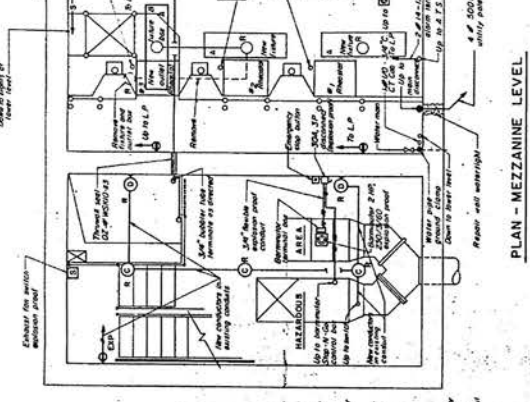
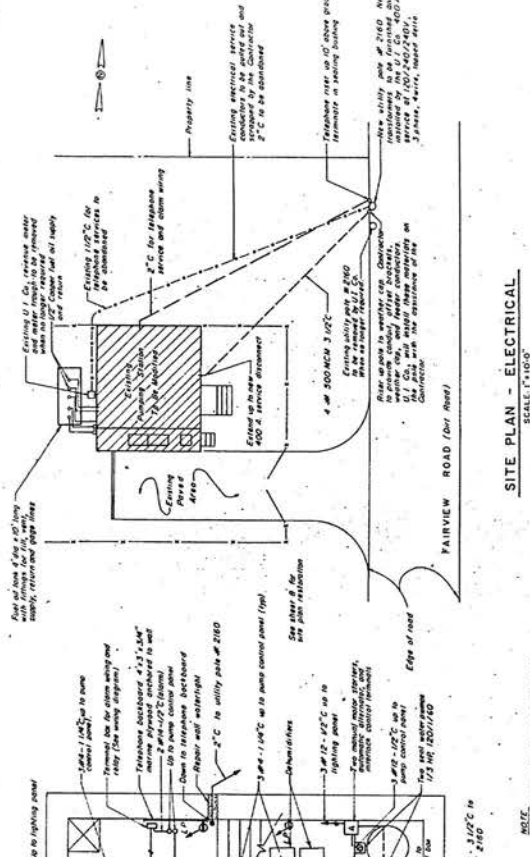
CONTRACT NO. 318

AS BUILT - JULY 1982

TOWN OF EAST HAVEN
 PROPOSED SANITARY SEWERS
 MORGAN POINT/RISEBURGH AREA
 MODIFICATIONS TO RISEVIEW PUMPING STATION
 ELECTRICAL SECTIONS AND DETAILS
 CARDINAL ENGINEERING ASSOCIATES INC.
 CONSULTING ENGINEERS
 99 COLONY ST.
 EAST HAVEN, CONNECTICUT 06424
 PROJECT NO. 82-001
 SHEET NO. 12

NO.	REVISION	DATE
1	AS BUILT	12/15/82
2	REVISION	01/15/83
3	REVISION	02/15/83
4	REVISION	03/15/83
5	REVISION	04/15/83
6	REVISION	05/15/83
7	REVISION	06/15/83
8	REVISION	07/15/83
9	REVISION	08/15/83
10	REVISION	09/15/83
11	REVISION	10/15/83
12	REVISION	11/15/83

SYMBOL	DESCRIPTION
(Circle with lightning bolt)	Lightning arrester
(Circle with 'A')	Automatic transfer switch
(Circle with 'B')	Breaker
(Circle with 'C')	Control panel
(Circle with 'D')	Disconnect switch
(Circle with 'E')	Emergency stop button
(Circle with 'F')	Flow meter
(Circle with 'G')	Grounding terminal
(Circle with 'H')	Hand switch
(Circle with 'I')	Indicator lamp
(Circle with 'J')	Interlocking device
(Circle with 'K')	Knife switch
(Circle with 'L')	Limit switch
(Circle with 'M')	Magnetic starter
(Circle with 'N')	Motor
(Circle with 'O')	Overload relay
(Circle with 'P')	Pressure switch
(Circle with 'Q')	Relay
(Circle with 'R')	Resistor
(Circle with 'S')	Selector switch
(Circle with 'T')	Terminal block
(Circle with 'U')	Thermostat
(Circle with 'V')	Time delay relay
(Circle with 'W')	Transformer
(Circle with 'X')	Variable frequency drive
(Circle with 'Y')	Water level sensor
(Circle with 'Z')	Zero current relay



NOTE: All electrical and mechanical work shall be in accordance with the National Electrical Code (NEC) and the National Fire Protection Association (NFPA) codes. All work shall be done in accordance with the Town of East Haven specifications and the Cardinal Engineering Associates Inc. specifications. All work shall be done in accordance with the Town of East Haven specifications and the Cardinal Engineering Associates Inc. specifications.

AS BUILT - JULY 1982

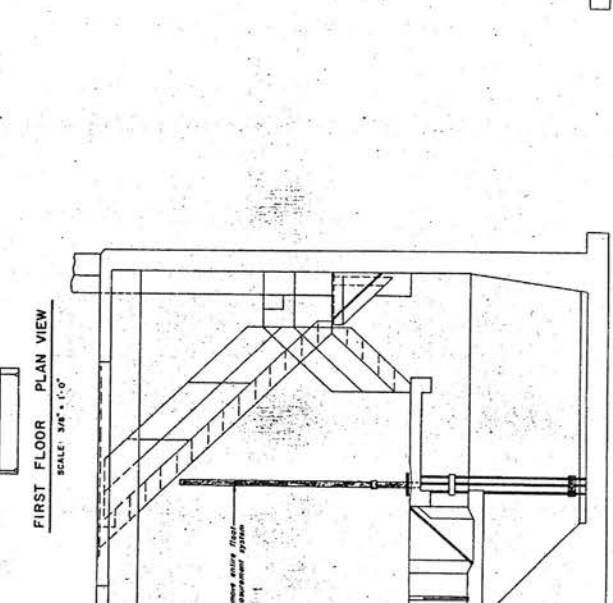
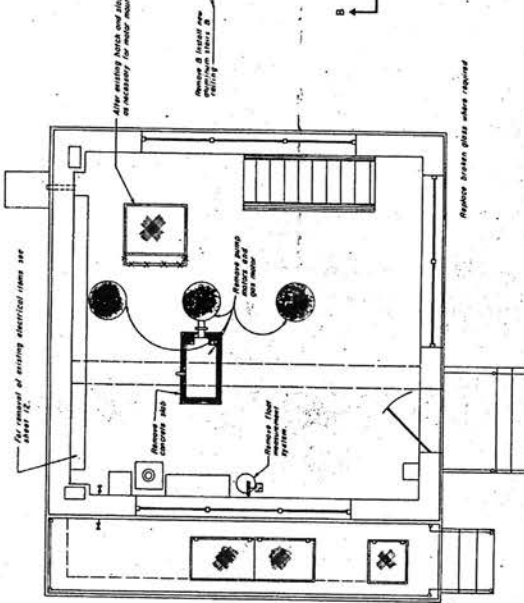
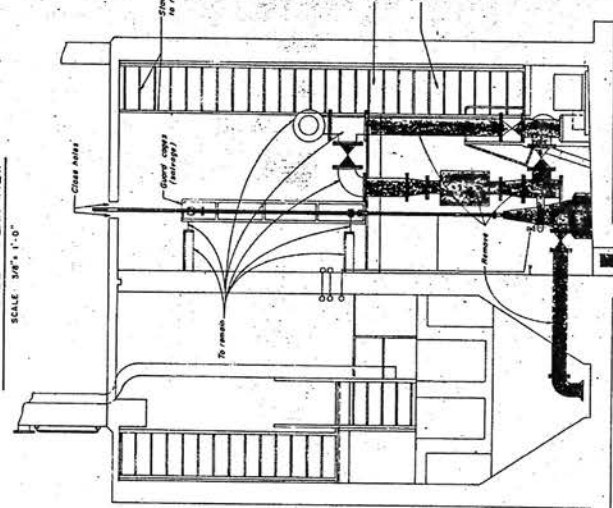
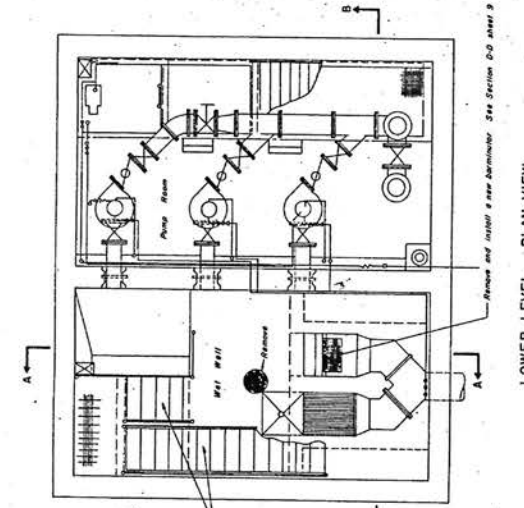
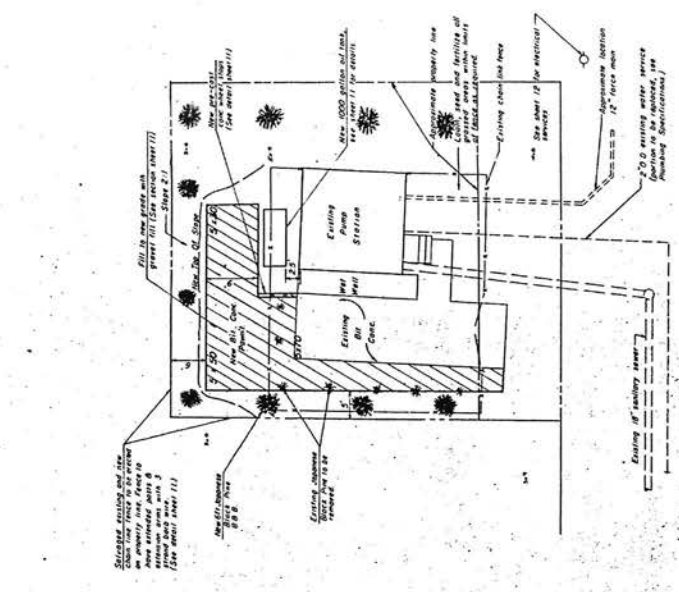
TOWN OF EAST HAVEN
 PROPOSED SANITARY SEWERS
 MORGAN POINT/ RIVERSIDE AREA

SITE PLAN AND EXISTING LAYOUT

CARDINAL ENGINEERING ASSOCIATES, INC.
 CONSULTING ENGINEERS
 90 COLONY ST.
 NORWICH, CT 06258
 PHONE: 860-841-1234
 FAX: 860-841-1234
 DATE: JAN 1979

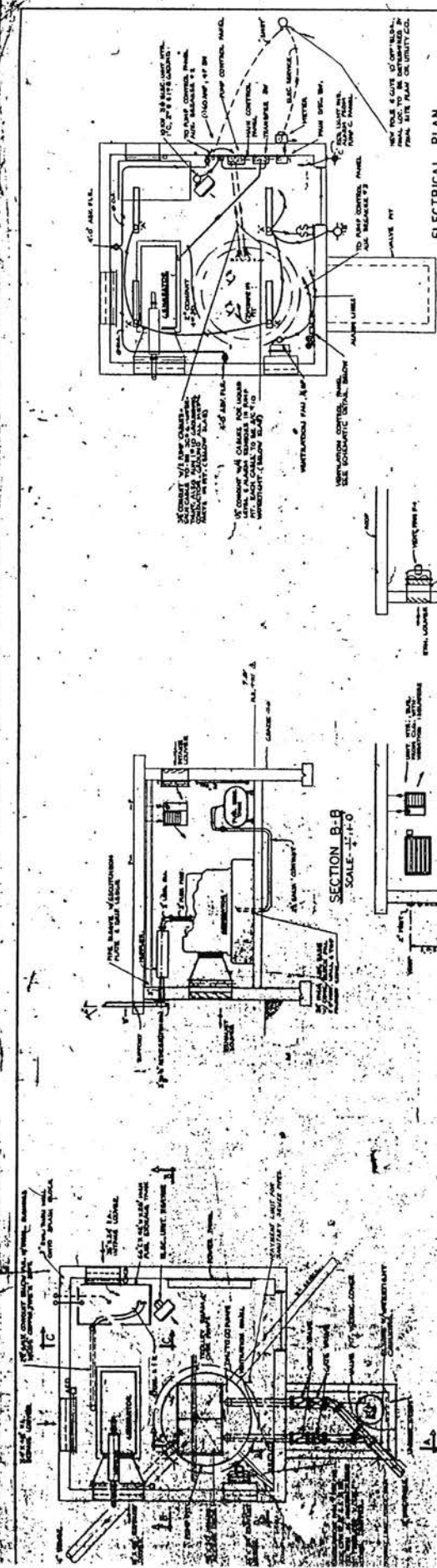
PROJECT: TOWN OF EAST HAVEN
DATE: JULY 1982
SCALE: 1" = 10'-0"

NO.	DESCRIPTION	DATE	BY	REVISED
1	REVISION			
2				
3				
4				
5				
6				
7				
8				



General Notes:

1. All proposed construction shall be in accordance with the contract.
2. Showed sewer elevations existing to be removed.



MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

ELECTRICAL PLAN
SCALE: 3/4" = 1'-0"

ELECTRICAL PLAN
SCALE: 3/4" = 1'-0"

SECTION B-B
SCALE: 1/4" = 1'-0"

SECTION D-D
SCALE: 3/4" = 1'-0"

SECTION C-C
SCALE: 1/4" = 1'-0"

ALARM SCHEDULE

1. LOW WATER LEVEL
2. POWER FAILURE - NORMAL SUPPLY
3. EXHAUST GAS DETECTED
4. EXHAUST FAN FAILURE - WET WALL

SYMBOLS

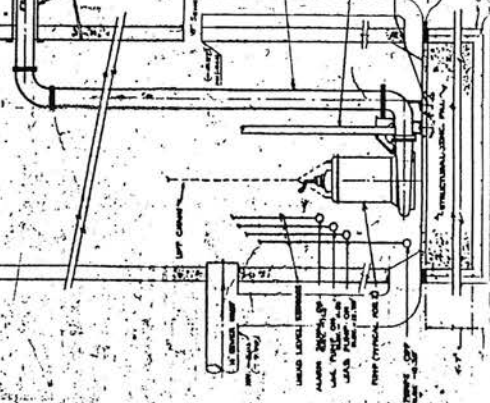
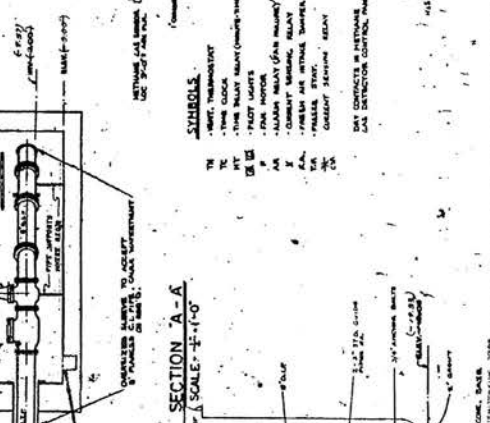
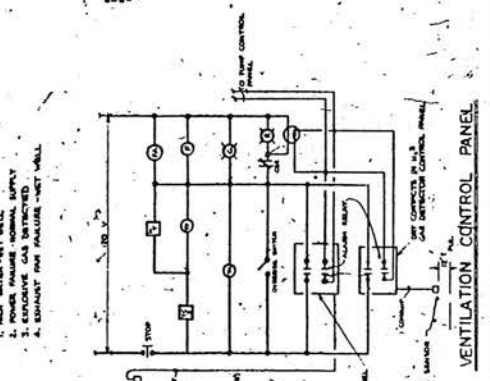
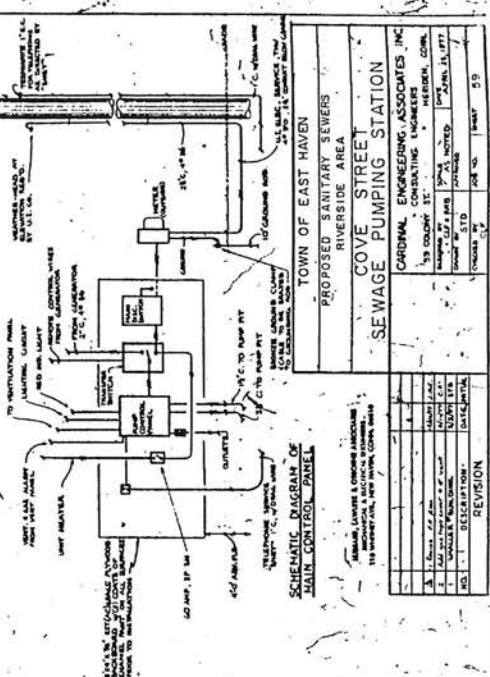
- TR - THERMISTOR
- TC - THERMOCOUPLE
- FL - FAN MOTOR
- AS - ALARM RELAY (SEE SCHEDULE)
- CS - CONTROL SYSTEM RELAY
- PS - POWER SUPPLY
- TR - THERMISTOR
- TC - THERMOCOUPLE
- FL - FAN MOTOR
- AS - ALARM RELAY (SEE SCHEDULE)
- CS - CONTROL SYSTEM RELAY
- PS - POWER SUPPLY

SECTION A-A
SCALE: 1/4" = 1'-0"

SECTION A-A
SCALE: 1/4" = 1'-0"

SECTION A-A
SCALE: 1/4" = 1'-0"

SECTION A-A
SCALE: 1/4" = 1'-0"

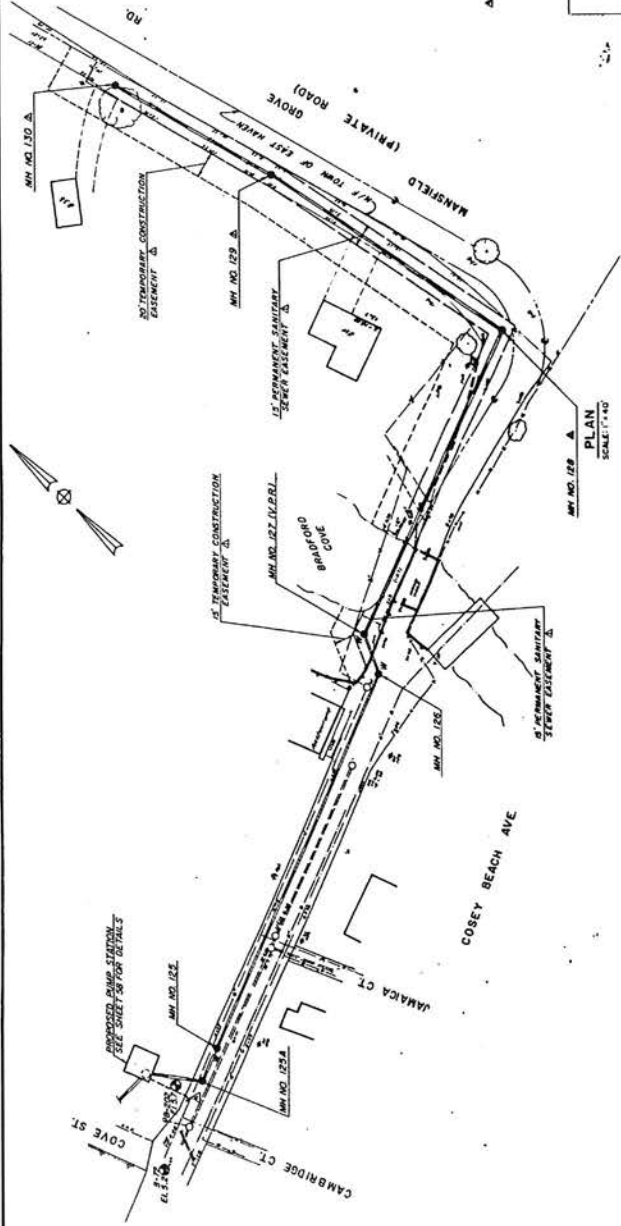


TOWN OF EAST HAVEN
RIVERSIDE AREA
COVE STREET
SEWAGE PUMPING STATION

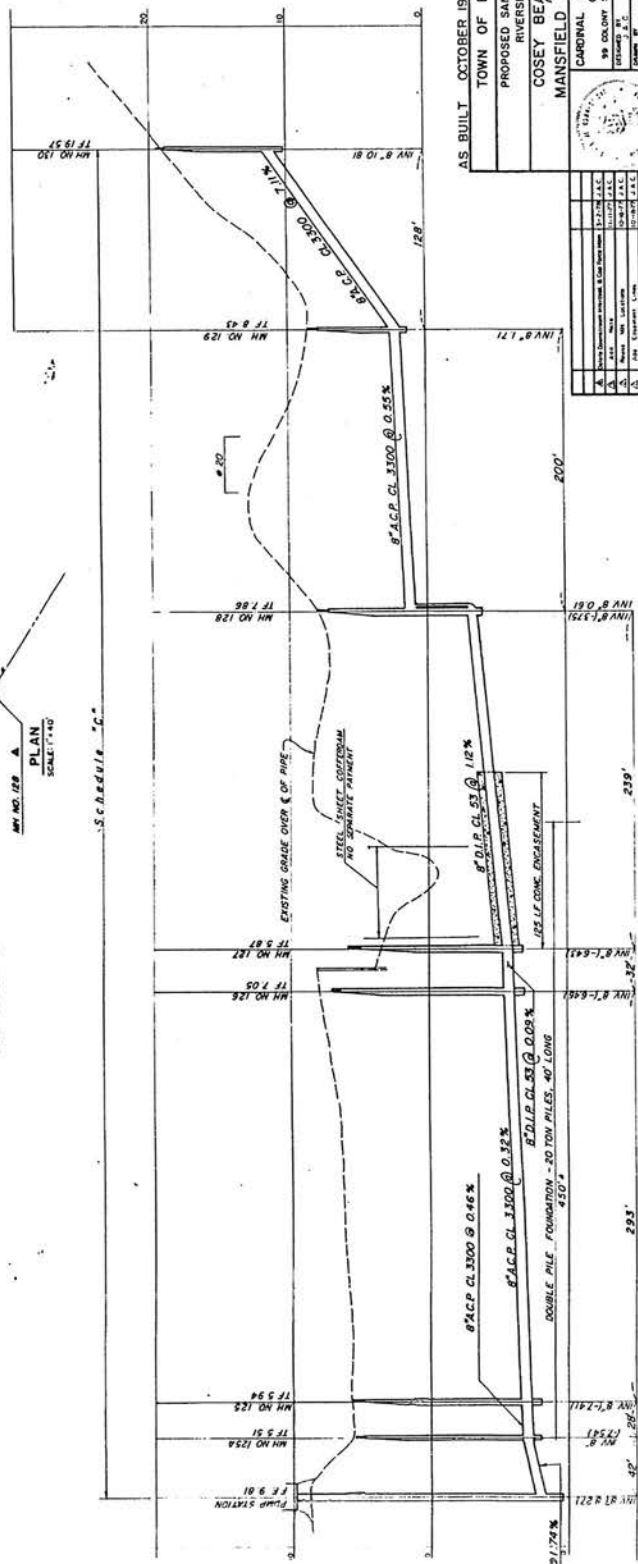
CARDINAL ENGINEERING ASSOCIATES, INC.
100 COLONY ST.
NORWALK, CT 06851
PROJECT NO. 3-80-100
DATE: APRIL 15, 1977

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMITS	APRIL 15, 1977
2	REVISION	
3	REVISION	
4	REVISION	
5	REVISION	

DESIGNED BY: [Name]
CHECKED BY: [Name]
DATE: [Date]



NOTE: MANSFIELD GROVE ROAD, ALTHOUGH PRIVATE, SHALL BE TREATED IN THE SAME MANNER AS TOWN ROADS AND SPECIFICATIONS SHALL BE THE SAME AS TOWN ROADS. ALL EASEMENTS SHALL BE SHOWN FOR UNDER APPLICABLE 80' WIDE.

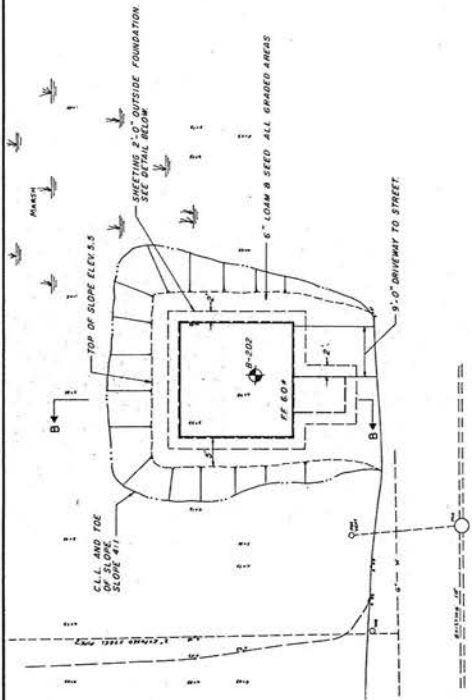


AS BUILT OCTOBER 1979
 TOWN OF EAST HAVEN
 PROPOSED SANITARY SEWERS
 RIVERSIDE AREA
 COSEBY BEACH AVENUE
 MANSFIELD GROVE ROAD

CARDINAL ENGINEERING ASSOCIATES INC.
 CONSULTING ENGINEERS
 89 COLONY ST.
 EAST HAVEN, CT 06424
 PHONE: 860-486-1111
 FAX: 860-486-1112

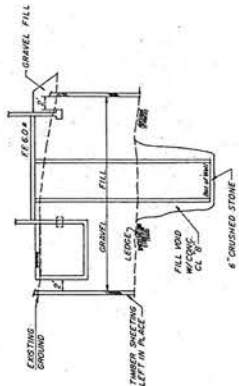
DATE: MAY 1977
 DRAWN BY: J.M.W.
 CHECKED BY: J.M.W.
 SHEET NO. 57

NO.	DESCRIPTION	DATE	INITIALS
1	ISSUED FOR PERMIT	10/19/79	J.M.W.
2	AS BUILT	10/19/79	J.M.W.
3	REVISION		

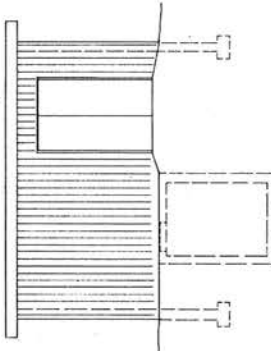


COSSEY BEACH AVE.

SITE PLAN
NOT TO SCALE



SECTION B-B
NOT TO SCALE



ELEVATION
N.T.S.

CONSTRUCTION NOTES

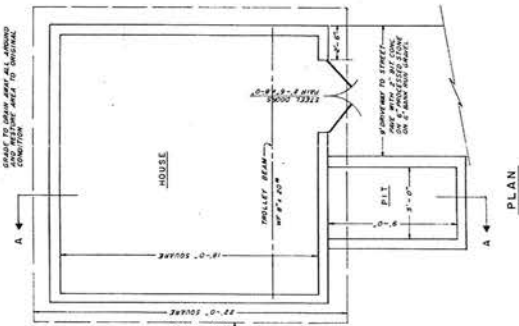
1. EXCAVATE, SHORE & Dewater AS REQUIRED.
2. LAYERS THOROUGHLY COMPACTED. IN 6" LAYERS.
3. USE 100# PORTLAND CEMENT, MIX PORTLAND CEMENT, SAND & GRAVEL WITH TRASS.
4. SUBMIT SHOP DRAWING FOR REINFORCEMENT BARS.
5. DOORS TO BE EXTENSION ZINC COATED. USE 16" WIDE LOCKING DEVICE AND LOCKS. FRAME WITH ZINC COATED STEEL. DOORS TO BE 8'0" HIGH & 4'0" WIDE.
6. REFER TO MECHANICAL DRAWING FOR LOUVERS, WEBS AND OTHER DETAILS.
7. COMPATIBLE WITH THE MECHANICAL REQUIREMENTS AND SITE PLAN.

REINFORCEMENT SCHEDULE

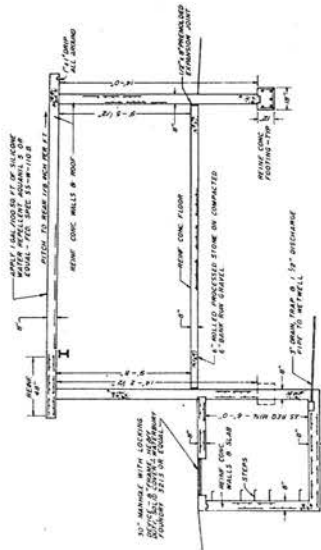
1. FOOTING (ALL):
2. CONTINUOUS #4 AS SHOWN
3. 2 LAYERS OF WIRE MESH 5'-12" X 5'-8" W/ #6 @ 12" O.C. SET ALL JOINTS
4. ADD 2 DIAGONAL #6 BARS 48" LONG.
5. BOTTOM LAYER 2 W/ #4 BARS @ 6" O.C.
6. TOP LAYER 2 W/ #4 BARS @ 6" O.C. 48" STRIP
7. BOTTOM LAYER 2 W/ #4 BARS @ 6" O.C. 48" STRIP
8. 6" FLOOR SLAB
9. 8" PIT TOP AND 8" PIT SLAB
10. TWO LAYERS #4 BARS @ 6" O.C. LONG DIMENSION
11. #4 BARS @ 12" O.C. LONG DIMENSION.

CONCRETE FINISHES

1. INSIDE HOUSE AND PIT (WALLS AND CEILING):
2. HOUSE FLOOR SLAB - STEEL FLOUT FINISH
3. ROOF TOP GABLES AND EXTERIOR UNDERSIDE - RUBBED FINISH
4. OUTSIDE WALLS - RUBBED FINISH SURFACE BY USE OF 4" WIDE VERTICAL ROUGH SAW BOARD FORMS.



PLAN
N.T.S.

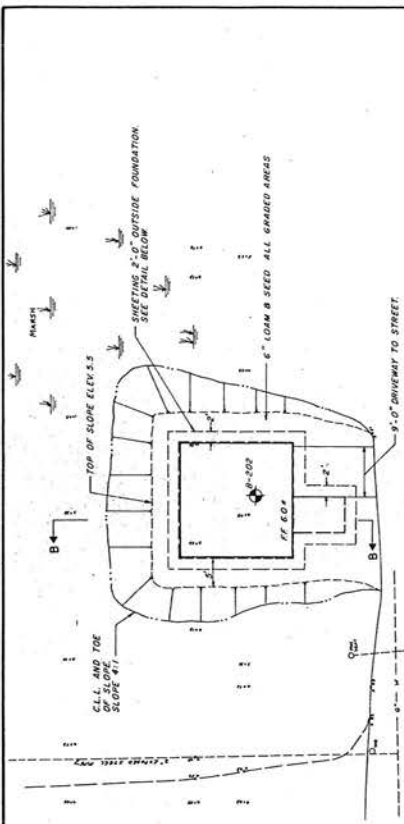


SECTION A-A
N.T.S.

NOTE: PAYMENT WILL BE MADE UNDER CONTRACT PRICE PER PUMP STATION FOR ALL ITEMS OF WORK.

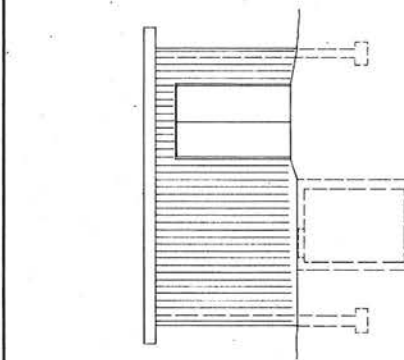
TOWN OF EAST HAVEN	
PROPOSED SANITARY SEWERS RIVERSIDE AREA	
COVE STREET SEWAGE PUMPING STATION	
CARDINAL ENGINEERING ASSOCIATES INC. CONSULTING ENGINEERS 99 COLONY ST MERIDEN, CONN	
DESIGNED BY E. M. K.	DATE MAY 1977
CHECKED BY D. B.	DATE MAY 1977
APPROVED BY R. S.	SHEET 58

NO.	DESCRIPTION	DATE	INITIAL
NO.	REVISION	DATE	INITIAL

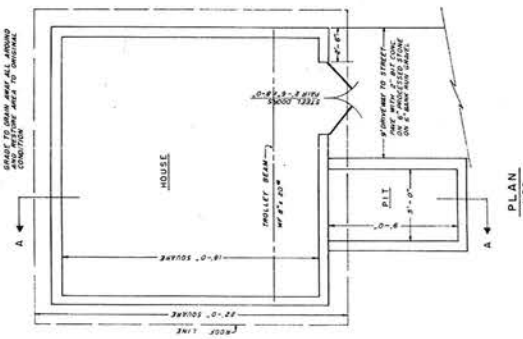


SITE PLAN
NOT TO SCALE

COSSEY BEACH AVE.



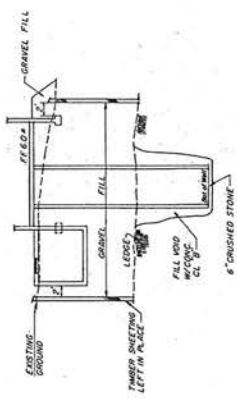
ELEVATION
N.T.S.



PLAN
N.T.S.

CONSTRUCTION NOTES

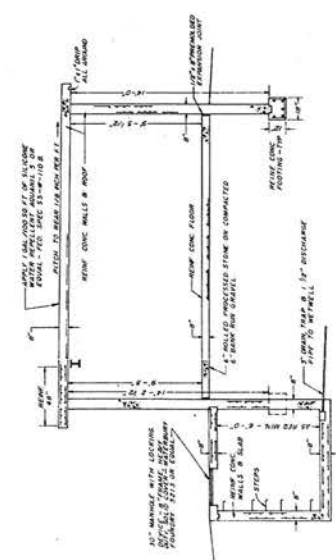
1. EXCAVATE, SHORE & Dewater as required.
2. FLOORS - MINIMUM 4" PORTLAND CEMENT CONCRETE WITH 3" SLAG.
3. CONCRETE WITH 3" SLAG.
4. SUBMIT SHOP DRAWINGS FOR REINFORCEMENT BASE.
5. DOORS TO BE EXTERIOR ZINC COATED GATE 16" LOGGING DEVICE AND LOCKS. FRAME WITH ZINC ANCHORS, SERIES 300, STYLE P OR EQUAL.
6. REFER TO MECHANICAL DRAWING FOR LOWERS, PITS AND OTHER DETAILS.
7. ALL REINFORCEMENT SHALL BE COMPATIBLE WITH THE MECHANICAL REQUIREMENTS AND SITE PLAN.



SECTION B-B
NOT TO SCALE

REINFORCEMENT SCHEDULE

1. FOOTING (ALL) #4 @ 24" ON CENTER
2. WALLS OF HOUSE AND PIT
3. FLOOR SLAB - 4" THICK #4 @ 12" ON CENTER
4. ROOF TOP FASCIA AND EXTERIOR UNDERGIRTS
5. ROOF TOP FLOOR SLAB - STEEL FLOOR FINISH
6. ROOF TOP FLOOR SLAB - ROUGH FINISH
7. OUTSIDE WELLS - 12" VERTICAL ROUGH SAW FORWARD FOR AS

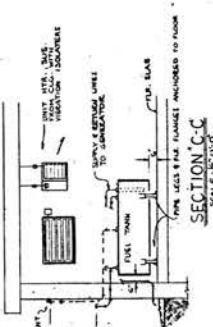
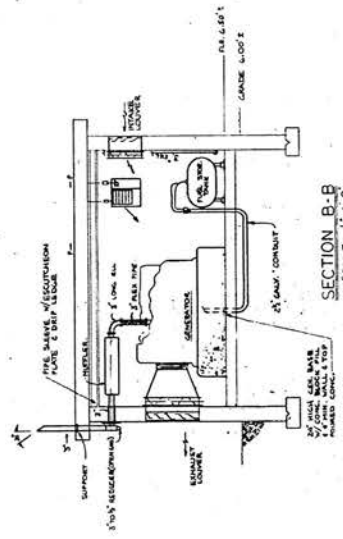
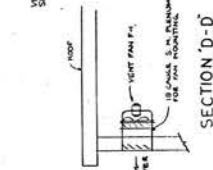
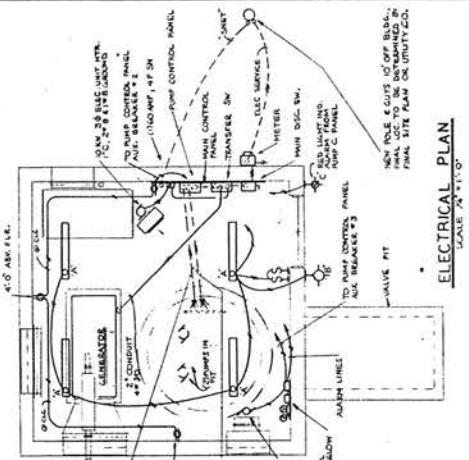


SECTION A-A
N.T.S.

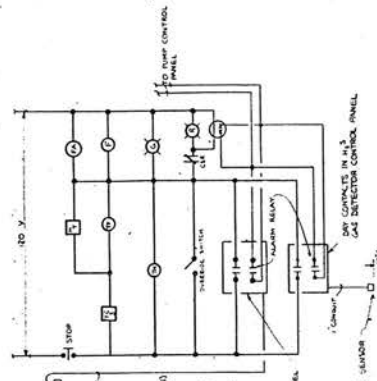
NOTE: PAYMENT WILL BE MADE UNDER CONTRACT PRICE PER PUMP STATION FOR ALL ITEMS OF WORK.

TOWN OF EAST HAVEN	
PROPOSED SANITARY SEWERS RIVERSIDE AREA	
SEWAGE PUMPING STATION COVE STREET	
CARDINAL ENGINEERING ASSOCIATES INC. CONSULTING ENGINEERS 99 COLON ST. MIDDLETOWN, CONN.	
DATE: JULY 1977	SCALE:
DESIGNED BY: E. M. K.	CHECKED BY: T. M. K.
DATE: JULY 1977	DATE: JULY 1977
PROJECT NO. 58	SHEET NO. 58

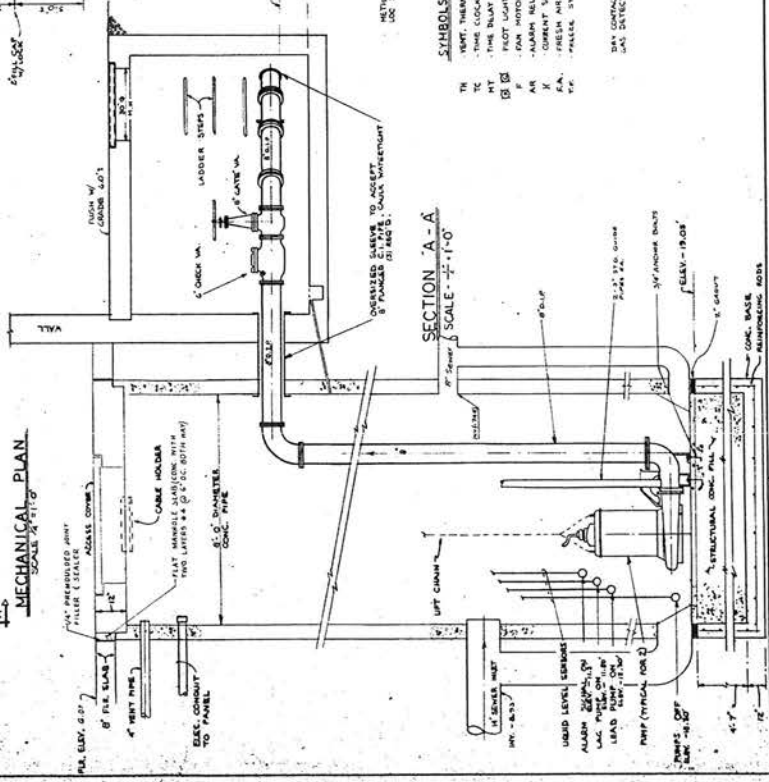
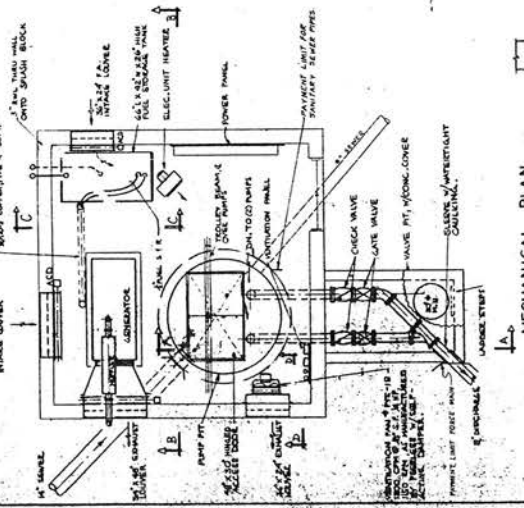
NO.	DESCRIPTION	DATE	INITIAL



- ALARM SCHEDULE**
1. HIGH WATER - WET WELL SUPPLY
 2. EXHAUST FAN FAILURE - WET WELL
 3. EXHAUST GAS DETECTED
 4. EXHAUST FAN FAILURE - WET WELL



- SYMBOLS**
- TR - THERMOSTAT
 - HT - HIGH THERMOSTAT
 - BT - BATTERY
 - FL - FAN MOTOR
 - AR - ALARM RELAY (FAN FAILURE)
 - CR - CURRENT SENSING RELAY
 - FA - FRESH AIR INTAKE DAMPER
 - FC - FAN CONTROL



PROPOSED SANITARY SEWERS
RIVERSIDE AREA
COVE STREET STATION
SEWAGE PUMPING STATION

CARDINAL ENGINEERING ASSOCIATES INC.
CONSULTING ENGINEERS
19 COLONY ST.
HERRICK, ILL.
PHONE 971-1418
CHICAGO STD. APPROVED
DATE: APRIL 15, 1971

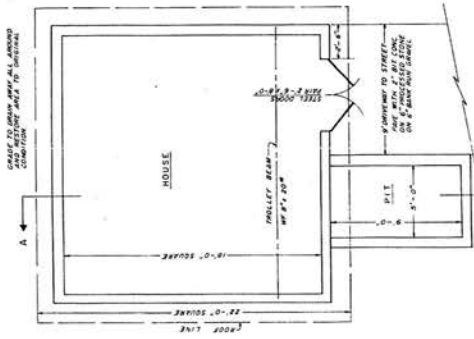
TOWN OF EAST HAVEN
180 WEST ST., NEW BURN, ILL. 60155

NO.	DESCRIPTION	DATE	INITIALS
1	SMALLER BUILDING	MAY 15	
2	REVISION		

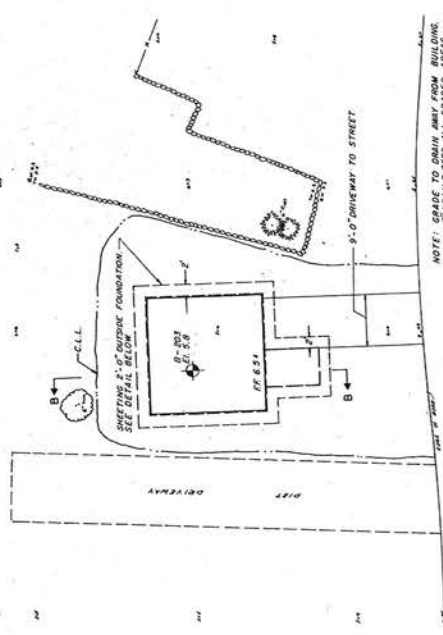
REVISION

NO. 59
JOB NO.
DRAWING NO.

CONTRACT NO. 31
MTO JOB NO. 2823

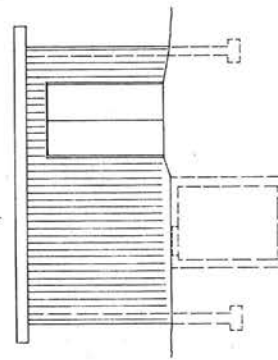


PLAN N.T.S.



SITE PLAN NOT TO SCALE

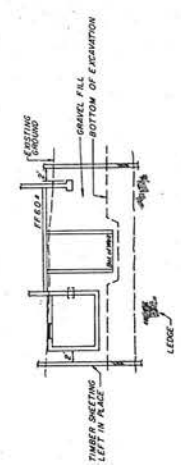
NOTE: GRADE TO MATCH SURROUNDING GRADE.
 6' LOW BARS ALL CORNER JOINTS.



ELEVATION N.T.S.

CONSTRUCTION NOTES

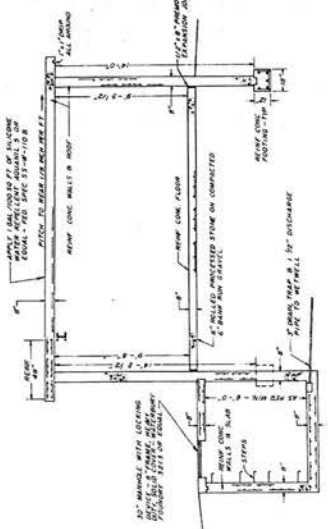
1. EXCAVATE, SHORER & DRYER AS REQUIRED.
2. LAYERS - THOROUGHLY COMPACTED.
3. CONCRETE WITH 3% SAND/SLUMP MIX PORTLAND CEMENT.
4. SUBMIT SHOP DRAWING FOR REINFORCEMENT BARS.
5. DOORS TO BE EXTERIOR, ZINC COATED, SAE 1015 STEEL, LOCKING DEVICE AND LOCKS. FRAME WITH ZINC ANODIZED ALUMINUM. HANDLE WITH ZINC ANODIZED ALUMINUM. HANDLE TO BE EQUAL TO OR BETTER THAN MECHANICAL DRAWING FOR DOORS.
6. REFER TO MECHANICAL DRAWING FOR DOORS, VENTS AND OTHER DETAILS.
7. COMPATIBLE WITH THE MECHANICAL REQUIREMENTS AND SITE PLAN.



SECTION B-B NOT TO SCALE

REINFORCEMENT SCHEDULE

1. FOOTING BARS AS SHOWN
2. WALLS OF HOUSE AND PIT
3. 2 LAYERS OF WIRE MESH 6" x 12" @ 18" O.C.
4. ADD 2 DIAGONAL 1/2" BARS 48" LONG
5. PIT TOP AND BOT. SLAB
6. FLOOR SLAB
7. 2 LAYERS OF WIRE MESH 6" x 12" @ 18" O.C.
8. PIT TOP AND BOT. SLAB
9. 2 LAYERS OF WIRE MESH 6" x 12" @ 18" O.C.
10. 1/2" BARS @ 12" O.C. LONG DIMENSION

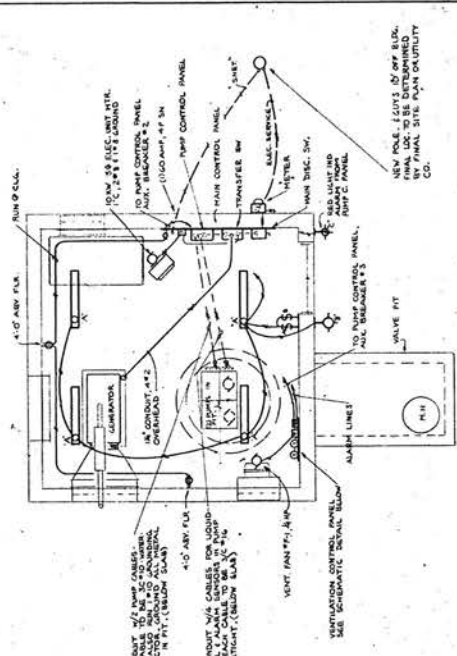
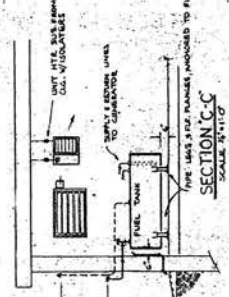
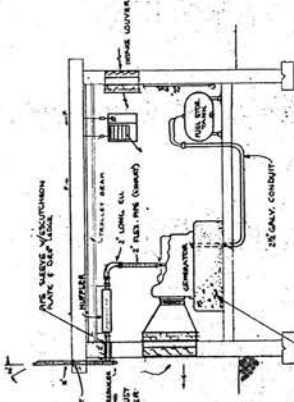
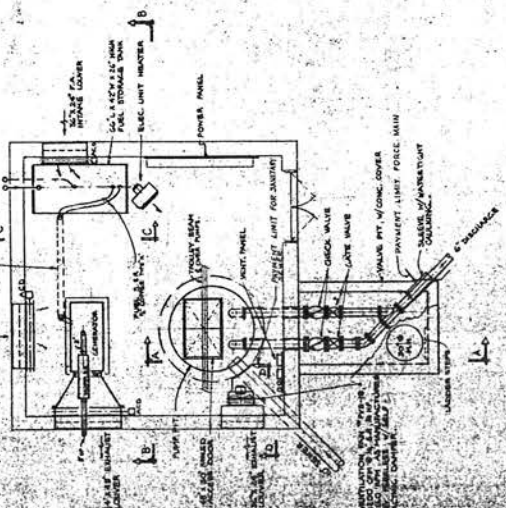


SECTION A-A N.T.S.

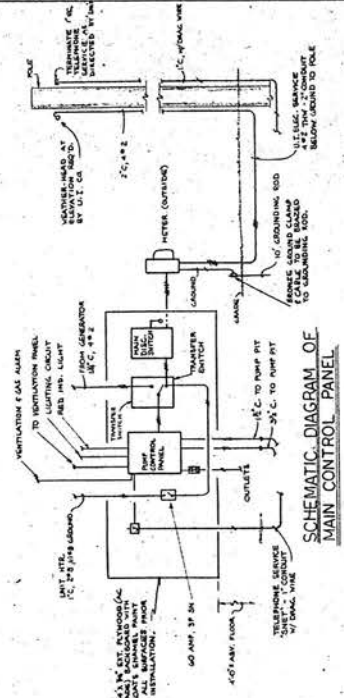
NOTE: PUMPST WILL BE MADE UNDER CONTRACT PRICE PER PUMP STATION FOR ALL ITEMS OF WORK.

TOWN OF EAST HAVEN	
PROPOSED SANITARY SEWERS	
RIVERSIDE AREA	
MEADOW STREET	
SEWAGE PUMPING STATION	
SCALE	DATE
30 COLONY ST.	MAY 1977
SECOND FLOOR	APPROVED
C.M.A.	
CHECKED	DATE
D.M.B.	6/53
JOB NO.	60
SHEET	60

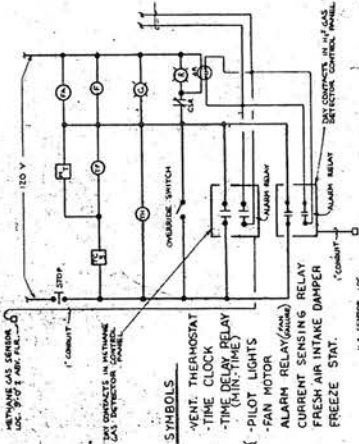
CONTRACT NO. 31



ELECTRICAL PLAN
SCALE 1/8"=1'-10"



SCHEMATIC DIAGRAM OF MAIN CONTROL PANEL

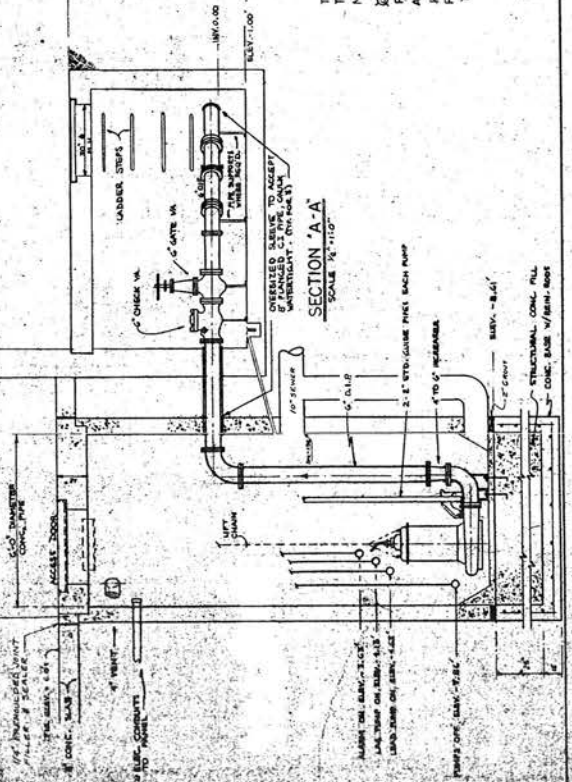


VENTILATION CONTROL PANEL

- ALARM SCHEDULE**
- 1- HIGH WATER - WET WELL.
 - 2- POWER FAILURE - NORMAL SUPPLY
 - 3- EXHAUSTIVE GAS DETECTED
 - 4- EXHAUST FAN FAILURE - WET WELL

- SYMBOLS**
- TH - VENT. THERMOSTAT
 - TC - TIME CLOCK
 - MT - TIME DELAY RELAY
 - ⊗ - PILOT LIGHTS
 - F - FAN MOTOR
 - AR - ALARM RELAY (NORMAL)
 - IF - CURRENT SENSING RELAY
 - IF - FRESH AIR INTAKE DAMPER
 - TF - FREEZE STAT.

SECTION A-A
SCALE 1/4"=1'-0"



TOWN OF EAST HAVEN
PROPOSED SANITARY SEWERS
RIVERSIDE AREA
MEADOW STREET
SEWAGE PUMPING STATION

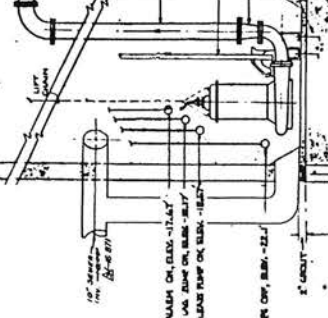
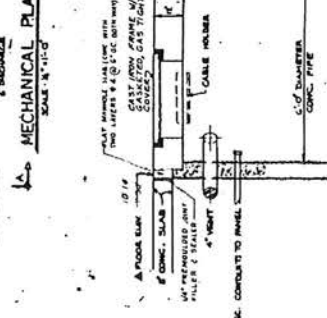
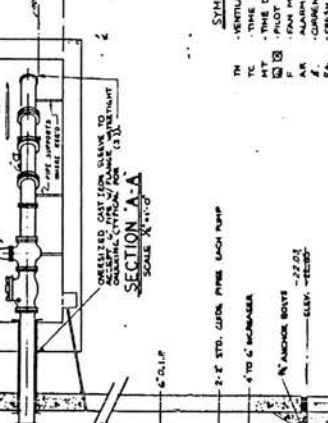
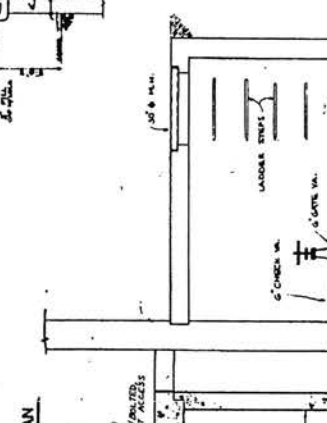
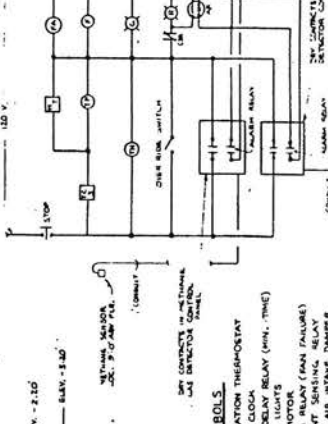
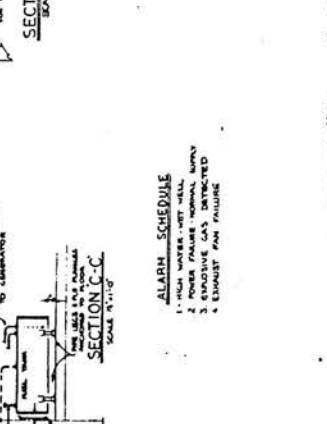
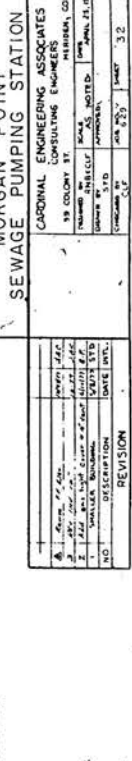
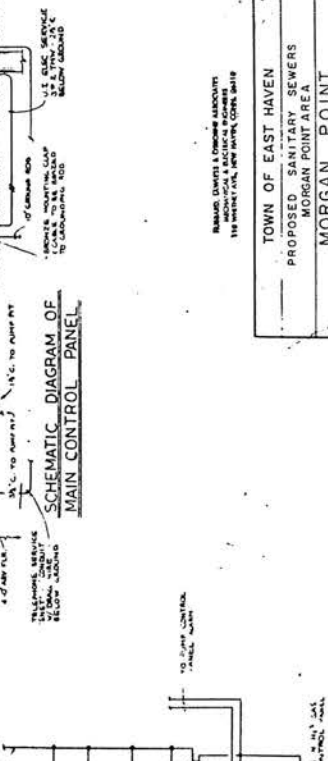
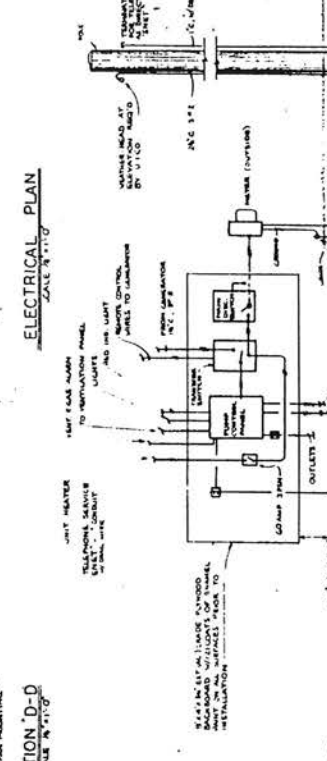
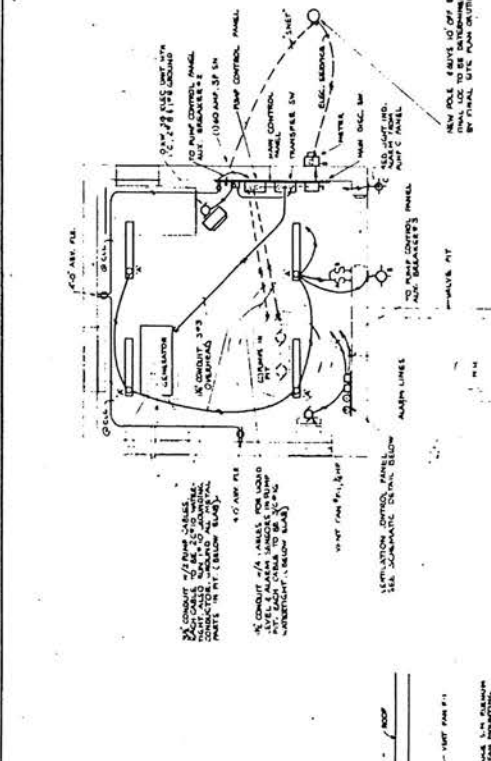
PREPARED BY: CAROLAN ENGINEERING ASSOCIATES INC.
CONSULTING ENGINEERS
39 COLONY ST.
HARTFORD, CONN.
DATE: JUNE 13, 1977

NO. 1: SHEETS: 15/20
NO. 2: DESCRIPTION: SANITARY SEWERS
NO. 3: DATE: JUNE 13, 1977

REVISION

NO.	DESCRIPTION	DATE

CONTRACT NO. 3



MECHANICAL PLAN
SCALE 1/4" = 1'-0"

ELECTRICAL PANEL
SCALE 1/4" = 1'-0"

SCHEMATIC DIAGRAM OF MAIN CONTROL PANEL
SCALE 1/4" = 1'-0"

VENTILATION CONTROL PANEL SCHEMATIC
SCALE 1/4" = 1'-0"

TOWN OF EAST HAVEN PROPOSED SANITARY SEWERS MORGAN POINT AREA SEWAGE PUMPING STATION			
REBURD, DWIGHT & COMPANY ASSOCIATES 118 WESTBURY AVE. WEST BURY, MASS. 01581			
CARDONAL ENGINEERING ASSOCIATES INC. 19 COLONY ST. WILMINGTON, MASS. 01897			
NO.	DESCRIPTION	DATE	REVISION
1	PRELIMINARY	APRIL 1977	1
2	FINAL DESIGN	JUNE 1977	2
3	FINAL DESIGN	JUNE 1977	3

NO.	DESCRIPTION	DATE	REVISION
1	PRELIMINARY	APRIL 1977	1
2	FINAL DESIGN	JUNE 1977	2
3	FINAL DESIGN	JUNE 1977	3

Attachment D
Prebid Meeting Minutes



PRE-BID MEETING
GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
East Haven Pump Station Resiliency Implementation
GNHWPCA Project Number: SSF 2013-05
W&C Project Number: 223133.11
Wednesday, April 12, 2017

MINUTES

ATTENDEES: See attached sign in sheet

I. INTRODUCTION & PROJECT TEAM

Tom Sgroi started the meeting by introducing himself, other attending members from the GNHWPCA, and Mike Burns from Woodard & Curran. He also mentioned Charlie Biggs, Joe Megale, the 24-hour contact line, Jay Sheehan, and Cory Knick. Contact information for these individuals is as follows:

Greater New Haven Water Pollution Control Authority (GNHWPCA) – Owner				
260 East Street, New Haven, CT 06511				
Name	Title	Office Phone	Cell Phone	Email
Tom Sgroi	Director of Engineering	(203) 466-5280		tsgroi@gnhwPCA.com
Charlie Biggs	Operation/Engineering Coordinator	(203) 466-5280	(203) 410-3488	cbiggs@gnhwPCA.com
Joe Megale	Deputy Director of Operations	(203) 466-5280	(203) 836-1740	jmegale@gnhwPCA.com
Gary Zrelak	Director of Operations	(203) 466-5285		gzrelak@gnhwPCA.com
Isabella Schroeder	Senior Engineer	(203) 777-4933		ischroeder@gnhwPCA.com
24-hour Contact	GNHWPCA Control Room "PCC"	(203) 466-5260		

Woodard & Curran – Consulting Engineer				
1699 King Street, Suite 402, Enfield CT 06082				
Name	Title	Office Phone	Cell Phone	Email
Jay Sheehan	Client Manager	(800) 446-5518	(203) 605-3127	jsheehan@woodardcurran.com
Mike Burns	Project Manager	(800) 446-5518	(860) 268-9566	mburns@woodardcurran.com
Cory Knick	Project Engineer	(800) 446-5518	(703) 919-8514	cknick@woodardcurran.com

II. PROJECT DESCRIPTION

- Tom Sgroi gave a brief overview of the project. He mentioned that the pump stations are in low lying areas that have been subjected to flooding in the past. The GNHWPCA applied for and received a grant from FEMA which is funding most of this project.
- Tom mentioned that aesthetics are very important in the neighborhoods where the pump stations are located.
- Mike Burns provided a brief overview of the construction sequencing. Essentially each existing pump station will be demolished after the new pumps, precast buildings, and all



associated electrical gear (including new generators) were installed and tested. The wet wells will remain, but new pumps are to be provided at each station.

- The specifications currently call for the precast structures to be provided with the equipment installed. A potential bidder asked if they or the precast building supplier would be responsible for obtaining the building permit. Mike Burns will follow up with the Town of East Haven to determine who should fill out the permit application. Tom Sgroi mentioned that the General Contractor would still be responsible for the overall project.
- A potential bidder asked about the temporary bypass piping. After a discussion, it was decided that all temporary bypass piping that was not on property owned by the GNHWPCA would need to be buried to avoid disruptions to traffic. This was clarified as part of Addendum #1.
- Tom Sgroi mentioned that the GNHWPCA would only allow bypass pumping to occur at two pump stations at a time.
- Manholes are available to set up the bypass pumping operation at the pump stations where the wet wells were going to be rehabilitated. The GNHWPCA handed out maps showing these manholes. These maps were also added to Addendum #1.
- The specifications are written such that the entire precast building (including the roof) is constructed by the precast manufacturer and is shipped to the site as a complete unit. However, if it is less expensive to build and install the roof onsite, this would be acceptable.
- The bid form includes a series of unit price items, and one of the potential bidders asked if the GNHWPCA intended to award the entire project or deduct some of these items. Mike explained that the GNHWPCA intends to award the entire project.
- The specifications call for the controls to be provided by a single supplier. During the meeting, Mike B. mentioned that the new controls at Farview and Cosey could be by one supplier, and the modifications to the controls at Minor and Meadow could be by another supplier. This information was incorrect, and all modifications to the controls have to be made by a single supplier as specified.
- A potential bidder asked if the addendums would be emailed. The GNHWPCA will email the addenda to the bidders who purchased plans and specifications. All potential bidders can see Bridget Buckley in the GNHWPCA office to obtain a set of plans and specifications.

III. PROJECT SCHEDULE

- Questions Due By: April 19, 2017
- Bid Opening: April 26, 2017
- Anticipated Notice to Proceed: June 9, 2017
- Time to Complete: 365 days

IV. CONSTRUCTION ISSUES

- Limits of work – limited to the site
- Hours of work – in general, between 7:00 and 4:00 PM, although arrangements can be made to perform some work at other hours if needed
- Neighborhood issues – Most stations are located in densely settled beach communities.
- By-Pass Pumping – See discussion items above.
- Farview CIPP coordination – The GNHWPCA will need to line the last section of gravity sewer that enters the Farview Pump Station. This will be performed over a period of 72



hours while the contractor is bypass pumping the station. Information has been added to Addendum #1.

- Pump Station operations during construction – Each pump station must remain operational at all times. The GNHWPCA will need at least one week’s notice before bypass pumping is scheduled.
- Pump Station & Staging Area Security – The contractor is responsible for securing the site and equipment.
- Equipment storage and protection – The contractor is responsible for storing and protecting equipment. Tom mentioned that the GNHWPCA cannot pay for equipment that is stored offsite.
- Equipment shut-down procedures and required notice – Only the GNHWPCA staff can operate the equipment. At least one weeks notice must be provided to the GNHWPCA before anticipated shutdowns.
- Sequence of construction – the contractor will be responsible for developing a schedule.
- Coordination with Precast Building Manufacturer

V. MEETINGS

- Progress Meetings as required.

VI. OPEN ISSUES

- GNHWPCA
- Woodard & Curran
- Potential Bidders

Attachment E
Prebid Meeting Sign-in Sheet



SSF 2013-05
East Haven Pump Station Resiliency Improvements
Pre-Bid Attendance
Wednesday, April 12, 2017 @ 11:00 AM
Sign-In Sheet

NAME (Please Print)	SIGNATURE	COMPANY	EMAIL
Serdar Umar	<i>[Signature]</i>	FLEET	sumur@g-fleet.com
PAUL LAMBERT	<i>[Signature]</i>	Baker Corp	PLAMBERT@BakerCorp.com
Wade Carlson	<i>[Signature]</i>	Delray Contracting	wcarlson@delrayinc.com
David Allen	<i>[Signature]</i>	Hovars Const Corp	dallen@HOVARS.COM
WYKELIN GRANDER	<i>[Signature]</i>	L. HOPNER ELEMANCO	ESTIMATING@HOPIERELECTRIC
Robert McGuigan	<i>[Signature]</i>	UNITED CONCRETE	rmcguigan@UNITED CONCRETE
Ernie Weingart	<i>[Signature]</i>	C.H. Nickerson	ernie@chnickerson.com
Tam Sorel	<i>[Signature]</i>	CONTRACT	tsorel@gnhwpc.com
Isabella Schmucker	<i>[Signature]</i>	GNHWPCA	ischmucker@gnhwpc.com
ANDY CULVER	<i>[Signature]</i>	Cadwin Pumps	Andrew-Culver@Kylmains.com
Zary Zrelak	<i>[Signature]</i>	GNHWPCA	gzrelak@gnhwpc.com
RAY BATH	<i>[Signature]</i>	BALKEE BOV.P./HWAAT	ray.bath@bghusa.com
MIKE PERNS	<i>[Signature]</i>	WOODARD + CURRAN	MPERNS@WOODARDCURRAN.COM
KORA SPANO	<i>[Signature]</i>	GNHWPCA	kspano@gnhwpc.com