# DEPARTMENT OF GENERAL SERVICES

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**Addendum D**

This amendment is to address questions for the above mentioned RFB:

1. Q: Please provide the schedule for spec 010110
   **A: Please refer to Section 00 70000A Table 1-1. Substantial completion date shall be 411 days from issuance of Notice to Proceed. Final completion shall be 60 days from Substantial Completion.**
2. Q: [Are there] any thresholds that would deem us exempt from [the PLA requirements]?
   **A: No**
3. Q: Please provide a spec for generator. Also drawing E001 calls for a 500kw generator while drawing E700 calls for a 300kw on the one line. Please clarify.

   **A: A generator spec has been added, see attached. The generator is a 500KW SD500 diesel generator with level two sound enclosure and 28 hour base tank. Generator shall be placed on an 8" high reinforced concrete pad extending out 6" wider than the generator on all sides. Pad shall have #4 rebar 12" O.C. in each direction on top and bottom of pad.**
4. Q: Please provide a spec for the fire alarm system.
   **A: A fire alarm spec has been added, see attached.**
5. Q: Geotech report is missing from the project manual.
   **A: See attached**
6. Q: Section 311000, page 6, 3.9 B Burning of brush and trees permitted on site?
   **A: Remove 3.9 B Burning**
7. Q: Section 312000, page 5, 3.4 B, blasting of rock is permitted on site?
   **A: Remove (blasting) 312000 3.4 (B) 1 (A)**
8. Q: Section 312000, pages 8 & 9, "dimensions insert" marked in red. Who fills in these dimensions?
   **A: Remove <insert dimension> all location in this section**
9. Q: Section 312000, page 9, 3.14 A & B. Where is this method of back fill being used on the site? Is there a place that requires Geofoam?
   **A: Remove section 3.14**

10. Q: Section 312000, page 10, 3.15, who is performing the soil moisture testing?
    **A: By others.**
11. Q: Section 017419 page 5& 6, 3.4, Rock, asphalt, and concrete from site to be crushed to 1 ½", washed and stockpiled? Please advise. Can this material be used for back fill operations? If so where can it be used?
    **A: This material can be use if it meets the criteria of the requirement set forth in these specifications. Use of material would be determined by the structural engineer.**
12. Q: Section 017419, page 6, 3.4 D., E. is it your intent to reused the pipe and conduits removed for new work installation?
    **A: No: The intent is not to re-use. The above section is incorrect**
13. Q: Specification 084243 – section 2.2-c.9 calls for "miniblinds", however there is no information regarding the miniblind glazing in this specification or 088000. at the request of the basis of design, please provide further information so it can be quoted as desired.

    **A: Provide "miniblind" glass in window BL-2 and all glass panels in automatic sliding door 147 into Special Autopsy Room 147 as follows:**

    **Miniblind Glazing: ASTM E 2190.**

    1. **Basis of Design Manufacturer: Unicel, Vision Control Mini, Thumbwheel control.**
    2. **Glass: ASTM C 1036, Type 1, Class 1, q3.**
        a. **Tint: Clear.**
        b. **Kind: 5/32" Fully tempered.**
    3. **Integral Miniblinds: Manufacturer's standard, horizontal louver blinds with aluminum slats and polyester-fiber cords; located in space between glass lites and operated by hardware located on face of glass panel.**
        a. **Operation: Tilt only. Thumbwheel operator.**
        b. **Color: As selected by Architect from manufacturer's full range.**
    4. **Factory Glazing: Install miniblind glazing at the factory.**
    5. **Test and adjust miniblinds to operate properly.**

14. Q: Is there an electrical budget amount for this project? If so, can you please release it, we need it for bonding purposes.

    **A: No budget. Bonding amounts dependent on total bid price.**

15. Q: Please have the site designer clearly indicate the limits of proposed concrete curbing and proposed concrete sidewalks.

    **A: The limits of the proposed curbs and sidewalks have been clarified, see revised drawing attached.**

16. Q: There are details for both segmental block walls and gabion walls. Please advise which detail applies to which walls.
    **A: Gabion walls have been eliminated from the project please disregard the detail.**

17. Q: Both the Utility Plan and Site Plan show blacked out areas at the smart car charging spaces. What does this represent?

    **A: The smart car striping did not print correctly, see revised drawings attached.**

18. Q: Please provide rim and inverts on sanitary sewer.

    **A: Existing rims and inverts previously provided on sanitary manholes, please see sheet ESCP attached.**

19. Q: Please provide a soils report or boring report.

    **A: See attached**

20. Q: Sheet C-102 shows DMH 1&2 having identical Rim Elev. As OCS-#1 (479.65). These elevations are significantly above finished grade in the immediate vicinity. Please provide correct Rim Elev. For both structures.

    **A: The rim elevations have been corrected, see revised drawing attached.**

21. Q: Detail sheets D101, 102, & 103 contain no detail for a DMH, which is called out. Please provide a construction detail.

    **A: See revised drawing with detail attached.**

22. Q: The relocation of existing watermain (8"+12") has little detail. Can these lines be shutdown during the connections? Or will live wet tapping be required? If new valves are required, provide a detail and spec for their installation, and any required thrust blocks.

    **A: Wet tap and valve details have been provided, see revised drawing attached.**

23. Q: Floor plan A-101, exterior wall details A700/7, A607/7 on rooms 134 Elec/Mech, 142 Storage, and 143 Chem. Stor. do not show spray foam at exterior walls; however, building section A202/2, and exterior elevation A201/2 do. Is spray foam required at these exterior wall rooms?

    **A: Yes, spray foam is to be provided in all of these exterior wall locations instead of batt insulation.**

24. Q: Floor plan A-101, details A507/1, A700/10 and A506/1 along line B.9, between columns 7 & 9 show spray foam at wall. Please confirm if spray foam is required along this interior wall.

    **A: Yes, spray foam is to be provided as shown in those locations.**

25. Q: Please clarify which catch basins shall be new Catch Basins denoted on Drawing C-102, and which detail on Drawing D102 shall be utilized for the new catch basin (there are two different details). Same goes for the Manhole and Sanitary Lines (which are new and which to remain); which are the new MH's and new sanitary lines?

    **A: The new catch basins will be 30X48, the 30X30 detail provided is for the raising the rim of the existing catch basins in the parking lot as required. All sewer manholes and the sewer main are existing. There is a new 6" sewer lateral to tie into the existing main as shown, clarification has been provided. See sheet ESCP attached.**

26. Q: A detail for light pole bases is also missing. Please provide one.

    **A: Existing light pole bases to be utilized, no new light poles are proposed.**

27. Q: There is no information regarding how the connection to the existing sewer main shall be completed. Please provide instruction and the size of the existing main.

    **A: See detail provided on sheet D-102, see sheet ESCP attached.**

28. Q: Sheet ES101 shows Generator at a different location than C101. Please clarify the location.

    **A: Contractor to reference electrical drawings for generator location.**

29. Q: On the fixture schedule, type D is an 8ft linear fixture. The symbol shown on the fixture schedule & plans is the typical downlight symbol. Can you confirm if this is supposed to be a downlight or a linear fixture?

    **A: The fixture schedule has been revised. See attached drawing.**

30. Q: Type F – model number HTG-3P is for a pendant mount, but description says recessed. Which is correct?

    **A: The fixture schedule has been revised. See attached drawing.**

31. Q: Type H – is unspecified – Please provide a make and model for this fixture.

    **A: The fixture schedule has been revised. See attached drawing.**

32. Q: Type I – cannot identify a J4 series, I believe this is actually the Juno L4 series. Can you confirm?

    **A: The fixture schedule has been revised. See attached drawing.**

33. Q: Type J – model number HTG-1P is for a pendant mount, but description says wall mounted. Which is correct? It does not appear to be wall mounted on the plans for type J.

    **A: The fixture schedule has been revised. See attached drawing.**

34. Q: On the fixture schedule, the model numbers are mostly for 35k, or 3k, but descriptions state 4000k. Please clarify which color we should go by.

    **A: The facility lighting should be 3500K with exception of the two autopsy rooms which shall be 4000K.**

35. Q: We have contacted the suppliers for the “Radiation Protection” materials listed in section 134900. To provide the correct shielding, we need the Radiologist Shielding Report. This is the information that the suppliers use to determine what thickness lead shielding will be required.

    **A: Provide 1/16” lead shielding as shown in the documents. See Section 134900, 2.2, C and D. A radiologist’s report will be available to the contractor after bid and modifications made at that time if required.**

36. Q: Cuts and fills in the building footprint; do footings and piers have to be on virgin soil? Or structural fill?

    **A: See note 8 on Drawing S002 and Foundation Construction Considerations in the Geotechnical Report.**

37. Q: Drawing C-102, Excess material is indicated to go hear as shown by an arrow. After reviewing the existing site there is no access to this area for stock piling material. Please clarify.
    **A: Location of stockpile has been modified. See drawing attached.**
38. Q: If Contract 2 is awarded, who is responsible for the removal of the slurry from the Geo well drilling operation?
    **A: The General Contractor.**
39. Q: What is the finish material between the building and block retaining wall? Appears to connect to asphalt at the southeast corner of the building (+-) EL 509?
    **A: 6" of ¾" red aggregate to be provided in this area as shown on sheet L101.**
40. Q: Drawing H801 under the pump schedule, Pumps P-A, B: The scheduled model numbers are split-coupled end suction pumps, however, written specs 232123 only discusses close-coupled end suction pumps. Which is required?
    **A: The scheduled pumps are required.**
41. Q: Drawing P200 shows a water control box (WB-1) in Room 149. Is this water control box necessary?
    **A: Yes.**
42. Q: Drawing H703, detail 2 shows a water meter with remote reader on the cold-water fill line for the hydronic system. Is this water meter to be provided by the water utility? If not, please provide a manufacturer and model number for the water meter.
    **A: Disregard the water meter.**
43. Q: Is an Errors and Omissions coverage being requested; or an OCP with the Construction manager as the named insured?
    **A: If the GC is doing the professional work, then they need it. If they are contracting that out, then their subs need it.**
44. Q: Please clarify and define the request for a Construction project Management Liability Policy. Or, is this defined by a General Liability insurance coverage?
    **A: Owners and Contractors Protective (OCP) Liability Coverage — a stand-alone policy that covers the named insured's liability for bodily injury (BI) and property damage (PD) caused, in whole or in part, by an independent contractor's work for the insured. The contractor purchases the policy to provide coverage for vicarious liability the client (project owner) incurs as a result of the contractor's acts or omissions on the project. The OCP policy also responds to liability arising out of the insured's own acts or omissions in connection with its general supervision of the contractor's operations.**
45. Q: Pollution coverage is requested, however, there are no ACM removals listed in in scope of work. Please provide a breakdown of the abatement being performed.
    **A: Pollution coverage is needed.**
46. Q: Will the local utility be responsible for pole- mounted transformers and medium voltage cabling between the poles?
    **A: No the electrical contractor is responsible for this equipment and work.**
47. Q: The H fixture in the lighting legend (E001) does not have a description/type, will one be provided?

**A: The fixture schedule has been updated. See attached drawing.**

48. Q: On E- 200 room 149, the light fixtures do not have a type of fixture designated to them. What type should they be?

    **A: They are type 'A'.**

49. Q: Who will be responsible for running communication lines between temporary utility poles, Fiber, Cat#6, ETC?

    **A: The electrical contractor is responsible for this equipment and work.**

50. Q: Will a fire alarm Riser diagram be provided?

    **A: Yes**

51. Q: Will a spec or model # be provided for the FLR receptacles on E- 200 in the conference room?

    **A: Yes refer to details on attached drawings.**

52. Q: There is not a Fire A arm Control Panel indicated in the drawings, will a spec and location be provided? This will be needed.

    **A: Yes refer to drawings and attached spec. The new panel shall be a "Fire-lite" model ES-200X, addressable fire alarm control panel located on the south wall of room 108.**

53. Q: Can a location for Cir's 73- 84 in panel PP1- 2 on E- 800 be provided on the power plan? They are not shown.

    **A: They are now home runs for CH 1, 2, 3 & 4 located in mech room 121. The home runs shown on the plans were for the pumps only.**

54. Q: Please provide additional information on the characteristics of the fabric, openness, and color of the Flexshade by Draper in Spec section 12 49 00- 'Manually Operated Window Treatments'.

    **A: 1. Characteristics of the fabric: Duplex basketweave fabric. 36% Fiberglass, 64% Vinyl. Approximately 99% UV Blockage, .027 inches thick. 14.6 oz/square yard.**

    **2. Openness: 1 percent open.**

    **3. Color: SW 2701 Oyster.**

55. Q: P001-Note 4,14-Speaks to existing work-Slab removal, replacement and such. New building?

    **A: Disregard**

56. Q: E701-detail 10, Note 2-Calls for rods above and below duct bank-Need rebar detail for #4 bar as to how many, spacing, distance past roadway, Etc.

    **A: Place #4 rebar in the concrete ductbank 2" from top and bottom, 8"O.C. in each direction. Extend 8' past roadway.**

57. Q: ES 101-Note 5-Provide 2" conduit for future car chargers-It was answered in previous question Electric Cont. to supply chargers. Are there more chargers in the future not shown?

    **A: Provide a spare two inch conduit for future car chargers.**

58. Q: Note 31-Building steel to be grounded -Exothermic Welded -Foundation rebar within concrete as well?

    **A: No not required.**

59. Q: Note 29-Paint and rustproof conduit as directed by General Contractor?

    **A: Paint emt light grey with Rustoleum or equal.**

60. Q: E001-Note 12-Certificates to be delivered to General Contractor before final payment?.

    **A: For electrical inspections**

61. Q: Radiation Protection-134900-1/1.2-B-1-Section 033000-Cast in Place Concrete, For Concrete topping over lead shielding in concrete slabs-Not finding lead shield within slabs, is this spec to be used and if so where?

    **A: There will be no shielding in concrete slabs. Disregard reference.**

62. Q: There is no specific contract for the SPRINKLER WORK. What contract will this scope of work fall under?

    **A: Plumbing.**

63. Q: Regarding your response in addendum #1 to the “Radiation Protection” materials listed in specification 134900, no thickness of the lead is called out. A radiation shielding report is a federal requirement, as per Ray-Bar. Please see the attached Ray-Bar document for a shielding report needed. No one will quote the lead shield material without a report or lead thickness. Please provide.

    **A: See response to question 35.**

64. What is the finish for all hardware-on-hardware sets 1 / 1.5 /2 / and 15? Only note we see is in the door spec, says for standard hardware finish to match doors. Doors are all painted and that is not a standard finish for door hardware.

    **A: Door hardware finish is to be selected from manufacturers standard finishes. They will not be painted.**

65. Storefront type B is located at the exterior of the security vestibule but only has normal glazing (IG1). All windows in this room have security glazing. Should this glazing be BR-1? Please confirm.

    **A: Yes. Glazing in storefront type B is to be BR-1.**

66. Drawing D101, please indicate the extent of the new timber railing and the new steel railing. The site plan is not clear on the footage for these railings.

    **A: Detail has been clarified, there are no steel railings on the project.**

67. Drawing H102 shows existing and new grades. Can you provide a new top or bottom of curb to determine the new top of replacement pavement?

    **A: Contractor to maintain a 6” reveal, grade tolerances may vary and are not depicted.**

68. Drawing H102, in the building footprint, what does abbreviation LSE (508.0) stand for? There is no description for this abbreviation.

    **A: It’s a carrier over from the architectural or civil plan set. It has no HVAC meaning.**

69. Plans call for the milling of 56,000sf of existing asphalt complete to subbase. Specification section 321216, page 4, 3.3 calls to mill 2 inches of existing asphalt. Also, the specification 017419 calls to dispose of millings on site. Can this material be used for back fill? If so, in what areas can it be used?

    **A: 56,000 S.F. of existing asphalt to be demolished, milling is subject to the contractor’s discretion. Millings cannot be used for backfill.**

70. Specification section 312000, page 11, 3.19 B calls for fabric under the new subbase. The detail on drawing D101 does not call for fabric. Please clarify.
    **A: No fabric is required.**
71. Specification section 321713 calls for “Wheel stops / Bumpers” however there are not shown on the drawings. Please clarify.
    **A: No wheel stops are to be provided.**

72. **Remove Drawing Cover Sheet and Replace with attached Cover sheet showing revised Drawing List.**

73. **Remove Drawing C101 and Replace with attached Drawing C101.**

74. **Remove Drawing C102 and Replace with attached Drawing C102.**

75. **Remove Drawing E101 Electrical Site Plan and Replace with attached Drawing CE101 Electrical Site Plan.**

76. **Remove Drawing ESCP and Replace with attached Drawing ESCP.**

77. **Remove Drawing D101 and Replace with attached Drawing D101.**

78. **Remove Drawing D102 and Replace with attached Drawing D102.**

79. **Remove Drawing H100 and Replace with attached Drawing H100.**

80. **Remove Drawing H101 and Replace with attached Drawing H101.**

81. **Remove Drawing H801 and Replace with attached Drawing H801.**

82. **Remove Drawing E001 and Replace with attached Drawing E001.**

83. **Remove Drawing E100 and Replace with attached Drawing E100.**

84. **Remove Drawing E101 Electrical Power Floor Plan and Replace with attached Drawing E101 Electrical Power Floor Plan.**

85. **Remove Drawing E200 and Replace with attached Drawing E200.**

86. **Remove Drawing E800 and Replace with attached Drawing E800.**

87. **Add attached Drawing E801, Electrical Schedules & Details.**

Regards,

Samantha Sweikata
Acting Commissioner

# SECTION 263213 - ENGINE GENERATORS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes packaged engine-generator sets for emergency power supply with the following features:

1. Diesel engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Performance requirements for sensitive loads.
5. Load banks.
6. Outdoor enclosure.

### 1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

### 1.4 SUBMITTALS

A. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

B. Qualification Data: For manufacturer.

C. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

F. Warranty: Special warranty specified in this Section.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with ASME B15.1.

G. Comply with NFPA 37.

H. Comply with NFPA 70.

I. Comply with NFPA 99.

J. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

K. Comply with UL 2200.

L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

## 1.6 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet.

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide Generac SD500 with level 2 enclosure or a comparable product by one of the following:

1. Caterpillar; Engine Div.
2. Generac Power Systems, Inc.
3. Onan/Cummins Power Generation; Industrial Business Group.

## 2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated.
2. Output Connections: Three-phase, four wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
3. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
6. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
8. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

    a. Provide permanent magnet excitation for power source to voltage regulator.

9. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Fuel: Fuel oil, Grade DF-2.

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
3. Dual Natural Gas with LP-Gas Backup (Vapor-Withdrawal) System:

    a. Carburetor.
    b. Fuel-Shutoff Solenoid Valves: One for each fuel source.
    c. Flexible Fuel Connectors: One for each fuel source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

H. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85 dBA or less.

I. Muffler/Silencer: Industrial type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 12 dB at 500 Hz.
2. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be 87 dBA or less.

J. Air-Intake Filter: Standard-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

K. Starting System: 12-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 3, wall-mounted cabinet.

## 2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for 28 hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

## 2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.

E. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:

1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
2. Switchboard Construction: Freestanding unit complying with Division 26 Section "Switchboards."
3. Switchgear Construction: Freestanding unit complying with Division 26 Section "Low-Voltage Switchgear."
4. Current and Potential Transformers: Instrument accuracy class.

F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 2 system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.

G. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

H. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals. Data system connections to terminals are covered in Division 26 Section "Electrical Power Monitoring and Control."

I. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

J. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil, low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil, low-pressure prealarm.
7. Fuel tank, low-fuel level.
8. Low coolant level.

K. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will

reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

L. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

## 2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Generator Disconnect Switch: Molded-case type, 100 percent rated.

1. Rating: Matched to generator output rating.
2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

C. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:

1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

D. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

## 2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: 12 percent, maximum.

## 2.8 LOAD BANK

A. Description: Permanent, outdoor, weatherproof, remote-controlled, forced-air-cooled, resistive and reactive unit capable of providing a balanced 3-phase, delta-connected load to generator set at 50 percent rated-system capacity, at 80 percent power factor, lagging. Unit may be composed of separate resistive and reactive load banks controlled by a common control panel. Unit shall be capable of selective control of load in 25 percent steps and with minimum step changes of approximately 5 and 10 percent available.

B. Resistive Load Elements: Corrosion-resistant chromium alloy with ceramic and steel supports. Elements shall be double insulated and designed for repetitive on-off cycling. Elements shall be mounted in removable aluminized-steel heater cases.

C. Reactive Load Elements: Epoxy-encapsulated reactor coils.

D. Load-Bank Heat Dissipation: Integral fan with totally enclosed motor shall provide uniform cooling airflow through load elements. Airflow and coil operating current shall be such that, at maximum load, with ambient temperature at the upper end of specified range, load-bank elements operate at not more than 50 percent of maximum continuous temperature rating of resistance elements.

E. Load Element Switching: Remote-controlled contactors switch groups of load elements. Contactor coils are rated 120 V. Contactors shall be located in a separate NEMA 250, Type 3R enclosure within load-bank enclosure, accessible from exterior through hinged doors with tumbler locks.

F. Contactor Enclosures: Heated by thermostatically controlled strip heaters to prevent condensation.

G. Load-Bank Enclosures: NEMA 250, Type 3R, complying with NEMA ICS 6. Louvers at cooling-air intake and discharge openings shall prevent entry of rain and snow. Openings for airflow shall be screened with 1/2-inch- (13-mm-) square, galvanized-steel mesh. Reactive load bank shall include automatic shutters at air intake and discharge.

H. Protective Devices: Power input circuits to load banks shall be fused, and fuses shall be selected to coordinate with generator circuit breaker. Fuse blocks shall be located in contactor enclosure. Cooling airflow and overtemperature sensors shall automatically shut down and lock out load bank until manually reset. Safety interlocks on access panels and doors shall disconnect load power, control, and heater circuits. Fan motor shall be separately protected by overload and short-circuit devices. Short-circuit devices shall be noninterchangeable fuses with 200,000-A interrupting capacity.

I. Remote-Control Panel: Separate from load bank in NEMA 250, Type 1 enclosure with a control power switch and pilot light, and switches controlling groups of load elements.

J. Control Sequence: Control panel may be preset for adjustable single-step loading of generator during automatic exercising.

## 2.9 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

C. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.

D. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

## 2.10 MOTORS

A. General requirements for motors are specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

## 2.11 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene.
2. Durometer Rating: 50.
3. Number of Layers: Two.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

## 2.12 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

## 2.13 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch 8-inch- high concrete base. Secure sets to anchor bolts installed in concrete bases.

D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

## 3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect engine exhaust pipe to engine with flexible connector.

D. Connect fuel piping to engines with a gate valve and union and flexible connector.

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems.

E. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

## 3.4 IDENTIFICATION

A. Identify system components according to Division 23 Section "Identification for HVAC Piping and Equipment" and Division 26 Section "Identification for Electrical Systems."

## 3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection (except those indicated to be optional) for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Exhaust Emissions Test: Comply with applicable government test criteria.
8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at two locations, and compare measured levels with required values.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and retest as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

M. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

## 3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 263213

# SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Notification appliances.
5. Remote annunciator.
6. Addressable interface device.
7. Digital alarm communicator transmitter.
8. Radio alarm transmitter.
9. System printer.

### 1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. NICET: National Institute for Certification in Engineering Technologies.

### 1.4 SYSTEM DESCRIPTION

A. Noncoded, UL-certified addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.

B. Noncoded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

### 1.5 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.

## 1.6 SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:

    a. Trained and certified by manufacturer in fire-alarm system design.
    b. NICET-certified fire-alarm technician, Level III minimum.
    c. Licensed or certified by authorities having jurisdiction.

B. Product Data: For each type of product indicated.

C. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
7. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

D. Qualification Data: For qualified Installer.

E. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Field quality-control reports.

G. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Record copy of site-specific software.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:

    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire-alarm control unit.
7. Copy of NFPA 25.

H. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

## 1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level III technician.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company

1.8 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning with Substantial Completion, provide software support for twoyears.

C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 1 unit of each type.
3. Keys and Tools: One extra set for access to locked and tamper proof components.
4. Audible and Visual Notification Appliances: One of each type installed.
5. Fuses: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Fire Lite MS 9600 series or comparable products by one of the following:

1. Amseco - a Potter brand; Potter Electric Signal Company.
2. Bosch Security Systems.
3. Commercial Products Group/CPG Life Safety Signals.
4. Faraday; Siemens Building Technologies, Inc.
5. Federal Signal Corporation.
6. Fire Control Instruments, Inc.; a Honeywell company.

7. Fire Lite Alarms; a Honeywell company.
8. Gamewell; a Honeywell company.
9. GE Infrastructure; a unit of General Electric Company.
10. Gentex Corporation.
11. Harrington Signal, Inc.
12. NOTIFIER; a Honeywell company.
13. Siemens Building Technologies, Inc.; Fire Safety Division.
14. Silent Knight; a Honeywell company.
15. SimplexGrinnell LP; a Tyco International company.

## 2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. CO detector.
3. Duct smoke detectors.
4. Verified automatic alarm operation of smoke detectors.
5. Automatic sprinkler system water flow.
6. Heat detectors in elevator shaft and pit.
7. Fire-extinguishing system operation.
8. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Identify alarm at fire-alarm control unit.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Activate voice/alarm communication system.
7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
8. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.
9. Activate stairwell and elevator-shaft pressurization systems.
10. Close smoke dampers in air ducts of designated air-conditioning duct systems.
11. Recall elevators to primary or alternate recall floors.
12. Activate emergency lighting control.
13. Activate emergency shutoffs for gas and fuel supplies.
14. Record events in the system memory.
15. Record events by the system printer.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Low-air-pressure switch of a dry-pipe sprinkler system.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or pre-action sprinkler system.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

## 2.3 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.

    a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
    b. Include a real-time clock for time annotation of events on the event recorder and printer.

2. Addressable initiation devices that communicate device identity and status.

    a. Smoke sensors shall additionally communicate sensitivity setting.
    b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class A

Install no more than 30 addressable devices on each signaling line circuitSerial Interface: Two RS-232 ports for printersRemote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

E. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

F. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

G. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

H. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

## 2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Single-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

## 2.5 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be two-wire type.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.

    a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 per minute.
    b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135.
    c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

## 2.6 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F at a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.7 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.

B. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.

D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.

E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level

of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.

F. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:
   a. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, white.

G. Voice/Tone Notification Appliances:

1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
2. High-Range Units: Rated 2 to 15 W.
3. Low-Range Units: Rated 1 to 2 W.
4. Mounting: Flush
5. Matching Transformers: Tap range matched to acoustical environment of speaker location.

## 2.8 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: 24-V ac or dc.

B. Material and Finish: Match door hardware.

## 2.9 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

## 2.10 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

## 2.11 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If either service line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply or loss of power.
5. Low battery.
6. Abnormal test signal.
7. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.12 SYSTEM PRINTER

A. Printer shall be listed and labeled by an NRTL as an integral part of fire-alarm system.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit on concrete base with tops of cabinets not more than 72 inches (1830 mm) above the finished floor. Comply with requirements for concrete base specified in Division 03 Section

1. Install seismic bracing. Comply with requirements in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
2. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

D. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

1. Connect new equipment to existing control panel in existing part of the building.
2. Connect new equipment to existing monitoring equipment at the supervising station.
3. Expand, modify, and supplement existing monitoring equipment as necessary to extend existing monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

E. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
3. Smooth ceiling spacing shall not exceed 30 feet.
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.

F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.

G. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

H. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

I. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

J. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

K. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

L. Device Location-Indicating Lights: Locate in public space near the device they monitor.

M. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

N. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

## 3.2 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

## 3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

## 3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

## 3.5 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

    a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
    b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
5. Test visible appliances for the public operating mode according to manufacturer's written instructions.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

## 3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111

# Formation Thermal Conductivity
## Test & Data Analysis

**Test location** **Goshen Emergency Services Center**
**Goshen, NY**

**Test Date** April 12-14, 2022

**Analysis For** Connecticut Wells Inc.
49 Hard Hill Road North
Bethlehem, CT 06751
Phone: (203) 266-5272

**Test Performed By** Connecticut Wells Inc.


WESTERN OFFICE
PO Box 256, Elkton, SD 57026
P: 866-991-4784 F: 605-542-3941

EASTERN OFFICE
6 William Warren Dr, Asheville, NC 28806
P: 828-275-7113

## EXECUTIVE SUMMARY

A formation thermal conductivity test was performed on the geothermal test bore at the Goshen Emergency Services Center at 22 Wells Farm Road in Goshen, New York. The vertical bore was completed on April 5, 2022 by Connecticut Wells Inc. Geothermal Resource Technologies' (GRTI) test unit was attached to the vertical bore on the morning of April 12, 2022.

This report provides an overview of the test procedures and analysis process, along with plots of the loop temperature and input heat rate data. The collected data was analyzed using the "line source" method and the following average formation thermal conductivity was determined.

**Formation Thermal Conductivity = 1.40 Btu/hr-ft-°F**

Due to the necessity of a thermal diffusivity value in the design calculation process, an estimate of the average thermal diffusivity was made for the encountered formation.

**Formation Thermal Diffusivity ≈ 0.92 $ft^2$/day**

The undisturbed formation temperature for the tested bore was determined from the initial loop temperature data collected at startup.

**Undisturbed Formation Temperature ≈ 52.4-54.0°F**

The formation thermal properties determined by this test do not directly translate into a loop length requirement (i.e. feet of bore per ton). These parameters, along with many others, are inputs to commercially available loop-field design software to determine the required loop length. Additional questions concerning the use of these results are discussed in the frequently asked question (FAQ) section at www.grti.com.

## TEST PROCEDURES

The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) has published recommended procedures for performing formation thermal conductivity tests in the ASHRAE HVAC Applications Handbook, Geothermal Energy Chapter. The International Ground Source Heat Pump Association (IGSHPA) also lists test procedures in their Design and Installation Standards. GRTI's test procedures meet or exceed those recommended by ASHRAE and IGSHPA, with the specific procedures described below:

**Grouting Procedure for Test Loops –** To ensure against bridging and voids, it is recommended that the bore annulus is uniformly grouted from the bottom to the top via tremie pipe.

**Time Between Loop Installation and Testing** – A minimum delay of five days between loop installation and test startup is recommended for bores that are air drilled, and a minimum waiting period of two days for mud rotary drilling.

**Undisturbed Formation Temperature Measurement –** The undisturbed formation temperature should be determined by recording the loop temperature as the water returns from the u-bend at test startup.

**Required Test Duration –** A minimum test duration of 36 hours is recommended, with a preference toward 48 hours**.**

**Data Acquisition Frequency -** Test data is recorded at five minute intervals.

**Equipment Calibration/Accuracy** – Transducers and datalogger are calibrated per manufacturer recommendations. Manufacturer stated accuracy of power transducers is less than ±2%. Temperature sensor accuracy is periodically checked via ice water bath.

**Power Quality –** The standard deviation of the power should be less than or equal to 1.5% of the average power, with maximum power variation of less than or equal to 10% of the average power.

**Input Heat Rate –** The heat flux rate should be 51 Btu/hr (15 W) to 85 Btu/hr (25 W) per foot of installed bore depth to best simulate the expected peak loads on the u-bend.

**Insulation –** GRTI's equipment has 1 inch of foam insulation on the FTC unit and 1/2 inch of insulation on the hose kit connection. An additional 2 inches of insulation is provided for both the FTC unit and loop connections by insulating blankets.

**Retesting in the Event of Failure –** In the event that a test fails prematurely, a retest may not be performed until the bore temperature is within 0.5°F of the original undisturbed formation temperature or until a period of 14 days has elapsed.

## Data Analysis

Geothermal Resource Technologies, Inc. (GRTI) uses the "line source" method of data analysis to determine the thermal conductivity of the formation. The line source method assumes an infinitely thin line source of heat in a continuous medium. A plot of the late-time temperature rise of the line source temperature versus the natural log of elapsed time will follow a linear trend. The linear slope is inversely proportional to the thermal conductivity of the medium. When a u-bend grouted in a borehole is used to inject heat into the ground at a constant rate in order to determine the average formation thermal conductivity, the test must be run long enough to allow the finite dimensions of the u-bend pipes and the grout to become insignificant. Experience has shown that approximately ten hours is required to allow the error of early test times and the effects of finite borehole dimensions to become insignificant.

In order to analyze real data from a formation thermal conductivity test, the average temperature of the water entering and exiting the u-bend heat exchanger is plotted versus the natural log of elapsed testing time. Using the Method of Least Squares, linear coefficients are then calculated to produce a line that fits the data. This procedure is repeated for various time intervals to ensure that variations in the power or other effects are not producing inaccurate results.

The calculated results are based on test bore information submitted by the driller/testing agency. GRTI is not responsible for inaccuracies in the results due to erroneous bore information. All data analysis is performed by personnel that have an engineering degree from an accredited university with a background in heat transfer and experience with line source theory. The test results apply specifically to the tested bore. Additional bores at the site may have significantly different results depending upon variations in geology and hydrology.

Through the analysis process, the collected raw data is converted to spreadsheet format (Microsoft Excel®) for final analysis. If desired, please contact GRTI and a copy of the data will be made available in either a hard copy or electronic format.

**Contact:** Chad Martin
Regional Managing Engineer
Asheville, NC
(828) 225-9166
cmartin@grti.com

## Test Bore Details
### (As Provided By Connecticut Wells Inc.)

| | |
|---|---|
| Site Name | Goshen Emergency Services Center |
| Location | Goshen, NY |
| Driller | Connecticut Wells Inc. |
| Installed Date | April 5, 2022 |
| Borehole Diameter | 8-3/4 inches, 0-140 ft<br>6 inches, 140-360 ft |
| Casing | Permanent 6 inch steel casing to 140 ft |
| U-Bend Size | 1-1/4 inch DR9 HDPE |
| U-Bend Depth Below Grade | 360 ft |
| Grout Type | GeoPro TG Lite/PowerTEC 1.0 |
| Grout Mixture | 100 lb TG Lite, 32 lb PowerTEC,<br>33 gal water |
| Grouted Portion | Entire bore |

### Drill Log

| Formation Description | Depth (ft) |
|---|---|
| Top soil, brown clay | 0'-10' |
| Clay hard pan-gray | 10'-132' |
| Shale | 132'-160' |
| Blue shale | 160'-175' |
| Sandstone | 175'-360' |

Note: Bore produced 5 gpm water at 160 ft; 75 gpm at 258 ft; 100+ gpm at 360 ft.

## THERMAL CONDUCTIVITY TEST DATA

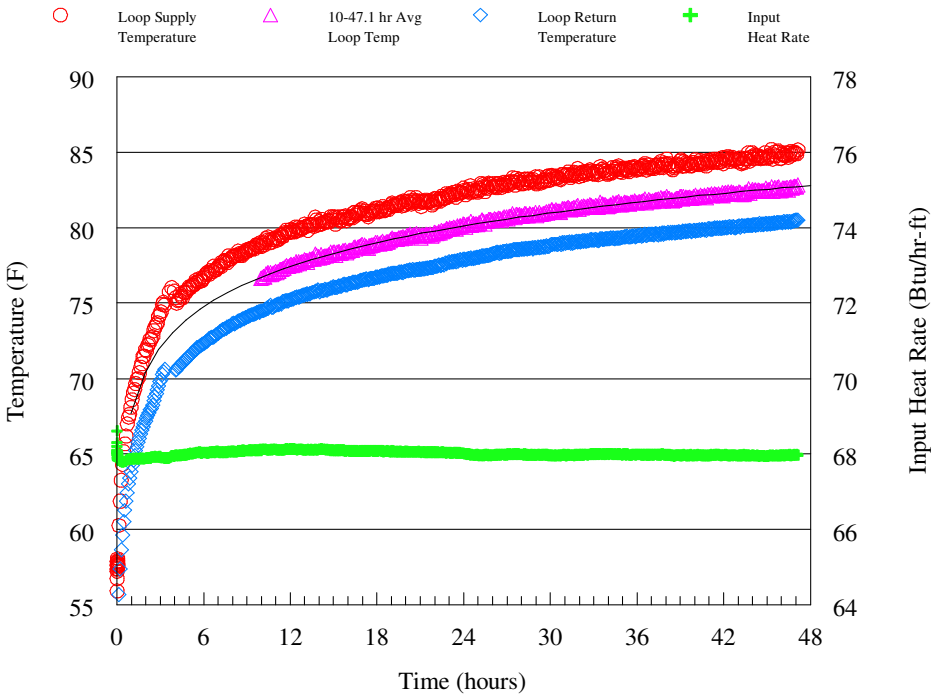


FIG. 1: TEMPERATURE & HEAT RATE DATA VS TIME

Figure 1 above shows the loop temperature and heat input rate data versus the elapsed time of the test. The temperature of the fluid supplied to and returning from the U-bend are plotted on the left axis, while the amount of heat supplied to the fluid is plotted on the right axis on a per foot of bore basis. In the test statistics below, calculations on the power data were performed over the analysis time period listed in the Line Source Data Analysis section.

### SUMMARY TEST STATISTICS

| | |
|---|---|
| Test Date | April 12-14, 2022 |
| Undisturbed Formation Temperature | Approx. 52.4-54.0°F |
| Duration | 47.1 hr |
| Average Voltage | 239.8 V |
| Average Heat Input Rate | 24,486 Btu/hr (7,174 W) |
| Avg Heat Input Rate per Foot of Bore | 68.0 Btu/hr-ft (19.9 W/ft) |
| Circulator Flow Rate | 10.9 gpm |
| Standard Deviation of Power | 0.08% |
| Maximum Variation in Power | 0.17% |

## LINE SOURCE DATA ANALYSIS

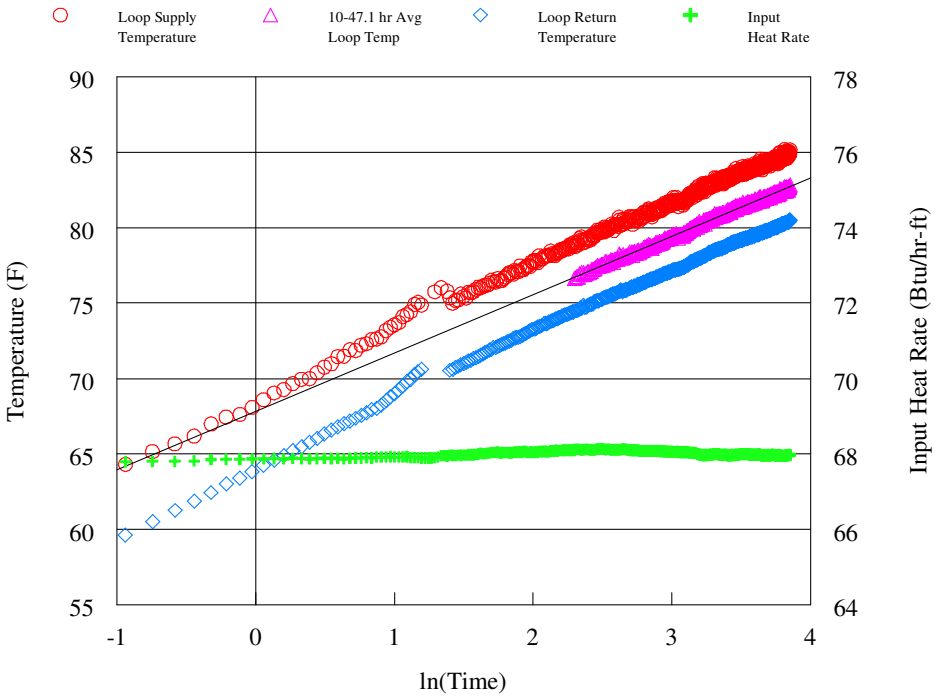


FIG. 2: TEMPERATURE & HEAT RATE VS NATURAL LOG OF TIME

The loop temperature and input heat rate data versus the natural log of elapsed time are shown above in Figure 2. The temperature versus time data was analyzed using the line source method (see page 3) in conformity with ASHRAE and IGSHPA guidelines. A linear curve fit was applied to the average of the supply and return loop temperature data between 10 and 47.1 hr. The slope of the curve fit was found to be 3.87. The resulting thermal conductivity was found to be **1.40 Btu/hr-ft-°F**.

## THERMAL DIFFUSIVITY

The reported drilling log for this test borehole indicated that the formation consisted of top soil, clay, hardpan, shale, and sandstone. Average heat capacity values for shale and sandstone were calculated from specific heat and density values listed by Kavanaugh and Rafferty[1]. A weighted average of heat capacity values based on the indicated formation was used to determine an average heat capacity of 36.6 Btu/ft$^3$-°F for the formation. A diffusivity value was then found using the calculated formation thermal conductivity and the estimated heat capacity. The thermal diffusivity for this formation was estimated to be **0.92 ft$^2$/day**.

[1]Stephen P. Kavanaugh and Kevin Rafferty, Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems (Atlanta: ASHRAE, 2014), 75.

# CERTIFICATE OF CALIBRATION

GRTI maintains calibration of the datalogger, current transducer and voltage transducer on a regular schedule. The components are calibrated by the manufacturer using recognized national or international measurement standards such as those maintained by the National Institute of Standards and Technology (NIST).

FTC Unit 209

DA Unit 40

| PRIMARY EQUIPMENT | | |
|---|---|---|
| COMPONENT | CALIBRATION DATE | CALIBRATION DUE DATE |
| Datalogger | 1/25/2021 | 1/25/2024 |
| Current Transducer | 2/3/2021 | 2/3/2024 |
| Voltage Transducer | 2/3/2021 | 2/3/2024 |

GRTI periodically verifies the combined temperature sensor/datalogger accuracy via an ice water bath. Temperature readings are simultaneously taken with a digital thermometer that has been calibrated using instruments traceable to NIST.

| DATE | 2/18/2021 | | | |
|---|---|---|---|---|
| THERMOCOUPLE 1 (°F) | 32.1 32.1 32.1 | | | |
| THERMOCOUPLE 2 (°F) | 32.0 32.0 32.0 | | | |
| THERMOCOUPLE 3 (°F) | 31.9 31.9 31.9 | | | |
| THERMOCOUPLE 4 (°F) | 32.0 32.0 32.0 | | | |
| DIGITAL THERMOMETER (°F) | 32.1 32.0 32.0 | | | |

WESTERN OFFICE
PO Box 256, Elkton, SD 57026
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EASTERN OFFICE
6 William Warren Dr, Asheville, NC 28806
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# Geotechnical Engineering Report

**Orange County Medical Examiners Office**
**Goshen, New York**
December 8, 2021
Terracon Project No. JB215178

**Prepared for:**
Hyman Hayes Associates, LLC
Latham, NY

**Prepared by:**
Terracon Consultants-NY, Inc.
Albany, New York

December 8, 2021

Hyman Hayes Associates, LLC
800 Troy Schenectady Road, Suite 103
Latham, NY 12110

Attn: Mr. Stanley Hayes
P: (518) 452-3470
E: shayes@hymanhayes.com

Re: Geotechnical Engineering Report
Orange County Medical Examiners Office
Wells Farm Road
Goshen, New York
Terracon Project No. JB215178

Dear Mr. Hayes:

We have completed the Geotechnical Engineering services for the above-referenced project. This study was performed in general accordance with Terracon Proposal No. PJB215178, dated October 5, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs retaining walls and pavements for the proposed project.

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

Sincerely,
**Terracon Consultants-NY, Inc.**

Asa Barnhill, E.I.T.
Staff Geotechnical Engineer

John T. Odorisio, P.E.
Sr. Geotechnical Engineer

Joseph Robichaud, Jr., P.E.
Sr. Associate/Office Manager

## REPORT TOPICS



**Note:** This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

## ATTACHMENTS



**Note:** Refer to each individual Attachment for a listing of contents.

# Geotechnical Engineering Report
## Orange County Medical Examiners Office
## Wells Farm Road
## Goshen, New York
**Terracon Project No. JB215178**
**December 8, 2021**

## INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Medical Examiner's Office to be located at Wells Farm Road in Goshen, New York. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Lateral earth pressures
- Pavement design and construction
- Frost considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per NYSBC
- Excavation considerations

The geotechnical engineering Scope of Services for this project included the advancement of five test borings (B-1 through B-5) to depths ranging from about 22 to 52 feet below existing site grades, visual classification and limited laboratory testing of recovered soil samples, and preparation of this summary report.

Maps showing the site and boring locations are presented in the **Site Location** and **Exploration Plan** sections, respectively.

## SITE CONDITIONS

| Item | Description |
|---|---|
| **Parcel Information** | The project is located at the Orange County Emergency Services Campus on Wells Farm Road in Goshen, New York.<br>The approximate center of the proposed building is located at:<br>○ Latitude: 41.4076° N<br>○ Longitude: 74.3544° W<br>See **Site Location** |

| Item | Description |
|---|---|
| **Existing Improvements** | The area of the proposed building is partially occupied by an existing parking lot and gravel access road to a solar field and water tank.<br>We understand that there are a series of underground utilities which pass below the planned building footprint which are currently planned to be relocated such that they are outside of the new building's footprint. |
| **Current Ground Cover** | Mixture of asphalt, gravel and vegetation (brush and landscaping). |
| **Existing Topography** (from drawings provided by Hyman Hayes) | Grades within the proposed building footprint slope down to the south east from about elevation 510 feet to about elevation 492 feet. Grades outside of the building footprint continue sloping down to the south east to Wells Farm Road to about elevation 460 feet. Site grading plans indicate the slopes are inclined at about 1V:3H. |

## PROJECT DESCRIPTION

Our understanding of the project is tabulated below.

| Item | Description |
|---|---|
| **Information Provided** | Various correspondences with Hyman Hayes, along with the following schematic drawings and site plans:<br>■ "20071 – OCME Program_6-29-21" pdf<br>■ "20071_OCME_Schematic Floor Plan_8-17-21" pdf<br>■ "As Built Sewer OC Emergency Services Center_grading_utility_asbuilt" pdf<br>■ "OCME Boring Stakeout" pdf<br>■ "SITE PLAN 11-8-21 PROPOSED BLDG PARKING" pdf. |
| **Project Description** | Construction of a new medical examiner's office building located at the southeast corner of the existing parking lot. |
| **Proposed Structure** | The project includes a single-story building with a footprint of about 13,000 square feet. The building will be slab-on-grade (non-basement). Due to the sloping site grades, portions of the building foundation walls will retain soil. |
| **Building Construction** | We understand the building is planned to be structural steel-framed supported on cast-in-place concrete foundations with a concrete slab-on-grade floor. |
| **Finished Floor Elevation** | 511 feet. |

| Item | Description |
|---|---|
| **Maximum Loads (assumed)** | ■ Columns: 100 kips<br>■ Walls: 3 kips per linear foot (klf)<br>■ Slabs: 150 pounds per square foot (psf) |
| **Grading/Slopes** | Cuts of up to about 2 feet and fills on the order of about 19 feet will be required to achieve the proposed fished floor elevation. |
| **Below-Grade Structures** | Conceptual drawings indicate some type of wall structure at the body trailer/delivery truck area. Portions of the building foundation walls will retain earth due to the sloping site grade. |
| **Free-Standing Retaining Walls** | Based on the plans provided there are retaining walls planned to the south west of the trailer loading dock supporting the adjacent water tower compound, one wall about the southern end of the building as well as one wall extending north from the building along the eastern edge of the parking lot. The retaining wall heights vary between about 2 feet and 8 feet in height. |
| **Pavements** | New pavements are planned about the northern limits of the new building to connect the existing parking lot to the new building. We assume that these pavements may be a combination of flexible asphalt and rigid concrete, and that the design life of the pavements is 20 years. |
| **Estimated Start of Construction** | Not provided. |

## GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

### Subsurface Profile

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

| Model Layer | Layer Name | General Description |
|---|---|---|
| **1** | **Fill** | Silty Sand with varying amounts of gravel |
| **2** | **Glacial Till** | Silty Sand with varying amounts of gravel, occasional cobbles and boulders |

Surficial materials consisted of about nil to 2 inches of topsoil or about 10 to 12 inches of pavement section at the locations investigated. The topsoil thicknesses indicated on the subsurface logs should be regarded as a rough approximation only; contractors are advised to make their own estimates or determination of topsoil thickness for bidding purposes.

Beneath the surficial materials, fill soils consisting of silty sand with varying amounts of gravel were encountered in borings B-3 through B-5 extending to depths of about 4 to 6 feet below the existing ground surface. The fill soils appear to consist of reworked native glacial till, likely as a result of the grading for construction of the adjacent parking lot and installation of the existing utility that runs through the site. The fill soils were noted to be loose to medium dense based on SPT 'N' values. Underlying the fill soils in borings B-3 through B-5 and directly beneath the surficial materials in borings B-1 and B-2, native glacial till soils consisting of silty sand with varying amounts of gravel with occasional cobbles and boulders noted. The soils were found to be medium dense to very dense based on SPT 'N' values. Each boring terminated without refusal in the native soils at depths varying from about 22 to 52 feet below existing grade.

It should be understood that test borings were not completed in the immediate vicinity of the existing buried utilities which traverse the planned building pad. The depth of uncontrolled fill above and adjacent to the utility lines may vary from those found in the test borings. Invert elevations of the utilities were not shown on the drawings provided.

## Groundwater Conditions

Groundwater observations and measurements were made as the boreholes were completed or after being left to stabilize over a weekend as noted on the individual boring logs. It should be understood that, in some instances, these measurements may not reflect actual groundwater levels in the event adequate time did not pass upon completion of the drilling for groundwater to achieve a static level in the augers.

Groundwater was encountered in Boring B-1 at a depth of about 8 feet below existing grade after being left to stabilize over the weekend. Groundwater was not noted at the remaining explorations on site. Based on our observations of soil samples recovered and field measurements or groundwater, it is our opinion the groundwater table is likely present between about 15 to 20 feet below existing grades. As evidenced by Boring B-1, perched water is anticipated to be encountered at various depths at the site. Perched water levels develop when surface water (i.e. precipitation or runoff) enters the subsurface through loose surficial soils and becomes trapped, or perched, on top of less permeable soils such as glacial till.

Fluctuations in groundwater level may occur because of seasonal variations in the amount of rainfall, runoff, and other factors that may differ from those present at the time the explorations were performed. Additionally, grade adjustments on and around the site, as well as surrounding drainage improvements, may affect the water table. The possibility of groundwater level

fluctuations should be considered when developing the design and construction plans for the project.

## GEOTECHNICAL OVERVIEW

In general, the subsurface conditions found by our investigation are judged typical of those expected within the general project vicinity, and the project site is considered suitable for support of the proposed building using conventional shallow spread foundations and slab-on-grade design. Based upon our evaluation of the subsurface conditions, we have developed the following guidelines to assist in planning for design and construction.

- New foundations may be supported on undisturbed native soils or on imported structural fill which is placed over the native soils after all existing utilities, fill, or otherwise unsuitable materials which may be found are removed. Existing fills should not be relied upon for new building foundation support.

- If existing fills throughout the site are similar in composition to those found in the test borings, consideration may be given to support the new pavements and floor slabs over the existing fills provided the subgrade surfaces are proof-rolled and stabilized as may be required. It should be understood the proof-rolling will lessen, but not eliminate, the possibility that settlement of pavements and slabs constructed over the existing fills may occur over time and require periodic maintenance.

- Based on the results of limited laboratory testing performed and our observation of the soil samples collected, it should be assumed that the native on-site soils are not suitable for reuse as Structural Fill due to their fines content. Additional laboratory testing of bulk samples should be performed prior to the start of construction to confirm the suitability of the on-site soils for use as Structural Fill.

- In general, groundwater is expected to be below foundation excavation depths and should not be a significant factor in planning for design and construction of the building. If perched water is encountered during construction, it is expected to be limited in volume and standard sump and pump methods should be sufficient for its removal. Dewatering is a means and methods consideration for the contractor.

- It is recommended that existing utilities be rerouted such that they are outside of the new building footprint. We understand that this is the current plan for the project.

We should be provided with the opportunity to review plans and specifications prior to their release for bidding to confirm that our recommendations were properly understood and implemented, and to allow us to refine our recommendations, if warranted, based upon the final design.

The **General Comments** section provides an understanding of the report limitations.

## SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC).

### Seismic Site Classification

Based on the soil properties encountered at the site and as described on the exploration logs, and the results of shear wave velocity testing completed in similar subsurface profiles in the general project area, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 52 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

## LIQUEFACTION

Based upon the composition, relative density and groundwater conditions encountered in the borings, it is our professional opinion that the site is not susceptible to liquefaction during the design seismic event.

## EARTHWORK

Earthwork is anticipated to include stripping of topsoil and or pavements, excavation and backfill for removal of existing utilities, associated site fill and backfill, and foundation excavations. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

If the owner elects to leave the existing fills in place beneath the building floor slabs and pavements, the compaction and stabilization of the subgrades recommended above will reduce but cannot eliminate the risk of settlement as described in the **Geotechnical Overview** section of this report. If this risk cannot be accepted, the existing fills should be removed in their entirety as part of the site preparation.

## Site Preparation

Site preparation should begin with stripping of existing pavements and topsoil from the building and pavement areas. Any existing utilities should be removed in their entirety from beneath the proposed building areas and rerouted outside of the new building footprint.

Prior to placing fills to raise site grades and/or after cuts are made to the plan subgrade elevations, the pavement and building subgrades should be proof-rolled using a steel drum roller with a static weight of at least ten tons. The roller should operate in its vibratory mode, unless requested otherwise by the Geotechnical Engineer observing the work, and travel at a speed not exceeding three feet per second (two miles per hour). The roller should complete at least five passes over all subgrade surfaces in opposing directions. The method of proof-rolling may be modified by the Geotechnical Engineer based upon the conditions revealed at the time of construction.

Soft areas identified by the proof rolling should be investigated to determine the cause and stabilized accordingly. These investigations may include the excavation of test pits. Where materials are found to be unsuitable by the Geotechnical Engineer, they should be removed and replaced as deemed necessary.

## Fill Material Types

Based upon the limited soil laboratory testing performed, the on-site soils do not appear to be suitable for reuse as Structural Fill due to their high fines content and should be reserved for use in landscaped areas or wasted off site. Rather, Structural Fill should consist of imported sand and gravel which meets the limits of gradation given below. The imported materials should be free of recycled concrete, asphalt, brick, glass, and pyritic shale rock.

**IMPORTED STRUCTURAL FILL**

| Sieve Size | Percent Finer |
|---|---|
| 3” | 100 |
| ¼” | 30 to 75 |
| No. 40 | 5 to 40 |
| No. 200 | 0 to 10 |

Additional bulk sampling and laboratory testing of on-site materials may be considered to further define their composition and allow for verification of potential reuse as Structural Fill. Any reused material should be free of organics, oversized particles, and unsuitable foreign matter.

## Fill Compaction Requirements

The Structural Fill should be placed in uniform loose layers no more than about one-foot thick where heavy vibratory compaction equipment is used. Smaller lifts should be used where hand

operated equipment is required for compaction. Each lift should be compacted to no less than 95 percent of the maximum dry density for the soil which is established by the Modified Proctor Compaction Test, ASTM D1557. In landscape areas, the compaction may be reduced to 90 percent of maximum dry density.

## Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks.

## Earthwork Construction Considerations

Shallow excavations for the construction of the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

## Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of surface materials and any unsuitable fills, proof-rolling, and mitigation of any areas identified as needing improvement through proof-rolling. Each lift of new compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts

Foundation bearing grades and subgrades for slabs should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

It should be understood that subsurface conditions will be more fully known when the site is excavated. The continuation of the Geotechnical Engineer into the construction phase of the project will allow for validation of the subsurface conditions assumed to exist for this study and in the development of the design recommendations in this report, along with assessing any variations, providing interim recommendations as necessary and reviewing associated design changes.

## SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork** and **Foundation Construction Considerations** sections of this report, the following design parameters and construction procedures are applicable for shallow foundations.

### Design Parameters – Compressive Loads

| Item | Description |
|---|---|
| **Maximum Net Allowable Bearing Pressure** [1, 2] | 4,000 pounds per square foot (psf) |
| **Required Bearing Stratum** [3] | Undisturbed native soils, or Structural Fill placed over the native soils after removal of any existing fill, utilities or otherwise unsuitable material that may be found |
| **Minimum Foundation Dimensions** | Columns: 24 inches<br>Continuous: 18 inches |
| **Ultimate Coefficient of Sliding Friction** [4] | .35 (concrete on native soils)<br>.45 (concrete on Structural Fill) |
| **Minimum Embedment below Finished Grade** [5] | Exterior footings in heated/unheated areas: 48 inches<br>Interior footings in unheated areas: 48 inches<br>Interior footings in heated areas: 24 inches |
| **Estimated Total Settlement from Structural Loads** [2] | Less than about (1) inch |
| **Estimated Differential Settlement** [2, 6] | About ¾ of total settlement |

| Item | Description |
|---|---|
| 1. | The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. Values assume that exterior grades are no steeper than 20% within 10 feet of structure. |
| 2. | Values provided are for maximum loads noted in **Project Description**. |
| 3. | The bearing grades should be prepared per the recommendations presented below in the **Foundation Construction Considerations**. |
| 4. | Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions. |
| 5. | Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure. Interior footings in heated area may be seated at the 24-inch depth if allowed by local building codes. In the case of haunched floor slab support for interior partition walls, the minimum depth requirement may be waived (again, if permitted by local building codes). |
| 6. | Differential settlements are as measured over a span of 50 feet. |

A standard perimeter foundation drain should be provided to collect and relieve water which enters the backfill soils after construction is complete. The drain should consist of nominal four-inch diameter perforated PVC or corrugated HDPE pipe set within ± 12 inches of clean crushed stone composed of ASTM C33 Blend 57 material. The stone should be enveloped with a non-woven synthetic filter fabric meeting the requirements of NYSDOT standard specifications table 737-01C for drainage geotextile to inhibit siltation. All drains should be provided with clean outs for their maintenance.

## Foundation Construction Considerations

The foundations may be seated directly upon undisturbed native soils, or on Structural Fill which is placed over the native soils after removal of existing utilities, fill or otherwise unsuitable materials that may be found. If over-excavation is required beneath the foundations to remove unsuitable material, the excavation should extend horizontally beyond each side of the foundation a distance equal to at least one-half depth of the undercut below the final bearing grade elevation. Replacement material should meet the specification and compaction guidelines for Structural Fill as outlined herein.

Foundation bearing grades should be proof-compacted using a mechanical or large reversible plate tamper to densify the soils loosened by the excavation process unless otherwise directed by the Geotechnical Engineer observing the grades. If groundwater seepage occurs or water collects within excavations from precipitation or runoff, proof compacting should be eliminated, and a minimum six-inch thick base of clean crushed stone should be provided to establish a more uniform and stable base for construction and to assist in dewatering. The stone should be an ASTM C33 Blend 57 aggregate which is enveloped in a non-woven synthetic filter fabric meeting the requirements of NYSDOT standard specifications table 737-01C for drainage geotextile.

All final bearing grades should be relatively firm, stable, and free of loose soil, mud, water and frost. The Geotechnical Engineer should approve the condition of the foundation bearing grades immediately prior to placement of reinforcing steel and concrete.

## FLOOR SLABS

Design parameters for floor slabs assume the requirements in the **Earthwork** and **Floor Slab Construction Considerations** sections of this report have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

### Floor Slab Design Parameters

The floor slabs should be constructed upon a minimum six-inch thick subbase course which conforms to the requirements for NYSDOT Type 2 Subbase or ASTM C33 Blend 57 aggregate. Consideration should be given to using a thicker subbase course in areas subject to heavier loads and/or use, or those exposed to freezing temperatures.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding its use and placement.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual.

Floor slab subgrades should be prepared as outlined in the Earthwork section herein. Under these conditions, a modulus of subgrade reaction equal to 150 pounds per cubic inch (psi/in) may be assumed at the top of the stone base layer for slab design purposes.

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted but could be larger than normal and result in some cracking. Mitigation measures, as noted in the **Earthwork** section of this report, are critical to the performance of floor slabs. If the risk of potential slab settlement is unacceptable to the owner, all fills must be removed from beneath the slab and replaced with Structural Fill.

### Floor Slab Construction Considerations

Even with the base course recommended above, we caution that the subgrades may not support repeated heavy construction traffic or telehandlers without suffering rutting and weaving that may be especially severe during wet seasons. If the grades are to be repeatedly traversed by these types of equipment, they should be reinforced as necessary to support them. Areas which become

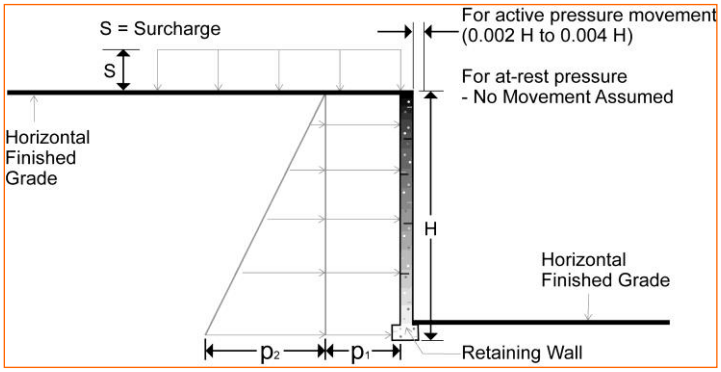
disturbed should be excavated and stabilized accordingly. Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and Structural Fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

## LATERAL EARTH PRESSURES

### Design Parameters

Building or site walls that retain earth should be designed to resist lateral pressures, with applicable surcharge loads, assuming the parameters listed below. Active earth pressures may be assumed for walls that are free to deflect as the backfill is placed. At-rest earth pressures should be assumed for all walls that are braced prior to backfilling or applying surcharge loads. The figure below can be referenced to determine the applicability of Active vs. At-Rest earth pressures.




The recommended design parameters, as applicable, are tabulated below;

| Design Parameter | Value |
|---|---|
| Soil Angle of Internal Friction | 30 degrees |
| Coefficient of At-Rest Earth Pressure (Ko) | 0.50 |
| Coefficient of Active Earth Pressure (Ka) | 0.33 |
| Coefficient of Passive Earth Pressure (Kp) | 3.00 |

| Design Parameter | Value |
|---|---|
| Total Unit Weight of Compacted Soil | 120 pcf |
| Coefficient of Sliding Friction | 0.35 (concrete on native soils)<br>0.45 (concrete on Structural Fill) |

1. For the tabulated values to be valid, the wall must be backfilled with imported Structural Fill as specified in the **Earthwork** section of this report (onsite soils should not be reused for this purpose). The structural backfill must extend out and up from the base of the wall at an angle of at least 45 degrees from vertical for the active and at-rest cases.
2. The tabulated values do not include a safety factor.

The recommended design parameters assume that backfill consists of imported Structural Fill as described in the **Earthwork** section herein, idealized non-sloping conditions on each side of the wall, and that the backfill remains permanently well-drained. Water must not be allowed to collect against the wall unless the wall is designed to accommodate the added hydrostatic pressure. Drainage system recommendations are provided below.

There are several options that may be considered if it is necessary to reduce the lateral loads acting against the building foundation walls. One method would be the use of mechanically (geogrid) stabilized earth with stone filled basket faces constructed several inches off the interior face of the foundation wall. We have used this method on several projects and can provide or assist in the design of this alternative if desired. Other methods to reduce or eliminate the lateral loading against the foundation walls involve the use of engineered materials, crushed aggregate, expanded lightweight shale and expanded polystyrene (geofoam) within the foundation wall's backfill zone.

Whichever material is selected, the engineered backfill material should entirely occupy the backfill zone wedge formed by a line extending up and away from a point two (2) feet beyond the interior edge of the wall at an angle of 45° off the vertical and the foundation wall itself. Where the wall extends beneath the exterior final grade and is backfilled on both its interior and exterior faces to that exterior grade with ordinary Structural Fill, the engineered fill materials to be placed within the backfill zone should be measured from a point two (2) feet beyond the interior edge of the wall at this grade and then up an angle of 45° off the vertical. The engineered material wall backfill evaluation may be performed using the following parameters which are unfactored, i.e. they do not contain a factor of safety and assume the backfills remain drained at all times.

| Engineered Material | Total Unit Weight (pcf) | Coefficient of at Rest Earth Pressure (Ko) |
|---|---|---|
| 50/50 Blend of NYSDOT #1&2 Crushed Aggregate | 95 | 0.18 |
| Nominal ¾" Norlite Expanded Shale Aggregate | 65 | 0.33 |
| Geofoam ASTM 578 Type II | 2 | N/A |

### Subsurface Drainage for Earth-Retaining Walls

Foundation drains should be installed as required to prevent surface infiltration and groundwater from becoming trapped in the wall backfill soils. It should extend around the entire building perimeter, not just along basement walls. The drain may consist of a nominal four (4) inch diameter perforated PVC or slotted HDPE pipe embedded at the base of a minimum twelve (12) inch wide column of clean crushed stone (ASTM C-33 Blend 57 crushed aggregate). The stone should be wrapped in a non-woven drainage geotextile meeting the requirements of NYSDOT Table 737-01C or approved equivalent. The drain should connect to a drainage structure or outlet to daylight.

## PAVEMENTS

### Flexible Pavement Design

The soils encountered in the test borings are considered generally suitable for the support of asphalt pavement, subject to the limitations outlined herein. A critical aspect of pavement performance is site preparation. The pavement sections recommended below assume the site has been prepared as described in the **Earthwork** section of this report.

The flexible pavements sections have been designed in general accord with AASHTO procedures using a reduced subgrade strength and local experience to account for frost and keep the anticipated pavement heave and cracking within generally tolerable limits. With the subgrades prepared as recommended below, a subgrade resilient modulus ($M_r$) equal to 4,000 psi has been assumed for design purposes.

Two flexible pavement sections may be considered for this site, a Light Duty Section for areas subject to automobile parking, and a Heavy-Duty Section for the entrance road and other areas which may be subject to truck traffic. For design purposes, it has been assumed that the pavement design life is 20-years, and that daily equivalent single axle loads (ESAL) are equal to 1 for Light Duty and 25 for Heavy Duty Sections. If the traffic loads vary from these, we should be provided with the opportunity to refine the pavement sections accordingly.

All materials should meet the requirements specified in the latest edition of the New York State Department of Transportation (NYSDOT) Standard Specifications for Construction Materials.

| Flexible Pavement Design | | | |
|---|---|---|---|
| **Layer** | **2019 NYSDOT Reference** | **Light Duty (inches)** | **Heavy Duty (inches)** |
| Asphaltic Concrete Top | Item 402.127303 | 1.5 | 2.0 |

| Flexible Pavement Design | | | |
|---|---|---|---|
| **Layer** | **2019 NYSDOT Reference** | **Light Duty (inches)** | **Heavy Duty (inches)** |
| Asphaltic Concrete Binder | Item 402.257903 | 2.0 | 3.0 |
| Crusher-Run Stone Base | Section 733.04, Type 2 | 8 | 12 |
| Stabilization Geotextile | Section 737-01, Table E | Single Ply | Single Ply |

## Rigid Pavement Design

Rigid pavements should be provided with a minimum six-inch thick base of crusher-run stone (NYSDOT section 733-04, Type 2 material) placed over a stabilization geotextile. The pavements may be designed assuming a modulus of subgrade reaction equal to 150 pounds per cubic inch at the top of the base layer.

## Pavement Drainage

Accumulation of water on pavement subgrades should be avoided by grading the subgrade to a slope of at least two percent, and/or by providing underdrains. Failure to provide adequate drainage will shorten pavement life.

## Pavement Maintenance

All pavements require periodic care, and preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Settlement of pavements due to consolidation of the existing fills may also occur and require periodic maintenance.

## Frost Considerations

Frost may penetrate beneath sidewalks and pavements and cause them to heave, and resulting displacements may be differential, particularly where sidewalks and pavements meet building doorways and along curbs. If the potential heaving of these features is to be minimized, a 16-inch thick base of ASTM C33 Blend 57 crushed stone should be placed beneath the sidewalks or pavements, along with an underdrain to relieve any collected waters, to limit the potential heave to generally tolerable magnitudes for most winters.

## GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations 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. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services 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.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

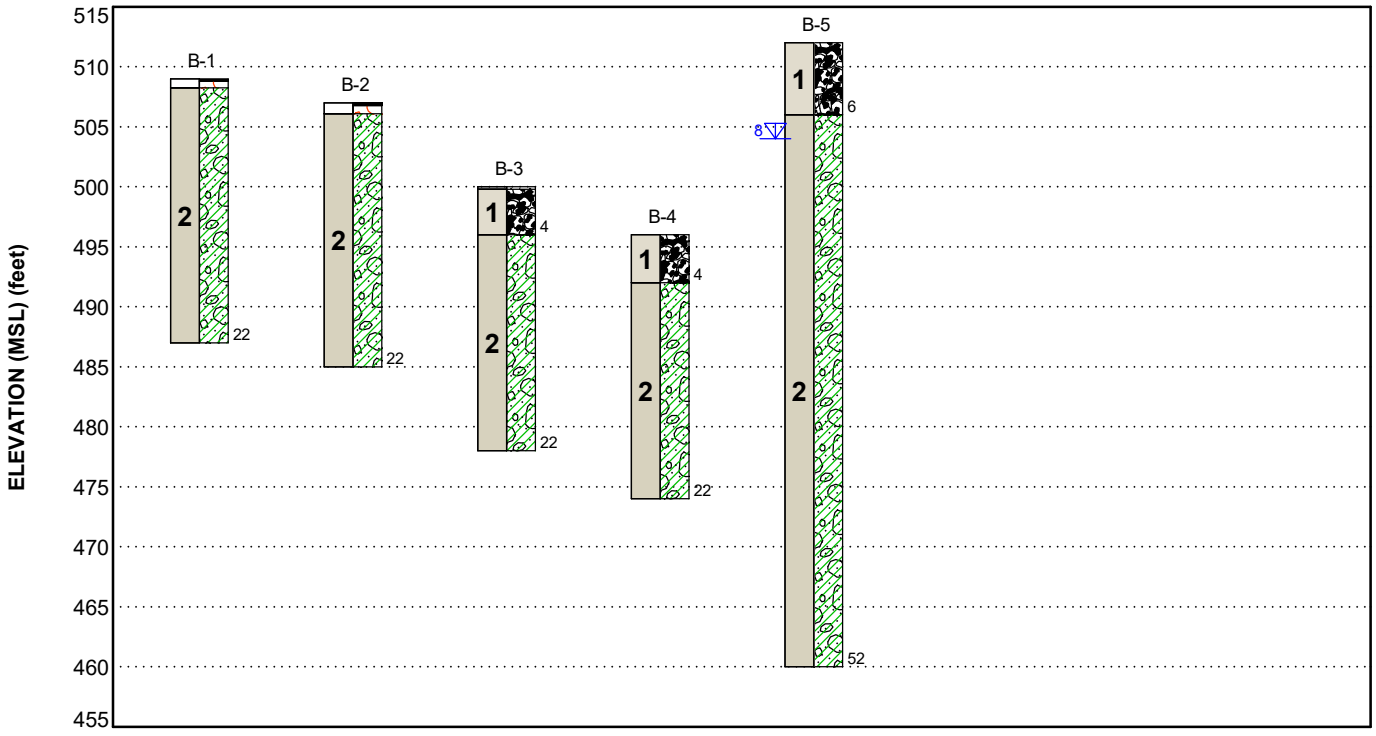
Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

# FIGURES

**Contents:**

## GEOMODEL

**Orange County Medical Examiners Office ■ Goshen, New York**
**Terracon Project No. JB215178**




This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name | General Description |
|---|---|---|
| 1 | Fill | Silty Sand with varying amounts of gravel |
| 2 | Glacial Till | Silty Sand with varying amounts of gravel, occasional cobbles and boulders |

## LEGEND

- Asphalt
- Aggregate Base Course
- Glacial Till
- Topsoil
- Fill

▽ Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

# ATTACHMENTS

# EXPLORATION AND TESTING PROCEDURES

## Field Exploration

| Number of Borings | Boring Depth (feet)[1] | Location |
|---|---|---|
| 5 | 22 to 52 | Planned building area |

1. Below ground surface.

**Boring Layout and Elevations:** The test locations were established in the field by Terracon using a hand-held GPS unit, taped measurements and/or visual reference from existing site features. Approximate ground surface elevations were obtained by interpolation from "OCME Boring Stakeout" pdf. If actual elevations in the field and more precise boring locations are desired, we recommend borings be surveyed following completion of fieldwork.

**Subsurface Exploration Procedures:** We advanced the borings with an ATV-mounted rotary drill rig using continuous flight augers. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the middle 12 inches of a normal 24-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. When an 18-inch sample is taken, the N-value is recorded as the number of blows required to advance the sampling spoon the final 12 inches. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling as well as over the weekend where noted. For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs.

The samples were placed in appropriate containers and taken to our laboratory for visual classification by a Geologist or Geotechnical Engineer. The soils were described based on the material's color, texture, plasticity and moisture condition. Soil classifications are in general accordance with the Unified Soil Classification System (USCS) as summarized herein. Final boring logs were prepared, and they represent the Geotechnical Engineer's interpretation based on the field logs and visual classifications, along with any laboratory testing performed.

## Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (6 samples tested)
- ASTM D6913 Standard Test Method for Particle-Size Analysis of Soils (6 samples tested)

# SITE LOCATION AND EXPLORATION PLANS

**Contents:**



Note: All attachments are one page unless noted above.

## SITE LOCATION

Orange County Medical Examiners Office ■ Goshen, New York
December 8, 2021 ■ Terracon Project No. JB215178


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

## EXPLORATION PLAN

Orange County Medical Examiners Office ■ Goshen, New York
December 8, 2021 ■ Terracon Project No. JB215178

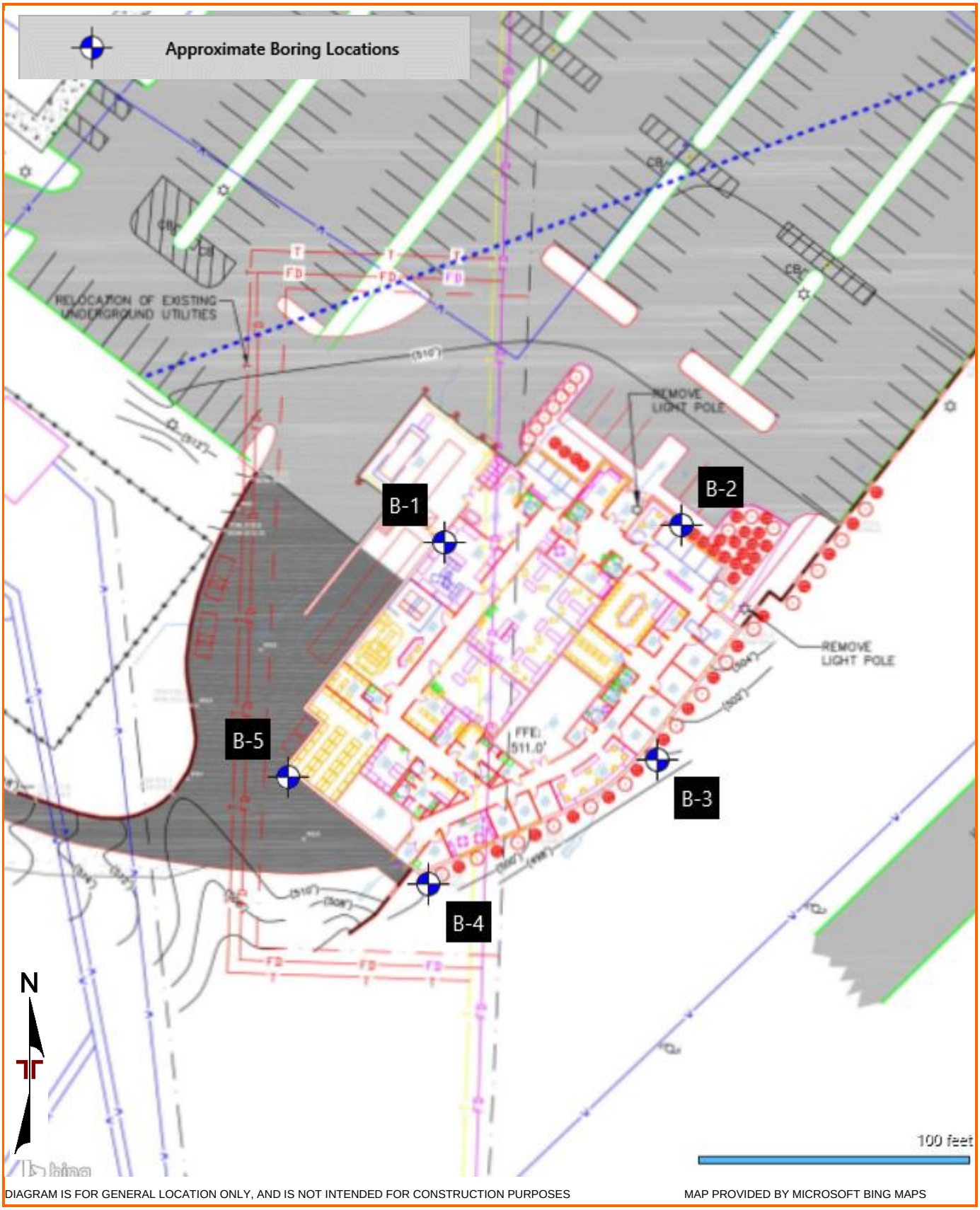



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

# EXPLORATION RESULTS

**Contents:**



Note: All attachments are one page unless noted above.

# BORING LOG NO. B-1



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4076° Longitude: -74.3545°

Approximate Surface Elev.: 509 (Ft.) +/-

| DEPTH | ELEVATION (Ft.) | MODEL LAYER | GRAPHIC LOG | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 509+/- | | | | | | | | |
| **ASPHALT** | | | | | | | | | |
| 0.8 | 508.5+/- | | | | | | | | |
| **AGGREGATE BASE COURSE** | | | | | | | | | |
| **GLACIAL TILL: SILTY SAND (SM)**, occasional cobbles and boulders, brown, dense to very dense | | | | | | X | 22 | 9-12-18-24<br>N=30 | 8.7 |
| **Grades with gravel** | | | | | | X | 4 | 28-50/4" | |
| | | | | 5 | | X | 24 | 16-24-23-25<br>N=47 | |
| **Grades grayish brown** | | | | | | X | 22 | 21-23-28-34<br>N=51 | |
| **Same, trace clay** | | 2 | | 10 | | X | 24 | 7-12-13-24<br>N=25 | |
| | | | | 15 | | X | 1 | 16-19-24-26<br>N=43 | |
| **Grades gray** | | | | 20 | | X | 2 | 30-28-30-34<br>N=58 | |
| 22.0 | 487+/- | | | | | | | | |
| ***Boring Terminated at 22 Feet*** | | | | | | | | | |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Borings backfilled with soil cuttings upon completion.
Sealed with bituminous cold patch at surface.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

*No free standing water observed*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-25-2021 | Boring Completed: 10-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# BORING LOG NO. B-2



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4076° Longitude: -74.3542°

Approximate Surface Elev.: 507 (Ft.) +/-

| MODEL LAYER | GRAPHIC LOG | DEPTH | ELEVATION (Ft.) | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | 0.3 **ASPHALT** | 507+/- | | | | | | |
| | | 0.9 **AGGREGATE BASE COURSE** | 506+/- | | | | | | |
| 2 | | **GLACIAL TILL: SILTY SAND WITH GRAVEL (SM)**, occasional cobbles and boulders, brown, medium dense to very dense | | | | | 22 | 3-12-15-10 N=27 | |
| | | | | | | | 20 | 12-16-19-34 N=35 | 8.5 |
| | | | | 5 | | | 24 | 16-21-29-35 N=50 | |
| | | | | | | | 4 | 50/5" | |
| | | **Grades grayish brown** | | 10 | | | 18 | 15-19-28-33 N=47 | |
| | | **Grades gray** | | 15 | | | 24 | 15-19-15-16 N=34 | |
| | | | | 20 | | | 24 | 22-20-26-26 N=46 | |
| | | 22.0 | 485+/- | | | | | | |
| | | ***Boring Terminated at 22 Feet*** | | | | | | | |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Borings backfilled with soil cuttings upon completion.
Sealed with bituminous cold patch at surface.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

*No free standing water observed*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-25-2021 | Boring Completed: 10-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# BORING LOG NO. B-3



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4074° Longitude: -74.3542°

Approximate Surface Elev.: 500 (Ft.) +/-

| MODEL LAYER | GRAPHIC LOG | DEPTH | ELEVATION (Ft.) | | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.2 | 500+/- | **TOPSOIL** | | | | | | |
| 1 | | | | **FILL - SILTY SAND WITH GRAVEL (SM)**, rootlets noted, fine grained, brown, loose to medium dense | | | | 19 | 3-4-3-3<br>N=7 | |
| | | | | | | | | 19 | 4-10-12-18<br>N=22 | 11.3 |
| | | 4.0 | 496+/- | | | | | | | |
| 2 | | | | **GLACIAL TILL: SILTY SAND WITH GRAVEL (SM)**, occasional cobbles and boulders, brown, medium dense to dense | 5 | | | 24 | 7-10-13-16<br>N=23 | |
| | | | | | | | | 24 | 14-16-14-14<br>N=30 | |
| | | | | | 10 | | | | | |
| | | | | | | | | 24 | 12-15-18-22<br>N=33 | |
| | | | | **cobbles and boulders noted** | 15 | | | 1 | 18-13-15-15<br>N=28 | |
| | | | | **Grades gray** | 20 | | | 7 | 15-18-20-24<br>N=38 | |
| | | 22.0 | 478+/- | | | | | | | |
| | | | | ***Boring Terminated at 22 Feet*** | | | | | | |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

*No free standing water observed*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-25-2021 | Boring Completed: 10-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# BORING LOG NO. B-4



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4073° Longitude: -74.3545°

Approximate Surface Elev.: 496 (Ft.) +/-

| MODEL LAYER | GRAPHIC LOG | DEPTH | ELEVATION (Ft.) | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | **FILL - SILTY SAND WITH GRAVEL (SM)**, rootlets noted, fine grained, brown, loose | | | | | 18 | 5-4-1-1<br>N=5 | |
| | | | | | | | 20 | 1-2-2-5<br>N=4 | 17.4 |
| | | 4.0 | 492+/- | | | | | | |
| 2 | | **GLACIAL TILL: SILTY SAND WITH GRAVEL (SM)**, occasional cobbles and boulders, brown, medium dense to dense | | 5 | | | 24 | 7-11-14-14<br>N=25 | |
| | | | | | | | 24 | 14-18-19-21<br>N=37 | |
| | | | | 10 | | | 24 | 11-14-15-15<br>N=29 | |
| | | | | 15 | | | 19 | 9-13-15-19<br>N=28 | |
| | | **Grades gray** | | 20 | | | 22 | 22-18-19-17<br>N=37 | |
| | | 22.0 | 474+/- | | | | | | |
| | | ***Boring Terminated at 22 Feet*** | | | | | | | |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

*No free standing water observed*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-25-2021 | Boring Completed: 10-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# BORING LOG NO. B-5



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4074° Longitude: -74.3547°

Approximate Surface Elev.: 512 (Ft.) +/-

| MODEL LAYER | GRAPHIC LOG | DEPTH | ELEVATION (Ft.) | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | 0.0 | 512+/- | 0 | | | | | |
| | | | | | | | 12 | 3-3-4-4<br>N=7 | 18.4 |
| | | | | | | | 20 | 3-3-5-8<br>N=8 | 13.7 |
| | | | | 5 | | | 22 | 7-10-18-18<br>N=28 | |
| | | 6.0 | 506+/- | | | | 1 | 16-22-22-22<br>N=44 | |
| 2 | | | | 10 | | | 24 | 5-10-10-13<br>N=20 | |
| | | | | 15 | | | 24 | 8-14-17-21<br>N=31 | |
| | | | | 20 | | | 24 | 14-16-19-20<br>N=35 | |
| | | | | 25 | | | 24 | 14-18-20-26<br>N=38 | |
| | | | | 30 | | | | | |

**FILL - SILTY SAND (SM)**, rootlets noted, brown, loose to medium dense

**Grades trace gravel**

**GLACIAL TILL: SILTY SAND (SM)**, occasional cobbles and boulders, brown to gray, medium dense to very dense

**Grades trace clay**

**Grades gray**

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

▽ *8.0' measured after weekend*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-22-2021 | Boring Completed: 10-22-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# BORING LOG NO. B-5



**PROJECT:** Orange County Medical Examiners Office

**CLIENT:** Hyman Hayes Associates LLC
Latham, New York

**SITE:** 22 Wells Farm Road
Goshen, New York

LOCATION See Exploration Plan

Latitude: 41.4074° Longitude: -74.3547°

Approximate Surface Elev.: 512 (Ft.) +/-

| MODEL LAYER | GRAPHIC LOG | DEPTH | ELEVATION (Ft.) | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | WATER CONTENT (%) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | | **GLACIAL TILL: SILTY SAND (SM)**, occasional cobbles and boulders, brown to gray, medium dense to very dense *(continued)* | | | | | 24 | 21-35-28-23<br>N=63 | |
| | | | | 35 | | | 22 | 14-15-18-19<br>N=33 | |
| | | | | 40 | | | 24 | 10-11-15-20<br>N=26 | |
| | | | | 45 | | | 20 | 19-25-33-37<br>N=58 | |
| | | | | 50 | | | 22 | 20-27-31-42<br>N=58 | |
| | | 52.0 | 460+/- | | | | | | |
| | | ***Boring Terminated at 52 Feet*** | | | | | | | |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
2 1/4" ID HSA

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan.

Notes:
Logged by AEB

**WATER LEVEL OBSERVATIONS**

▽ *8.0' measured after weekend*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 10-22-2021 | Boring Completed: 10-22-2021

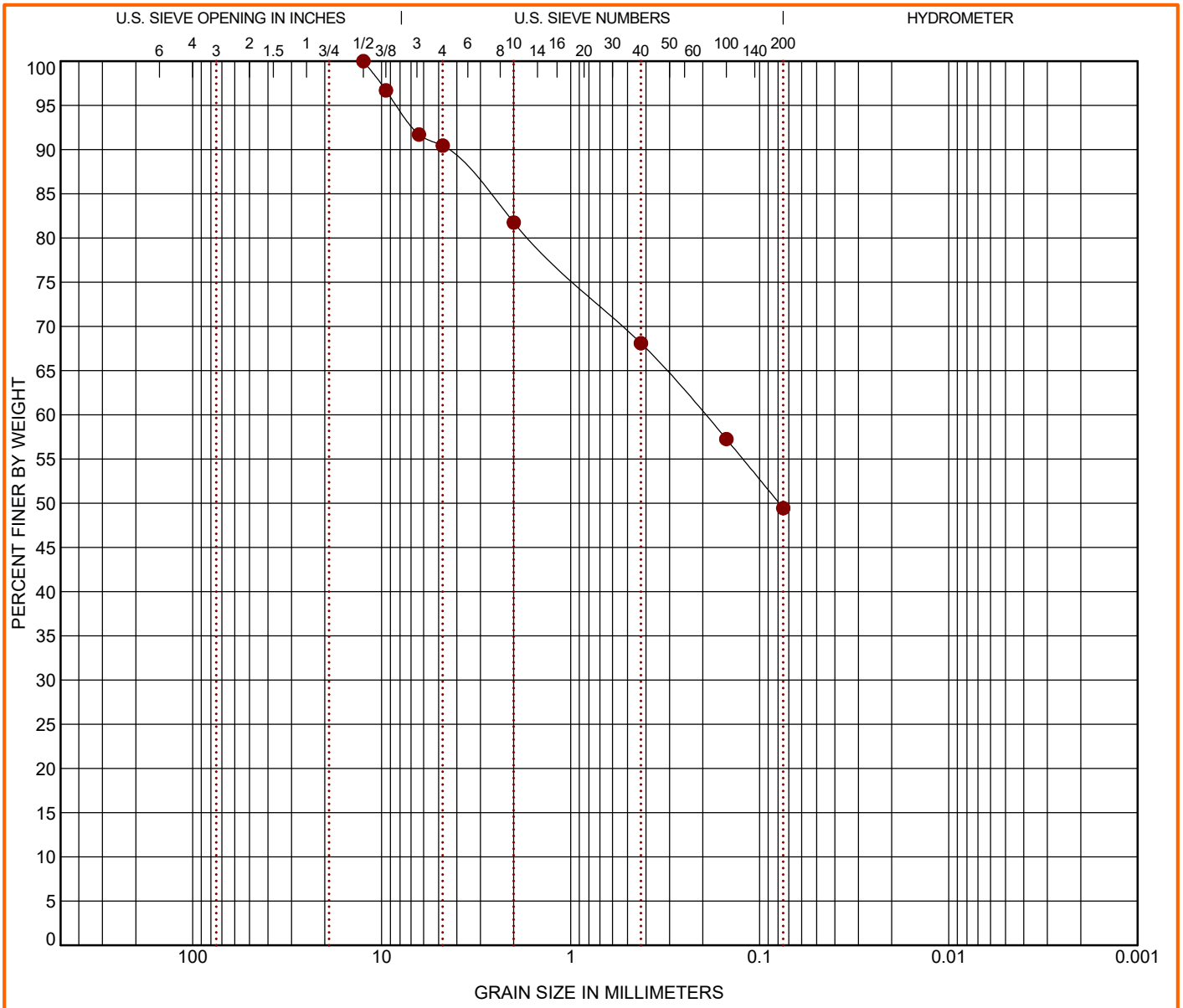
Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215178

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/29/21

# GRAIN SIZE DISTRIBUTION

**ASTM D422 / ASTM C136**




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-1 | 1 - 3 | SILTY SAND (SM) | 8.7 | NP | NP | NP | | |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-1 | 1 - 3 | 12.5 | 0.195 | | | 0.0 | 9.5 | 41.0 | | 49.4 | |

PROJECT: Orange County Medical Examiners Office

SITE: 22 Wells Farm Road
Goshen, New York

Terracon
30 Corporate Cir Ste 201
Albany, NY

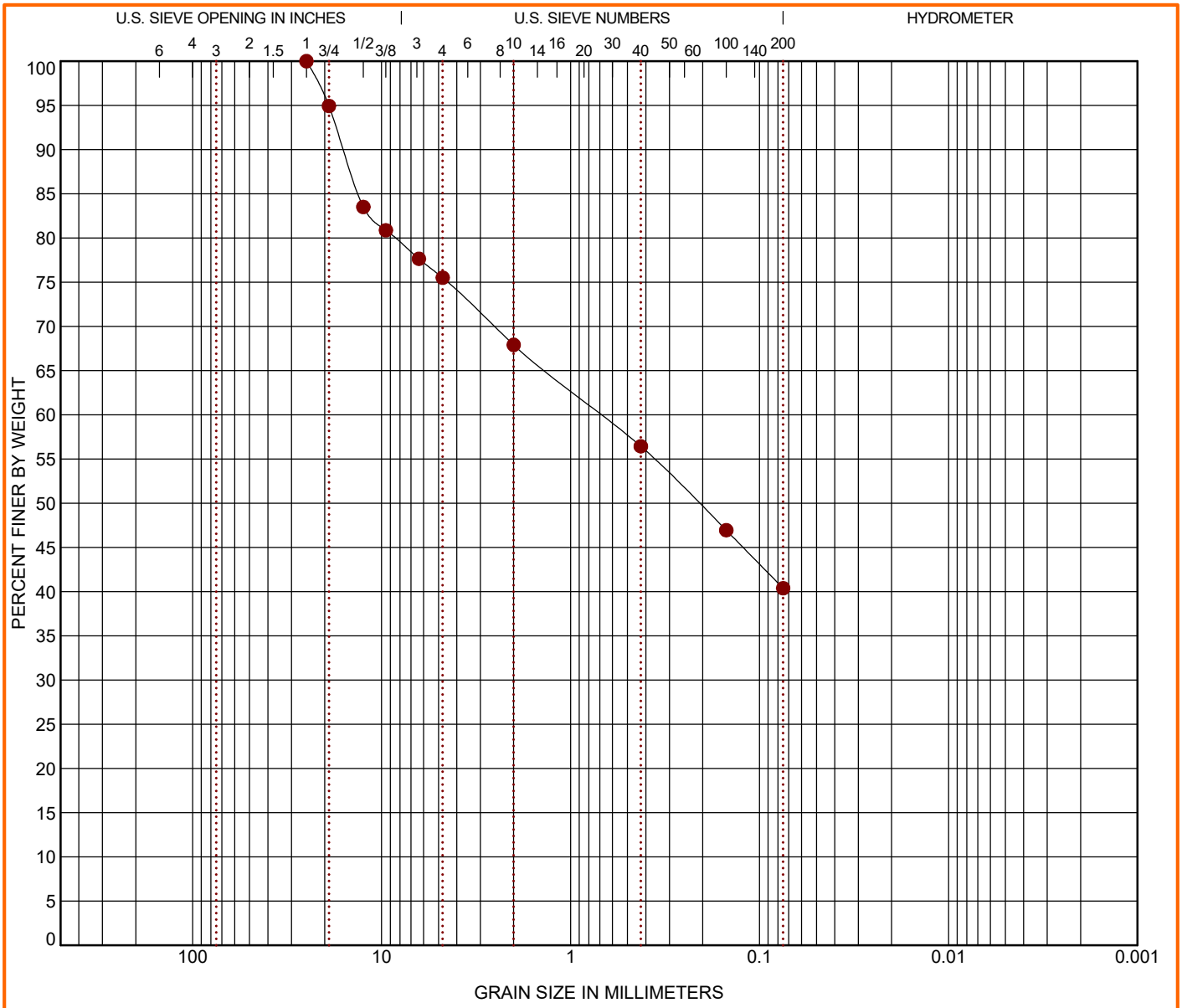
PROJECT NUMBER: JB215178

CLIENT: Hyman Hayes Associates LLC
Latham, New York

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/16/21

# GRAIN SIZE DISTRIBUTION

**ASTM D422 / ASTM C136**




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-2 | 3 - 5 | SILTY SAND with GRAVEL (SM) | 8.5 | NP | NP | NP | | |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-2 | 3 - 5 | 25 | 0.688 | | | 0.0 | 24.5 | 35.1 | | 40.4 | |

PROJECT: Orange County Medical Examiners Office

SITE: 22 Wells Farm Road
Goshen, New York

Terracon
30 Corporate Cir Ste 201
Albany, NY

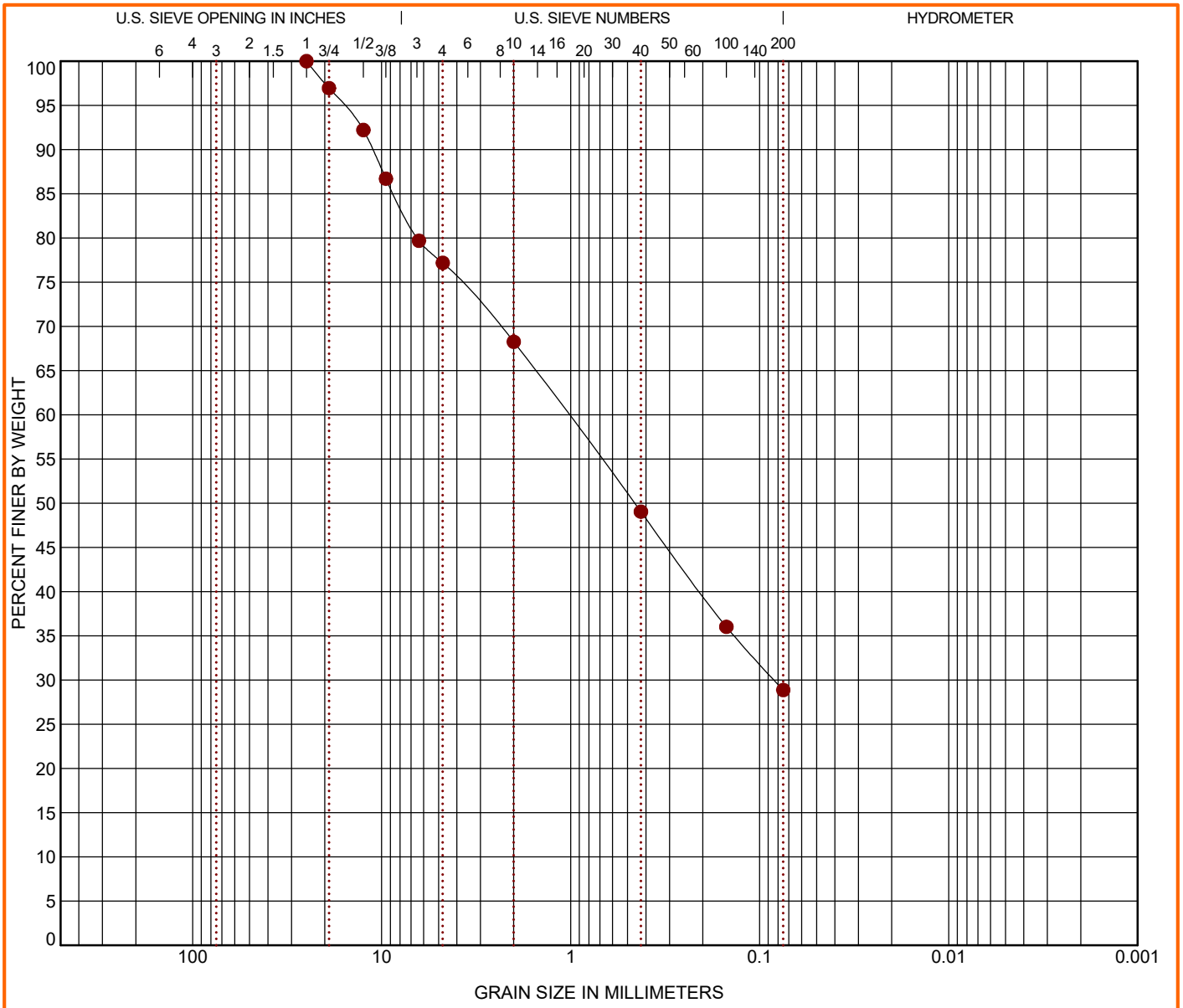
PROJECT NUMBER: JB215178

CLIENT: Hyman Hayes Associates LLC
Latham, New York

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215178 ORANGE COUNTY MED.GPJ TERRACON_DATATEMPLATE.GDT 11/16/21

# GRAIN SIZE DISTRIBUTION

**ASTM D422 / ASTM C136**




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-3 | 2 - 4 | SILTY SAND with GRAVEL (SM) | 11.3 | NP | NP | NP | | |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-3 | 2 - 4 | 25 | 1.028 | 0.084 | | 0.0 | 22.8 | 48.3 | | 28.9 | |

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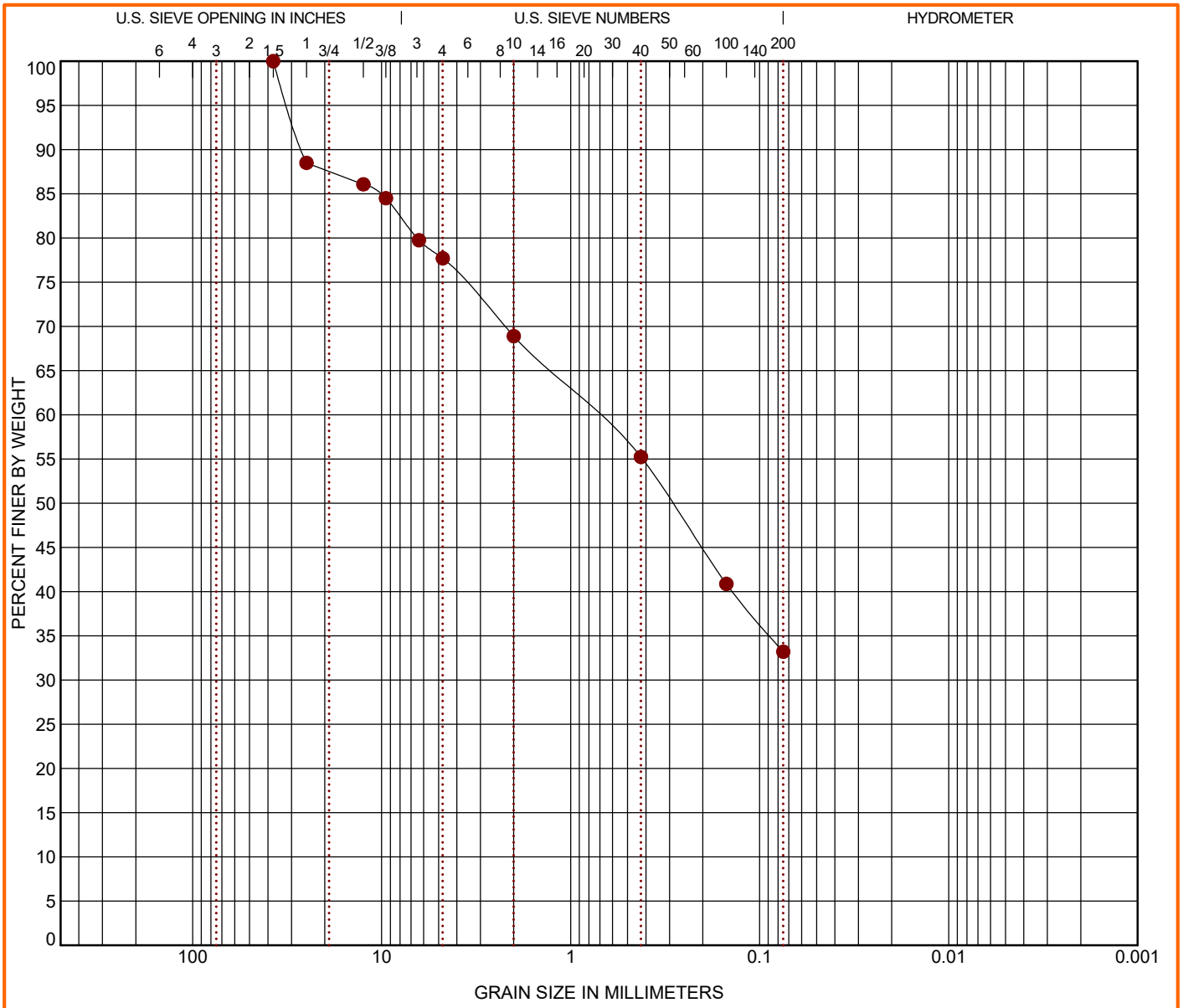


| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-4 | 2 - 4 | SILTY SAND with GRAVEL (SM) | 17.4 | NP | NP | NP | | |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-4 | 2 - 4 | 37.5 | 0.729 | | | 0.0 | 22.3 | 44.5 | | 33.2 | |

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Latham, New York

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# GRAIN SIZE DISTRIBUTION

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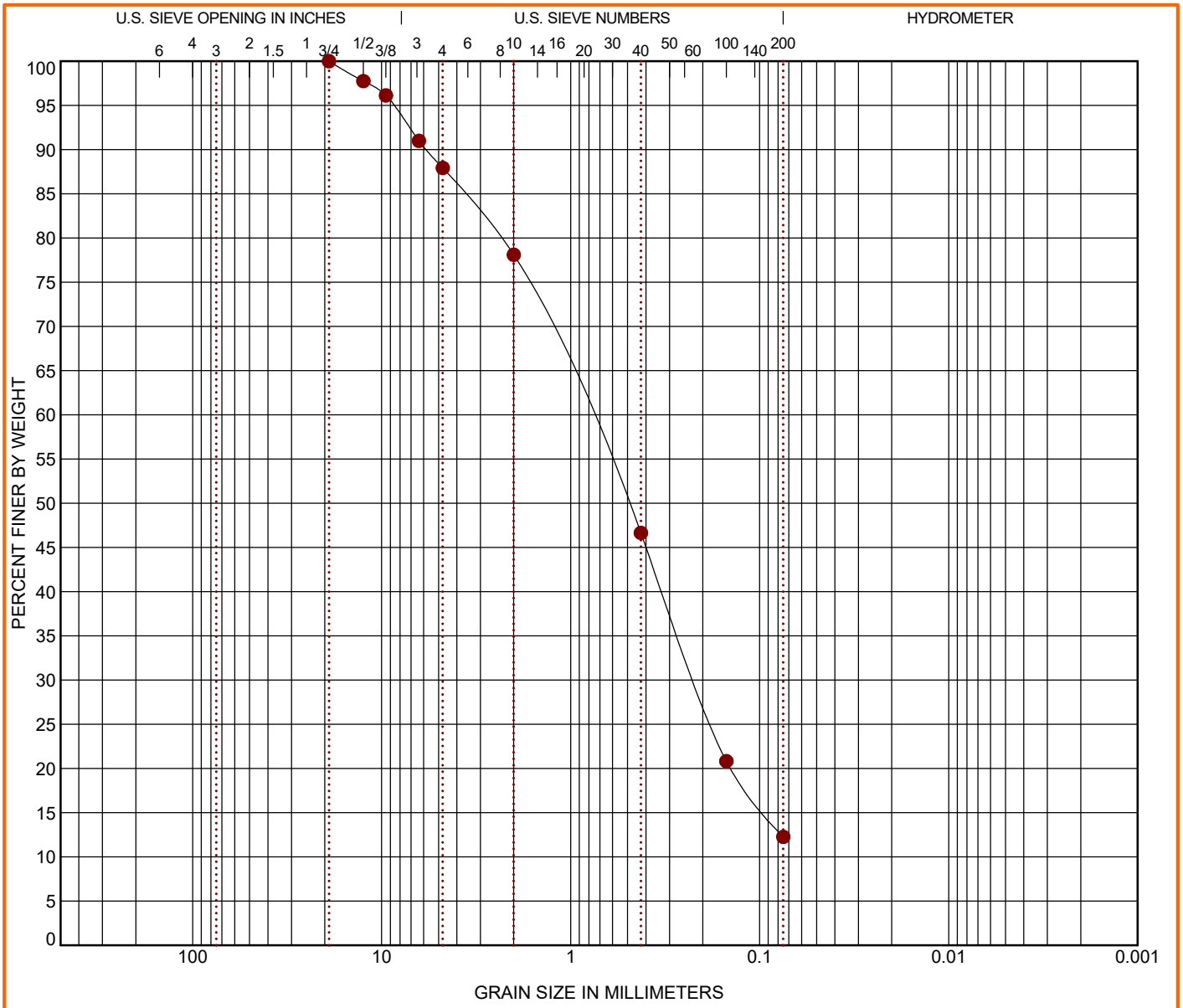


| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-5 | 0 - 2 | SILTY SAND (SM) | 18.4 | NP | NP | NP | 0.92 | 13.13 |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-5 | 0 - 2 | 19 | 0.82 | 0.217 | | 0.0 | 12.1 | 75.7 | | 12.3 | |

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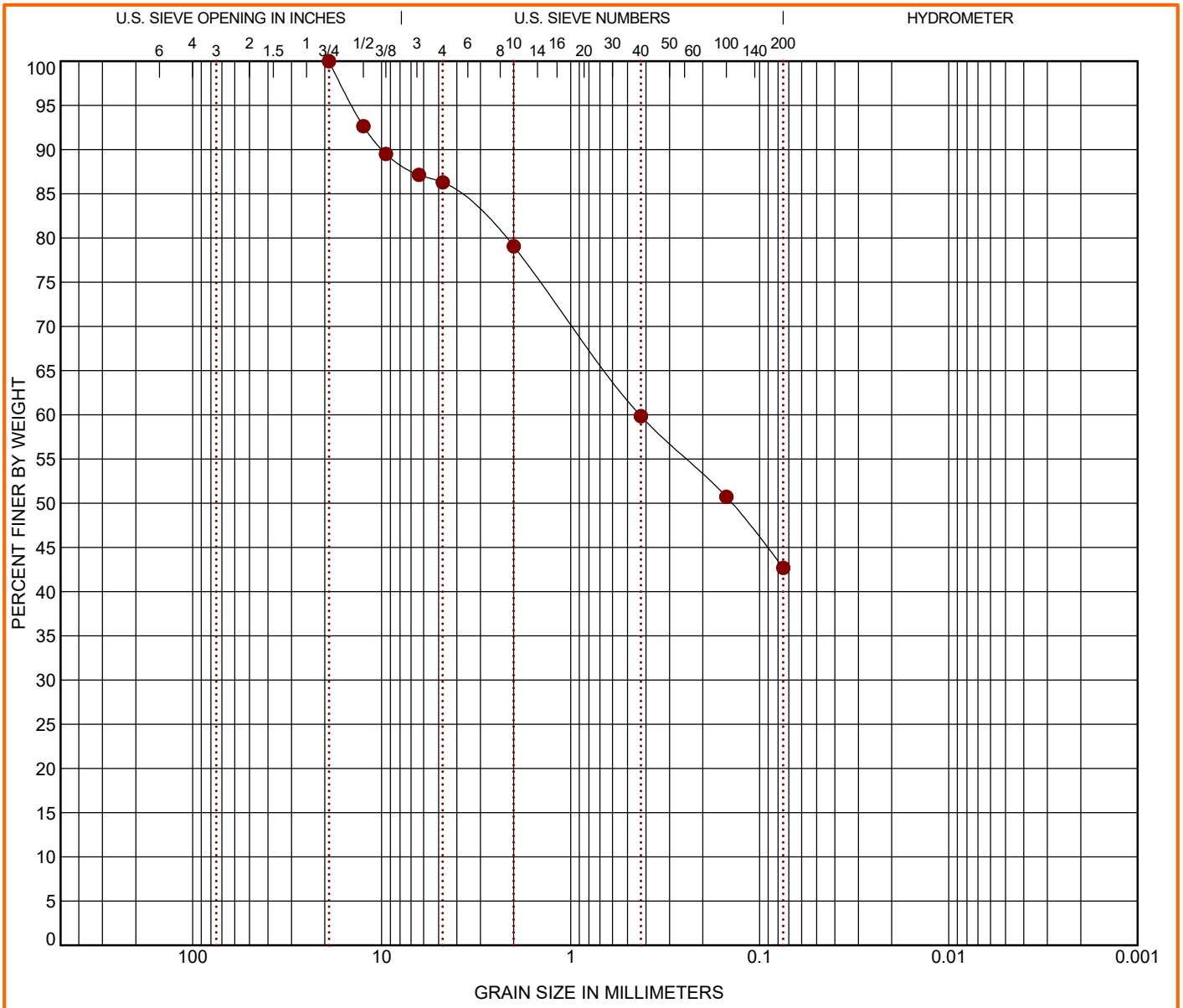
# GRAIN SIZE DISTRIBUTION

**ASTM D422 / ASTM C136**




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Boring ID | Depth | USCS Classification | WC (%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| B-5 | 2 - 4 | SILTY SAND (SM) | 13.7 | NP | NP | NP | | |

| Boring ID | Depth | $D_{100}$ | $D_{60}$ | $D_{30}$ | $D_{10}$ | %Cobbles | %Gravel | %Sand | %Silt | %Fines | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B-5 | 2 - 4 | 19 | 0.43 | | | 0.0 | 13.7 | 43.6 | | 42.7 | |

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# SUPPORTING INFORMATION

**Contents:**



Note: All attachments are one page unless noted above.

# GENERAL NOTES

**DESCRIPTION OF SYMBOLS AND ABBREVIATIONS**

**Orange County Medical Examiners Office ■ Goshen, New York**

**Terracon Project No. JB215178**

| SAMPLING | WATER LEVEL | FIELD TESTS |
|---|---|---|
| Split Spoon | **Water Initially Encountered**<br>**Water Level After a Specified Period of Time**<br>**Water Level After a Specified Period of Time**<br>**Cave In Encountered**<br><br>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. | **N** Standard Penetration Test Resistance (Blows/Ft.)<br>**(HP)** Hand Penetrometer<br>**(T)** Torvane<br>**(DCP)** Dynamic Cone Penetrometer<br>**UC** Unconfined Compressive Strength<br>**(PID)** Photo-Ionization Detector<br>**(OVA)** Organic Vapor Analyzer |

## DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

## LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. 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 | | 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.** | **Descriptive Term (Consistency)** | **Unconfined Compressive Strength Qu, (tsf)** | **Standard Penetration or N-Value Blows/Ft.** |
| Very Loose | 0 - 3 | Very Soft | less than 0.25 | 0 - 1 |
| Loose | 4 - 9 | Soft | 0.25 to 0.50 | 2 - 4 |
| Medium Dense | 10 - 29 | Medium Stiff | 0.50 to 1.00 | 4 - 8 |
| Dense | 30 - 50 | Stiff | 1.00 to 2.00 | 8 - 15 |
| Very Dense | > 50 | Very Stiff | 2.00 to 4.00 | 15 - 30 |
| | | Hard | > 4.00 | > 30 |

## RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

# UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

| 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 ≥ 4 and 1 ≤ Cc ≤ 3 [E] | | GW | Well-graded gravel [F] |
| | | | Cu < 4 and/or [Cc<1 or Cc>3.0] [E] | | GP | Poorly graded gravel [F] |
| | | **Gravels with Fines:** More than 12% fines [C] | Fines classify as ML or MH | | GM | Silty gravel [F, G, H] |
| | | | Fines classify as CL or CH | | GC | Clayey gravel [F, G, H] |
| | **Sands:** 50% or more of coarse fraction passes No. 4 sieve | **Clean Sands:** Less than 5% fines [D] | Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E] | | SW | Well-graded sand [I] |
| | | | Cu < 6 and/or [Cc<1 or Cc>3.0] [E] | | SP | Poorly graded sand [I] |
| | | **Sands with Fines:** More than 12% fines [D] | Fines classify as ML or MH | | SM | Silty sand [G, H, I] |
| | | | Fines classify as CL or CH | | SC | Clayey sand [G, H, I] |
| **Fine-Grained Soils:** 50% or more passes the No. 200 sieve | **Silts and Clays:** Liquid limit less than 50 | **Inorganic:** | PI > 7 and plots on or above "A" | | CL | Lean clay [K, L, M] |
| | | | PI < 4 or plots below "A" line [J] | | ML | Silt [K, L, M] |
| | | **Organic:** | Liquid limit - oven dried | < 0.75 | OL | Organic clay [K, L, M, N] |
| | | | Liquid limit - not dried | | | Organic silt [K, L, M, O] |
| | **Silts and Clays:** Liquid limit 50 or more | **Inorganic:** | PI plots on or above "A" line | | CH | Fat clay [K, L, M] |
| | | | PI plots below "A" line | | MH | Elastic Silt [K, L, M] |
| | | **Organic:** | Liquid limit - oven dried | < 0.75 | OH | Organic clay [K, L, M, P] |
| | | | Liquid limit - not dried | | | Organic silt [K, L, M, Q] |
| **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] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 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 ≥ 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 ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

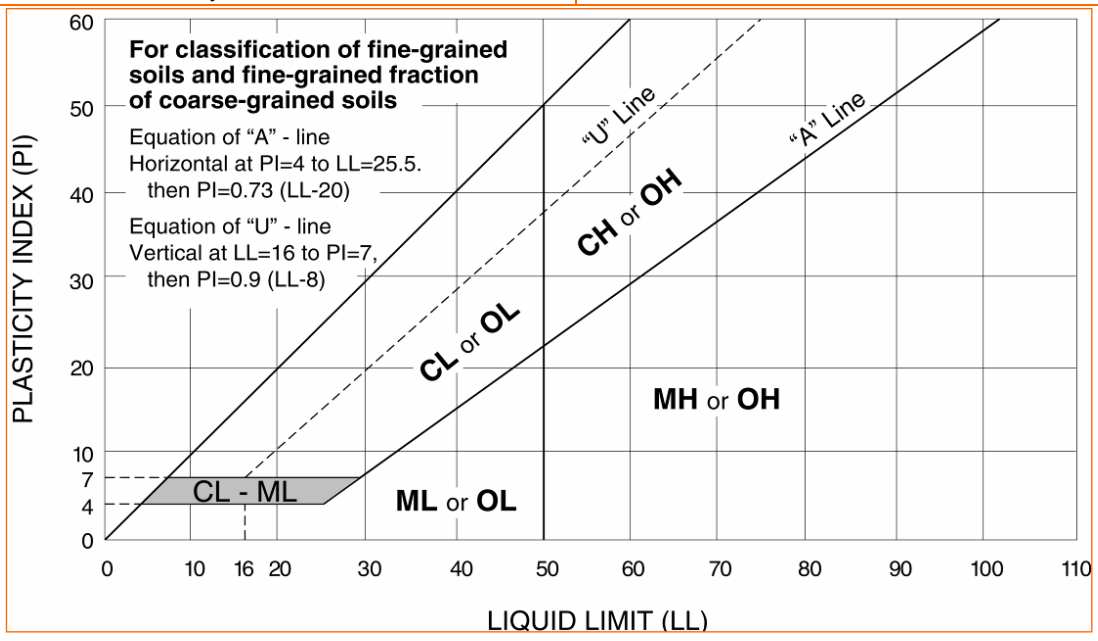
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 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.



# DESCRIPTION OF ROCK PROPERTIES

| WEATHERING | |
|---|---|
| **Term** | **Description** |
| **Unweathered** | No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces. |
| **Slightly weathered** | Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition. |
| **Moderately weathered** | Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones. |
| **Highly weathered** | More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. |
| **Completely weathered** | All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact. |
| **Residual soil** | All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported. |

| STRENGTH OR HARDNESS | | |
|---|---|---|
| **Description** | **Field Identification** | **Uniaxial Compressive Strength, psi (MPa)** |
| **Extremely weak** | Indented by thumbnail | 40-150 (0.3-1) |
| **Very weak** | Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife | 150-700 (1-5) |
| **Weak rock** | Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer | 700-4,000 (5-30) |
| **Medium strong** | Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer | 4,000-7,000 (30-50) |
| **Strong rock** | Specimen requires more than one blow of geological hammer to fracture it | 7,000-15,000 (50-100) |
| **Very strong** | Specimen requires many blows of geological hammer to fracture it | 15,000-36,000 (100-250) |
| **Extremely strong** | Specimen can only be chipped with geological hammer | >36,000 (>250) |

| DISCONTINUITY DESCRIPTION | | | |
|---|---|---|---|
| **Fracture Spacing (Joints, Faults, Other Fractures)** | | **Bedding Spacing (May Include Foliation or Banding)** | |
| **Description** | **Spacing** | **Description** | **Spacing** |
| **Extremely close** | < ¾ in (<19 mm) | **Laminated** | < ½ in (<12 mm) |
| **Very close** | ¾ in – 2-1/2 in (19 - 60 mm) | **Very thin** | ½ in – 2 in (12 – 50 mm) |
| **Close** | 2-1/2 in – 8 in (60 – 200 mm) | **Thin** | 2 in – 1 ft. (50 – 300 mm) |
| **Moderate** | 8 in – 2 ft. (200 – 600 mm) | **Medium** | 1 ft. – 3 ft. (300 – 900 mm) |
| **Wide** | 2 ft. – 6 ft. (600 mm – 2.0 m) | **Thick** | 3 ft. – 10 ft. (900 mm – 3 m) |
| **Very Wide** | 6 ft. – 20 ft. (2.0 – 6 m) | **Massive** | > 10 ft. (3 m) |

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

| ROCK QUALITY DESIGNATION (RQD) [1] | |
|---|---|
| **Description** | **RQD Value (%)** |
| **Very Poor** | 0 - 25 |
| **Poor** | 25 – 50 |
| **Fair** | 50 – 75 |
| **Good** | 75 – 90 |
| **Excellent** | 90 - 100 |

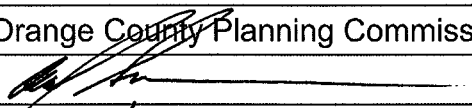
1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009
Technical Manual for Design and Construction of Road Tunnels – Civil Elements

## MS4 SWPPP Acceptance Form - continued

**V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative**

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

| | |
|---|---|
| Printed Name: | Alan J Sorensen, AICP |
| Title/Position: | Orange County Planning Commissioner |
| Signature: |  |
| Date: | 11/21/2022 |

**VI. Additional Information**

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

# OCME

# TOWN OF GOSHEN
# ORANGE COUNTY, NEW YORK

# STORMWATER POLLUTION
# PREVENTION PLAN NARRATIVE

## PREPARED FOR:

- OCME
- TOWN OF GOSHEN
- NYS DEPT. OF ENVIRONMENTAL CONSERVATION

**April 29, 2022**

**Revised August 29, 2022**

**Revised October 10, 2022**

## PREPARED BY:

Fusco Engineering & Surveying, D.P.C.
233 East Main St., Middletown, NY 10940
TEL: (845) 344-5863
EMAIL:aafjr@fuscoengineering.com
**PROJECT: 21-034**

SWPPP Preparer Certification 10/10/22

**revention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.**

**Al Fusco**
**N.Y.S.P.E. License # 054404**

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# APPENDICES

**A- SOILS MAP**
**B- PRE & POST DEVELOPMENT MAPS, HYDROCAD RESULTS C- SWPPP CONSTRUCTION INSPECTION REPORTS**
**D- NOI, NOI ACCEPTANCE FORM & NOT**
**E- CONSTRUCTION WASTE MANAGEMENT PLAN**
**F- CONTRACTOR CERTIFICATION STATEMENT**
**G- STORMWATER MAINTENANCE AND MANAGEMENT INSPECTON CHECKLIST**

# 1. PROJECT INFORMATION

## 1.1 Project Name and Location

**Orange County Medical Examiner's Office**
**22 Wells Farm Road**
**Goshen, New York 10924**

## 1.2 Property Owner Name and Address

**County of Orange**
**255-275 Main Street**
**Goshen, New York 10924**

## 1.3 Project Operator Name and Address

**County of Orange**
**255-275 Main Street**
**Goshen, New York 10924**

## 1.4 SWPPP Municipality

**Town of Goshen**
**41 Webster Avenue**
**Goshen, New York 10924**

## 1.5 SWPPP Reviewer

**Orange County Department of Public Works**
**2455 NY Route 17M**
**Goshen, New York 10924**

## 2. INTRODUCTION

### 2.1. Project Description

The site is located at 22 Wells Farm Road, near the intersection of 6 ½ Station Road, in the Town of Goshen, New York. The tax map designation for the Parcels is10-1-60.21 (65 acres).

There is an existing government office located on the subject property. The current site is served by an existing water and sewer service that conveys flows to an existing main.

The portion of the site that is proposed for development is characterized by a southeasterly sloping topography that descends from the western portion of the site. Topography on the site reflects the local surrounding topography and the parcel is covered with open fields.

The soils on the property were identified using the soil classifications of the USDA Soil Conservation Service (SCS), Soil Survey of Orange County, New York and the USGS Soil Survey Database. The site soils consist primarily of Bath-Nassau channery silt loams (BnB), Mardin gravelly silt loam (MdC), and Mardin gravelly silt loam (MdD). The approximate soil boundaries and types are shown on the attached Pre & Post Development Drainage Analysis Maps.

The proposed project consists of a new medical examiners building. On-site parking is proposed with connection to municipal water & sewer. A stormwater drainage system will attenuate & treat post development stormwater flows. The proposed development is subject to a stormwater management plan that has been developed in accordance with the requirements of the current SPDES General Permit for Stormwater Discharges from Construction Activity NYS GP-0-20-001.

### 2.2. Project Disturbance Area

Total Project Property Area: 65 Acres
Total Disturbed Area: 2.0 Acres
Existing Impervious Area: 6.26 Acres
Proposed Increase In Impervious Area: 0.65 Acres

### 2.3. Cultural Resources Investigation

The New York State Historic Preservation Office (SHPO) online CRIS tool indicates that the project site is not located in close proximity or adjacent to any sensitive archeological site(s).

### 2.4. Existing Drainage Patterns

Generally, the pre-development site conditions are best described as impervious surface. There is one watershed within the existing site that is shown on the shown on the attached Pre-Development Analysis Map.

### 2.5. Proposed Drainage Patterns

The pre-development watershed boundaries are very similar to the post development condition. The proposed building and parking is located within this watershed. The addition of the impervious surface increases post-developed runoff and pollutants in these watersheds.

## 3. STORMWATER MANAGEMENT

### 3.1. General

In general, increased imperviousness can change the volume and rate of runoff as well as the amount of suspended or dissolved substances entering local streams. In some cases, a change in the quantity of impervious surfaces can change the distribution of water in each area, affecting local water bodies, wetlands and associated fauna and flora. The project design includes measures to reduce the level of runoff and pollutants in post-development runoff in compliance with New York State DEC requirements.

### 3.2. Stormwater Quantity

There is an additional 28,749 SF of impervious surface associated with the project. This minor increase in impervious surface can be attenuated by the proposed Wet Pond stormwater management facility.

Information and data to prepare this report was obtained from the following sources:

- Topographic, Boundary and Planimetric information from a survey performed in the field by Fusco Engineering & Land Surveying, DPC as well as information provided by the owner
- Site Plan as prepared by Fusco Engineering & Land Surveying, DPC.
- The site soil information from USDA Web Soil Survey.

The TR-55 method was used to determine the pre-development and post-development runoff rates at the design points (DP) identified on the property, which is illustrated on the attached drawings entitled Pre Development Stormwater Analysis and Post Development Stormwater Analysis.

Drainage summaries have been shown on Table 1, which outline the runoff volume from the 1, 10 and 100 year storm events in the pre-development and post-development conditions, using a Type III storm distribution as evidenced by storm distribution boundaries found in the TR-55 publication. The 24-hour rainfall values used for each storm occurrence were taken from the NYSDEC Stormwater Design Manual as listed below:

1 year storm = 2.60 in.
10 year storm = 4.75 in
100 year storm = 8.5 in

Details of the proposed stormwater facilities have been included on Pre & Post Development

Drainage Analysis Maps and the project drawings. The Pre and Post Development Analysis Maps have been prepared to illustrate existing drainage areas and their configuration following construction on the site.

It is the overall goal of the SWPPP to provide for proper drainage control on a quality and quantity basis. The plan has been prepared so there will be no negative effect on downstream properties.

The hydrologic characteristics of the pre-development site conditions were modeled using HydroCAD computer software. The model analyzes watershed conditions and provides hydrograph generation and routing based on the Natural Resources Conservation Service (NRCS) Technical Release 55 (TR-55) procedures. These procedures consider the land cover and use on site, the underlying soils, the general topography and local rainfall distribution to model stormwater runoff volumes and flow rates resulting from the site.

### 3.3. Increase in Stormwater Runoff Rates

Table 1 below compares the pre- and post-development runoff calculations.

**Table 1**
**Pre- vs. Post-Development Runoff to DP1 (cfs)**

| Storm Frequency | Runoff (Pre) | Runoff (Post) |
|---|---|---|
| 1 year | 0.70 | 0.10 |
| 10 year | 2.14 | 2.09 |
| 100 year | 5.14 | 2.53 |

The post-development rates of runoff are slightly greater than the existing condition and can be attenuated and treated by the stormwater facility discussed above.

## 4. STORMWATER QUALITY

### 4.1. Impervious Surfaces

The impervious cover used in this analysis represents the land use as described and shown on the project plans. Water Quality Volume (WQv) is provided through the implementation of a Wet Pond. 100% of the WQv required is 3,181 CF while 3,253 CF of WQv has been provided within the Wet Pond. This treatment method does not require Runoff Reduction Volume (RRv) in accordance with Chapter 9 of the NYSDEC SWPPP Manual (January 2015) for re-development projects. The supporting calculations are presented in Appendix B located at the end of this report.

### 4.2. Sources of Pollutants

The New York State DEC lists several potential pollutants and their sources to be considered during site design. Nutrients, sediment, bacteria and various other components can potentially contribute to the reduction of water quality and impacts to downstream receiving waters and

habitat for water dependent species.

Many of these constituents, i.e., nitrogen, phosphorus, bacteria and others, are expected to be accounted for in the capture and treatment of the water quality volume. The DEC guidelines have established that if the water quality volume from impervious surfaces is treated, the water quality goals of the State are met. A primary source of nutrients, i.e., the use of fertilizers, is discussed below.

Sediments are typically associated with runoff from un-stabilized sites or are the result of erosion in watercourses that cannot handle the velocity of stormwater flows. They can also result from the sanding of impervious surfaces during winter storm events. Un-stabilized sediments can be transported via storm flows to receiving wetlands and watercourses, altering the soil-water-air interface in wetlands and burying established vegetation. The current proposal will include a sedimentation basin and a wet pond that will encourage removal of un-stabilized sediments.

1. Thermal impacts, i.e., the increase in water temperature caused by the process of water running off of parking lots, roofs and other impervious surfaces that are heated by the sun, are of greatest concern in areas where a site is directly tributary to a Class B creek. There are no such streams nearby. Furthermore, the site runoff will be treated by the existing stormwater facility located near Wells Farm Road. Based on this information, no special consideration was given to moderating the temperature of stormwater leaving the site.

### 4.3. Use of Fertilizers and Pesticides

The applicant proposes the use of a variety of construction and maintenance techniques reflecting best management practices in order to limit impacts of stormwater runoff. No fertilizers containing phosphorous will be utilized in order to limit pollutants from the project to the maximum extent possible.

Phosphorus from fertilizer runs off lawns via stormwater and can enter surface waters and ground water, both of which can reach other water bodies. Using phosphorus-free lawn fertilizers is one step that will be taken to protect water quality. The project sponsor therefore proposes that any fertilizers used during construction will be phosphorus-free.

These combined systems have been designed to treat the NYSDEC water quality volume, and control peak flow runoff rates from the 10- and 100-year storm events.

## 5. EROSION & SEDIMENT CONTROL

### 5.1. General

During construction of the Project, extensive erosion and sediment control consisting of vegetative and structural measures will be implemented. These practices will be included in the final plans and will show the location and details of these controls. Among the techniques to be utilized are:

1. Staked haybales and silt fences around the downhill perimeter of the construction.
2. A stabilized construction entrance installed at the access point to the site.
3. Temporary seeding of all disturbed areas if they will remain bare for more than three weeks.
4. Permanent seeding and mulching as soon as possible after final grading.
5. Water spray for dust control.
6. The plans will indicate the proposed controls to be implemented during construction. However, adjustment of these controls may be required to accommodate localized field conditions.
7. Disturbed areas will be permanently stabilized by establishing a permanent vegetative cover. The exposed area will receive a minimum of 4 inch topsoil prior to seeding.

## 6. MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

### 6.1. General

The storm water management facilities shall be maintained by the Owner of the Project during and after construction. All storm water management facilities shall be routinely inspected and any necessary repairs made immediately in order to maintain all practices as designed. The Contractor and Owner shall utilize good housekeeping methods for all litter and debris that is generated during construction. This shall include for example, placing all wastes in a dumpster on a daily basis and emptying dumpsters on a regular basis. It is also recommended to store any chemicals that are utilized during construction in a safe place according to manufacturer's safety data sheets (MSDS).

## 7. SUMMARY

### 7.1. General

Drainage from the proposed impervious surfaces will be collected by the proposed catch basins and routed to the existing stormwater management facility. The Soil Conservation Service TR-55 method has been utilized to evaluate the changes in stormwater runoff rates as a result of development of the site. The storm drainage system has been designed to collect and convey stormwater in a manner that would provide no increase in stormwater runoff rates downstream from the existing stormwater management facility.

The proposed project has also been designed to minimize the extent of proposed grading and disturbance. The construction activity on the site will therefore not result in additional pollutant loadings and post development runoff to downstream water bodies. The proposed erosion and sediment control practices will prevent the erosion and sediment deposits to downstream properties.

# APPENDIX A

SOILS MAP

# Hydrologic Soil Group—Orange County, New York


Map Scale: 1:871 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Lines**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Points**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County, New York
Survey Area Data: Version 22, Aug 29, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| BnB | Bath-Nassau channery silt loams, 3 to 8 percent slopes | C | 0.5 | 25.3% |
| MdC | Mardin gravelly silt loam, 8 to 15 percent slopes | D | 0.6 | 34.0% |
| MdD | Mardin gravelly silt loam, 15 to 25 percent slopes | D | 0.7 | 40.6% |
| **Totals for Area of Interest** | | | **1.8** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# APPENDIX B

PRE & POST DEVELOPMENT MAPS, HYDROCAD RESULTS

N
W
E
S
NORTH

EXISTING
ORANGE COUNTY
EMERGENCY SERVICES
CENTER BUILDING

EXISTING
SOLAR PANEL FARM

CONC. PAD

WATER TOWER

ELEC. BOX ON CONC. PAD

DIRT: 6,073 sqft
GRASS: 30,037 sqft

Tc

ANALYSIS POINT

DIRT ROAD

WELLS FARM ROAD

CB RIM:508.60 INV:504.50
CB RIM:507.70 INV:503.80 INV:503.60
CB RIM:507.85 INV:503.25
CB RIM:502.70 INV:502.40 INV:502.20
CB RIM:508.3 INV:502.00 INV:501.60
CB RIM:502.83 INV:499.23 INV:499.13
CB RIM:504.20 INV:497.80 INV:497.40
CB RIM:482.26 INV:478.20 INV:478.10
CB RIM:484.70 INV:477.50 INV:477.20
CB RIM:469.79 INV:466.59
CB RIM:469.33 INV:464.13 INV:464.03
CB RIM:453.23 INV:449.83

THM=479.93
INV.=473.05

NWS 303' @ 0.58% NWS

811
Know what's below.
Call before you dig.

*LEGEND*

- BOLLARD
- UTILITY POLE
- SIGN
- CATCH BASIN
- LIGHT POLE
- HYDRANT
- WATER VALVE
- PROPOSED PARKING
- EXISTING PAVEMENT
- EXISTING SIDEWALK
- EXISTING DIRT ROAD
- CHAIN LINK FENCE
- UNDERGROUND ELECTRIC
- WATER LINE
- SEWER LINE
- UNDERGROUND FIBER OPTICS
- UNDERGROUND TELEPHONE
- CONTOUR LINE MAJOR
- CONTOUR LINE MINOR

1 EX101 EXISTING CONDITIONS PLAN
SCALE: 1"=40'

CALLED NORTH

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |

PROGRESS PRINT
NOT FOR CONSTRUCTION
3/23/2022 11:30 AM

SEAL


ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER
HYMAN HAYES ASSOCIATES
800 Tiny-Schenectady Road
Suite 103
Latham, NY 12110
(518) 432-3470
www.hymanhayes.com

FORENSIC CONSULTANT
MEP CONSULTANT
FELLENZER ENGINEERING
CIVIL CONSULTANT
Fisco Engineering & Land Surveying PC
I.T. SECURITY CONSULTANT
CONVERGENT TECHNOLOGIES GROUP
FF&E CONSULTANT
CLASSIC CONTRACT INTERIORS, LLC
COST CONSULTANT
STUART-LYNN COMPANY


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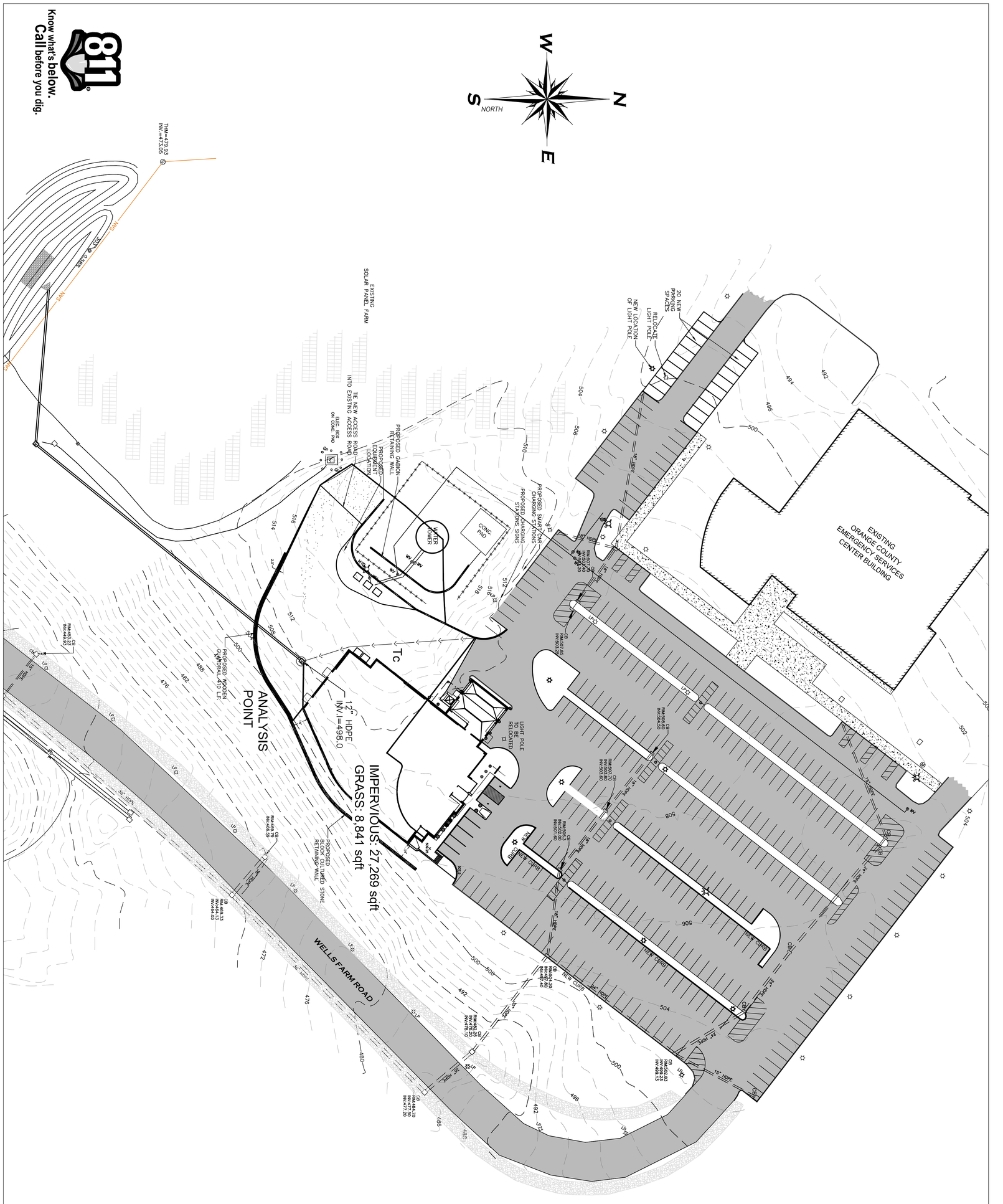
ORANGE COUNTY, NEW YORK

SHEET TITLE
PREDEVELOPMENT CONDITIONS ANALYSIS MAP

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 01/05/2022 |
| SCALE: | As indicated |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
PRE




POST

SHEET NUMBER

| | |
|---|---|
| DATE: | |
| SCALE: | As indicated |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET TITLE

# POSTDEVELOPMENT CONDITIONS ANALYSIS MAP

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

ORANGE COUNTY, NEW YORK


ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER

HYMAN HAYES ASSOCIATES

HHA

800 Troy-Schenectady Road
Suite 103
Latham, NY, 12110
(518) 452-3470
www.hymanhayes.com


| FORENSIC CONSULTANT | M/E/P CONSULTANT | CIVIL CONSULTANT | I.T./SECURITY CONSULTANT | FF&E CONSULTANT | COST CONSULTANT |
|---|---|---|---|---|---|
| | FELLENZER ENGINEERING | Fusco Engineering & Land Surveying PC | CONVERGENT TECHNOLOGIES ASSOCIATES | CLASSIC CONTRACT INTERIORS, LLC | STUART-LYNN COMPANY |

SEAL

REVISION SCHEDULE

| # | DESCRIPTION | DATE |
|---|---|---|


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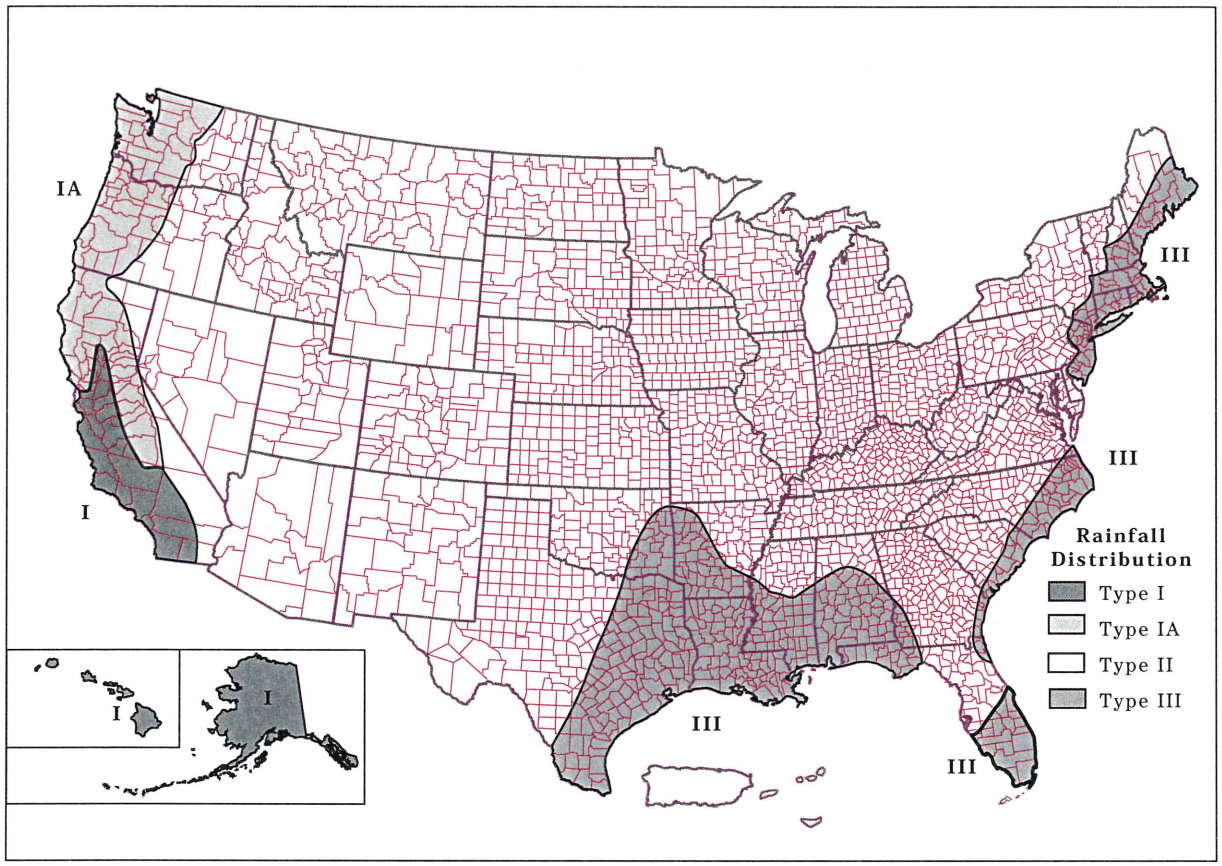
**Figure B-2** Approximate geographic boundaries for NRCS (SCS) rainfall distributions




## Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

### East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

### West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

### Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

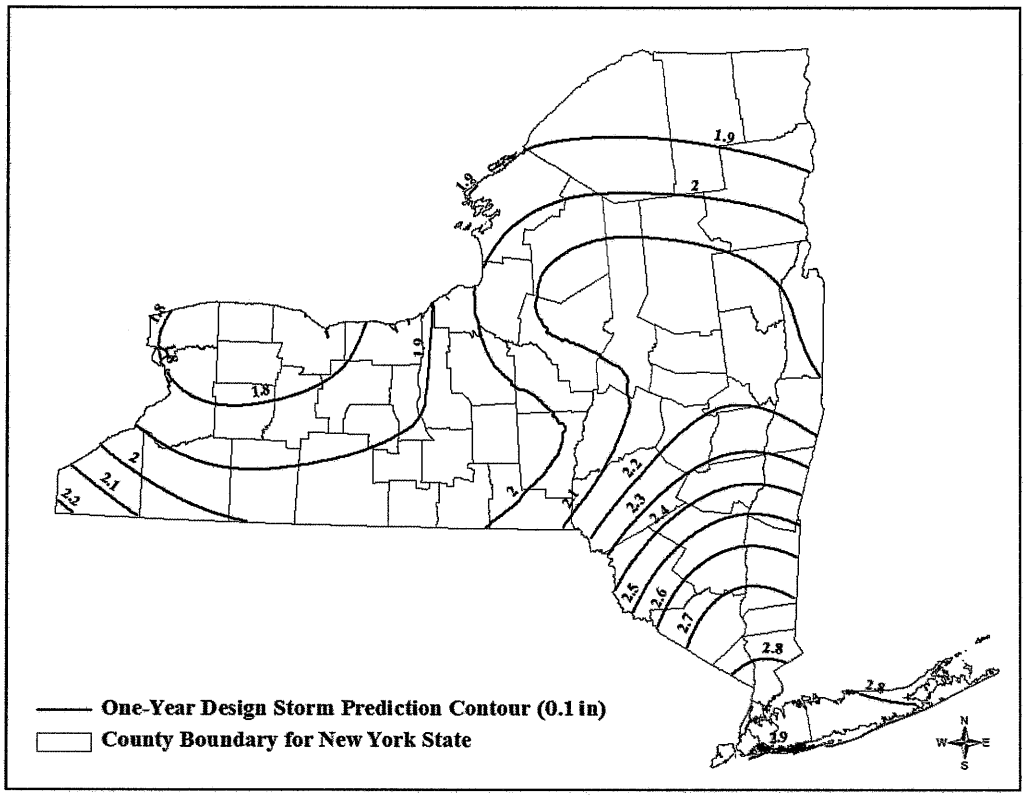
### Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

### Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

**Figure 4.2: One-Year Design Storm in New York State (NYSDEC, 2013)**




## Section 4.5 Overbank Flood Control Criteria ($Q_p$)

The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bankfull capacity of the channel, and therefore must spill over into the floodplain).

Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate ($Q_p$) to predevelopment rates.

The overbank flood control requirement ($Q_p$) does not apply in certain conditions, including:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams. Refer to Section 4.3 for instructions.
- A downstream analysis reveals that overbank control is not needed (see section 4.10).

### Basis for Design of Overbank Flood Control

When addressing the overbank flooding design criteria, the following represent the minimum basis for design:

- TR-55 and TR-20 (or approved equivalent) will be used to determine peak discharge rates.

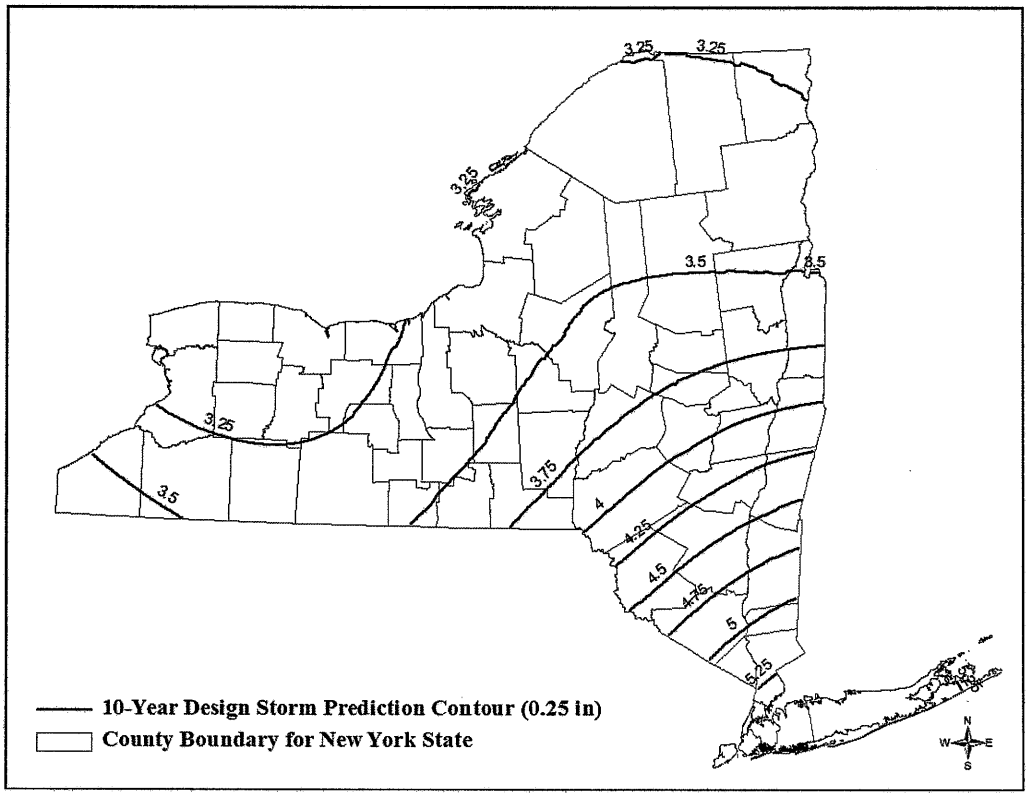
- When the predevelopment land use is agriculture, the curve number for the pre-developed condition shall be "taken as meadow".

- Off-site areas should be modeled as "present condition" for the 10-year storm event.

- Figure 4.3 indicates the depth of rainfall (24 hour) associated with the 10-year storm event throughout the State of New York.

- The length of overland flow used in $t_c$ calculations is limited to no more than 150 feet for predevelopment conditions and 100 feet for post development conditions. On areas of extremely flat terrain (<1% average slope), this maximum distance is extended to 250 feet for predevelopment conditions and 150 feet for post development conditions.

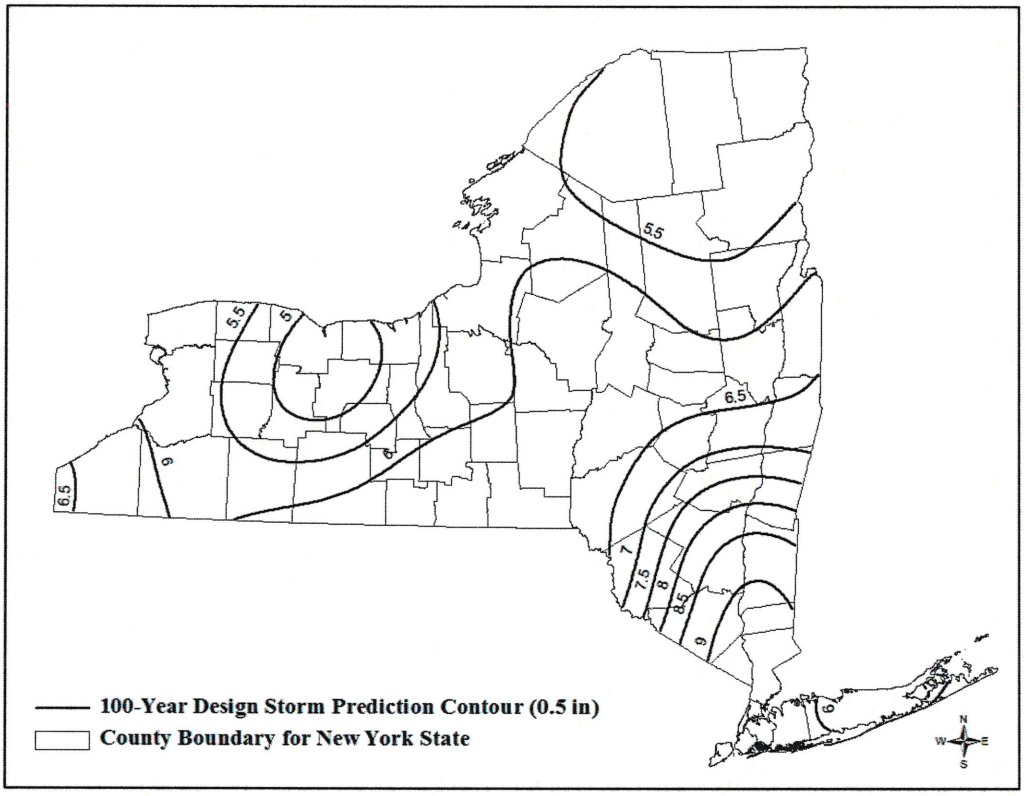
**Figure 4.3: Ten-Year Design Storm in New York State (NYSDEC, 2013)**



- When determining the storage required to reduce 100-year flood peaks, model off-site areas under current conditions.

- When determining storage required to safely pass the 100-year flood, model off-site areas under ultimate conditions.

**Figure 4.4: One Hundred-Year Design Storm in New York State (NYSDEC, 2013)**




## Section 4.7 Alternative Method

New development causes changes to runoff volume, flow rates, timing of runoff and, most importantly, habitat destruction and degradation of the physical and chemical quality of the receiving waterbody. Traditionally, event based design storms are used for evaluation of hydrology and sizing of stormwater management practices. With an increasing need for assessment of the long term effects of development and maintenance of pre-development hydrology, the necessity of continuous simulation modeling as an effective tool for analysis and evaluation of flow-duration, downstream quality, quantity, biological, and hydro-habitat sustainability has been acknowledged.

Version 1.8
Last Updated: 11/09/2015

Total Water Quality Volume Calculation
WQv(acre-feet) = [(P)(Rv)(A)] /12

| Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?..... | No |
|---|---|

| Design Point: | 1 | |
|---|---|---|
| P= | 1.40 | *inch* |

*Manually enter P, Total Area and Impervious Cover.*

**Breakdown of Subcatchments**

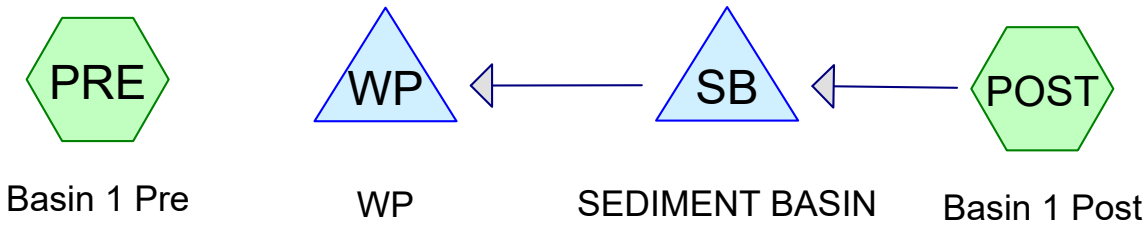
| Catchment Number | Total Area *(Acres)* | Impervious Area *(Acres)* | Percent Impervious *%* | Rv | WQv *($ft^3$)* | Description |
|---|---|---|---|---|---|---|
| 1 | 0.82 | 0.65 | 79% | 0.76 | 3,181 | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| Subtotal (1-30) | 0.82 | 0.65 | 79% | 0.76 | **3,181** | **Subtotal 1** |
| **Total** | 0.82 | 0.65 | 79% | 0.76 | **3,181** | **Initial WQv** |

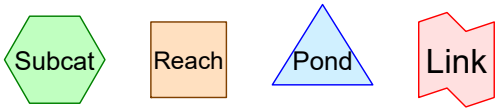
**Identify Runoff Reduction Techniques By Area**

| Technique | Total Contributing Area *(Acre)* | Contributing Impervious Area *(Acre)* | Notes |
|---|---|---|---|
| Conservation of Natural Areas | 0.00 | 0.00 | *minimum 10,000 sf* |
| Riparian Buffers | 0.00 | 0.00 | *maximum contributing length 75 feet to 150 feet* |
| Filter Strips | 0.00 | 0.00 | |
| Tree Planting | 0.00 | 0.00 | *Up to 100 sf directly connected impervious area may be subtracted per tree* |
| **Total** | **0.00** | **0.00** | |

**Recalculate WQv after application of Area Reduction Techniques**

| | Total Area *(Acres)* | Impervious Area *(Acres)* | Percent Impervious *%* | Runoff Coefficient Rv | WQv *($ft^3$)* |
|---|---|---|---|---|---|
| "<<Initial WQv" | 0.82 | 0.65 | 79% | 0.76 | 3,181 |
| Subtract Area | 0.00 | 0.00 | | | |
| WQv adjusted after Area Reductions | **0.82** | **0.65** | 79% | 0.76 | 3,181 |
| Disconnection of Rooftops | | 0.00 | | | |
| Adjusted WQv after Area Reduction and Rooftop Disconnect | 0.82 | 0.65 | 79% | 0.76 | **3,181** |
| WQv reduced by Area Reduction techniques | | | | | 0 |




**Routing Diagram for OCME Wet Pond 10-10-22**
Prepared by Arden Consulting Engineers PLLC, Printed 10/10/2022
HydroCAD® 10.20-2f s/n 04164 © 2022 HydroCAD Software Solutions LLC

## Rainfall Events Listing (selected events)

| Event# | Event Name | Storm Type | Curve | Mode | Duration (hours) | B/B | Depth (inches) | AMC |
|---|---|---|---|---|---|---|---|---|
| 1 | 1-Year | Type III 24-hr | | Default | 24.00 | 1 | 2.70 | 2 |
| 2 | 10-Year | Type III 24-hr | | Default | 24.00 | 1 | 4.75 | 2 |
| 3 | 100-Year | Type III 24-hr | | Default | 24.00 | 1 | 8.50 | 2 |

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.893 | 74 | >75% Grass cover, Good, HSG C (POST, PRE) |
| 0.139 | 87 | Dirt roads, HSG C (PRE) |
| 0.626 | 98 | Paved parking, HSG C (POST) |
| **1.658** | **84** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 1.658 | HSG C | POST, PRE |
| 0.000 | HSG D | |
| 0.000 | Other | |
| **1.658** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.893 | 0.000 | 0.000 | 0.893 | >75% Grass cover, Good | POST, PRE |
| 0.000 | 0.000 | 0.139 | 0.000 | 0.000 | 0.139 | Dirt roads | PRE |
| 0.000 | 0.000 | 0.626 | 0.000 | 0.000 | 0.626 | Paved parking | POST |
| **0.000** | **0.000** | **1.658** | **0.000** | **0.000** | **1.658** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Width (inches) | Diam/Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | WP | 478.00 | 428.60 | 264.0 | 0.1871 | 0.013 | 0.0 | 8.0 | 0.0 |

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment POST: Basin 1 Post** Runoff Area=36,110 sf 75.52% Impervious Runoff Depth>1.88"
Tc=6.0 min CN=92 Runoff=1.80 cfs 0.130 af

**Subcatchment PRE: Basin 1 Pre** Runoff Area=36,110 sf 0.00% Impervious Runoff Depth>0.82"
Flow Length=184' Tc=7.5 min CN=76 Runoff=0.70 cfs 0.056 af

**Pond SB: SEDIMENT BASIN** Peak Elev=483.08' Storage=1,097 cf Inflow=1.80 cfs 0.130 af
Outflow=1.78 cfs 0.107 af

**Pond WP: WP** Peak Elev=479.67' Storage=3,163 cf Inflow=1.78 cfs 0.107 af
Primary=0.10 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.035 af

**Total Runoff Area = 1.658 ac Runoff Volume = 0.186 af Average Runoff Depth = 1.35"**
**62.24% Pervious = 1.032 ac 37.76% Impervious = 0.626 ac**

## Summary for Subcatchment POST: Basin 1 Post

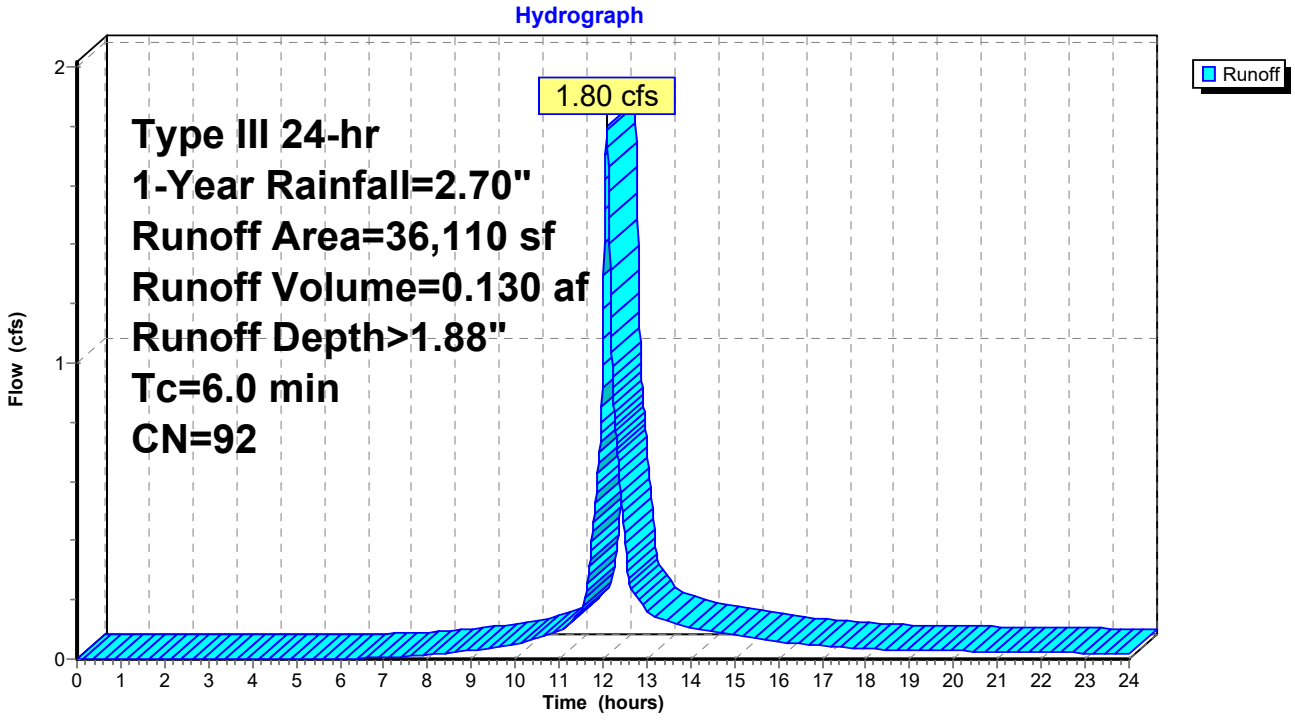
Runoff = 1.80 cfs @ 12.09 hrs, Volume= 0.130 af, Depth> 1.88"
Routed to Pond SB : SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 27,269 | 98 | Paved parking, HSG C |
| 8,841 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 92 | Weighted Average |
| 8,841 | | 24.48% Pervious Area |
| 27,269 | | 75.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Minimum** |

## Subcatchment POST: Basin 1 Post



## Summary for Subcatchment PRE: Basin 1 Pre

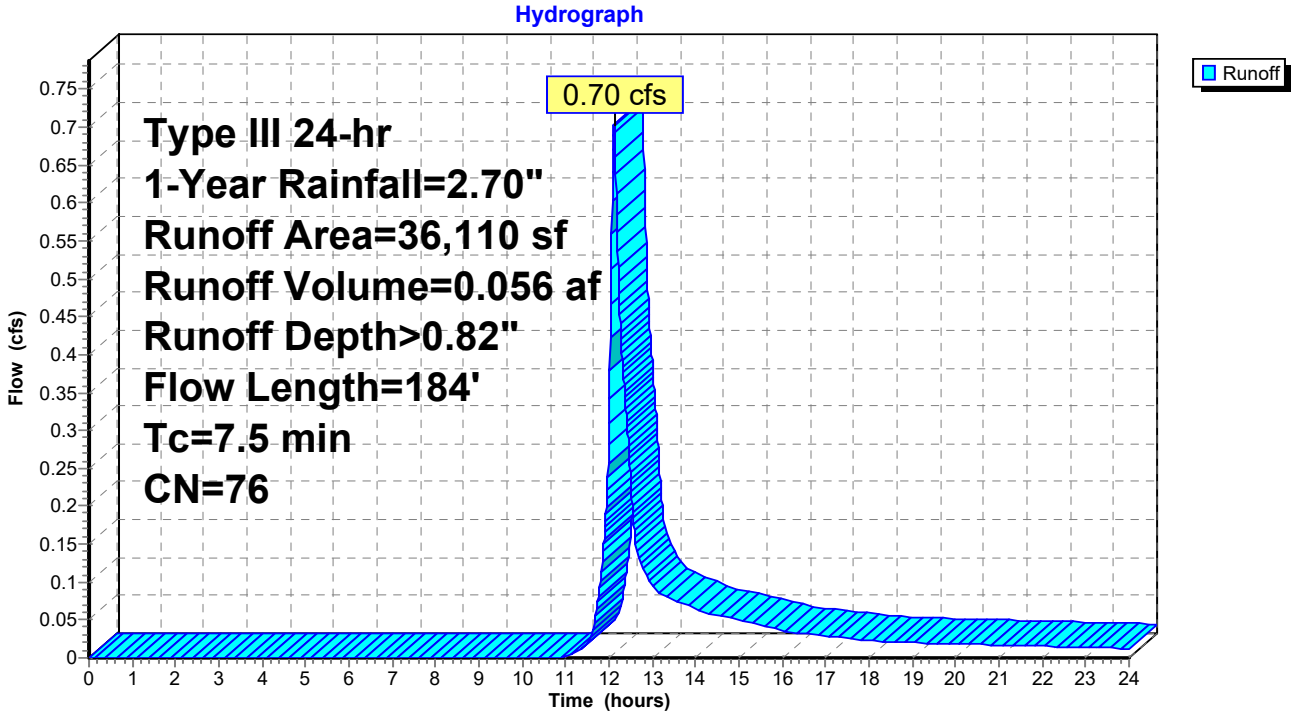
Runoff = 0.70 cfs @ 12.12 hrs, Volume= 0.056 af, Depth> 0.82"
Routed to nonexistent node AP-PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 6,073 | 87 | Dirt roads, HSG C |
| 30,037 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 76 | Weighted Average |
| 36,110 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.0450 | 0.24 | | **Sheet Flow, Sheet Flow, Woods: Light Underbrush** Grass: Short n= 0.150 P2= 3.25" |
| 0.5 | 84 | 0.1800 | 2.97 | | **Shallow Concentrated Flow, Shallow Concentrated Flow, Wood** Short Grass Pasture Kv= 7.0 fps |
| 7.5 | 184 | Total | | | |

## Subcatchment PRE: Basin 1 Pre



## Summary for Pond SB: SEDIMENT BASIN

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 1.88" for 1-Year event
Inflow = 1.80 cfs @ 12.09 hrs, Volume= 0.130 af
Outflow = 1.78 cfs @ 12.10 hrs, Volume= 0.107 af, Atten= 1%, Lag= 0.7 min
Primary = 1.78 cfs @ 12.10 hrs, Volume= 0.107 af
Routed to Pond WP : WP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 483.08' @ 12.10 hrs Surf.Area= 1,455 sf Storage= 1,097 cf
Flood Elev= 484.00' Surf.Area= 2,419 sf Storage= 2,865 cf

Plug-Flow detention time= 107.6 min calculated for 0.107 af (82% of inflow)
Center-of-Mass det. time= 37.8 min ( 841.2 - 803.4 )

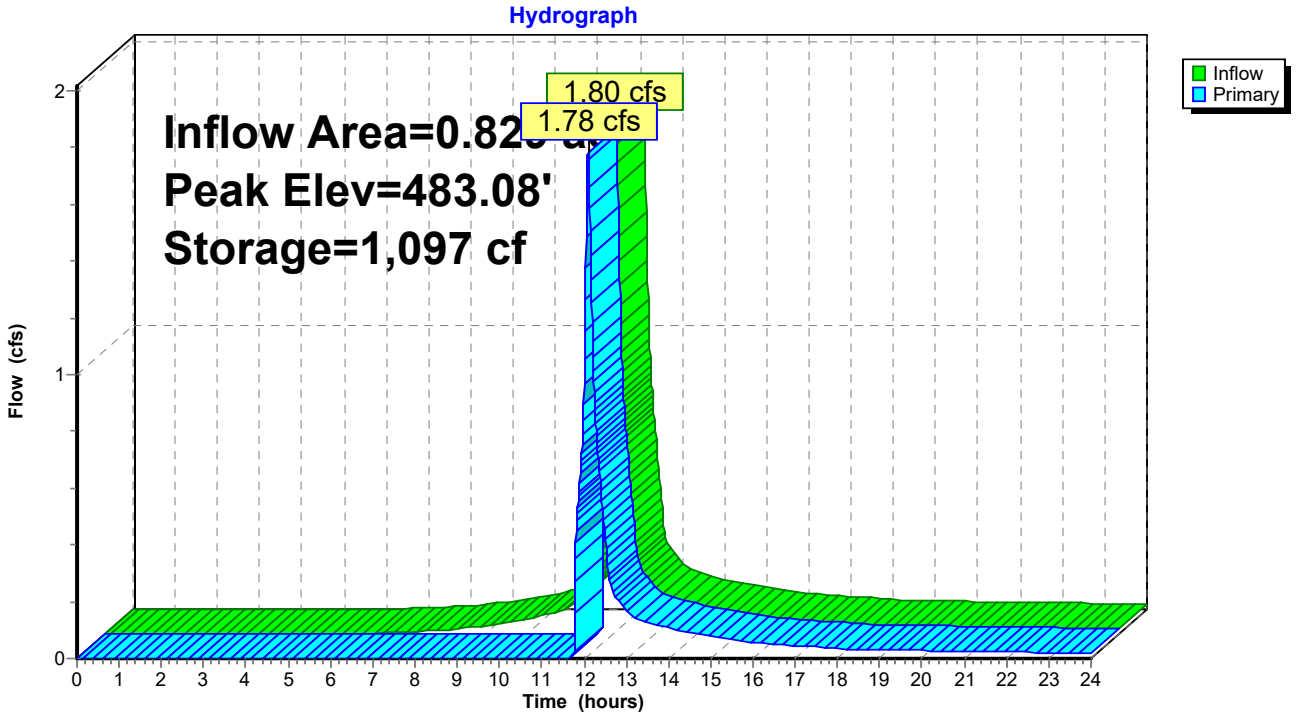
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 482.00' | 2,865 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 482.00 | 637 | 245.0 | 0 | 0 | 637 |
| 484.00 | 2,419 | 327.0 | 2,865 | 2,865 | 4,413 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 483.00' | **35.0' long + 2.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=1.78 cfs @ 12.10 hrs HW=483.08' TW=478.72' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.78 cfs @ 0.65 fps)

## Pond SB: SEDIMENT BASIN



## Summary for Pond WP: WP

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 1.55" for 1-Year event
Inflow = 1.78 cfs @ 12.10 hrs, Volume= 0.107 af
Outflow = 0.10 cfs @ 14.18 hrs, Volume= 0.035 af, Atten= 94%, Lag= 124.9 min
Primary = 0.10 cfs @ 14.18 hrs, Volume= 0.035 af
Routed to nonexistent node DP N-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 479.67' @ 14.18 hrs Surf.Area= 2,920 sf Storage= 3,163 cf
Flood Elev= 482.00' Surf.Area= 6,222 sf Storage= 13,703 cf

Plug-Flow detention time= 324.8 min calculated for 0.035 af (33% of inflow)
Center-of-Mass det. time= 206.2 min ( 1,047.3 - 841.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 478.00' | 13,703 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

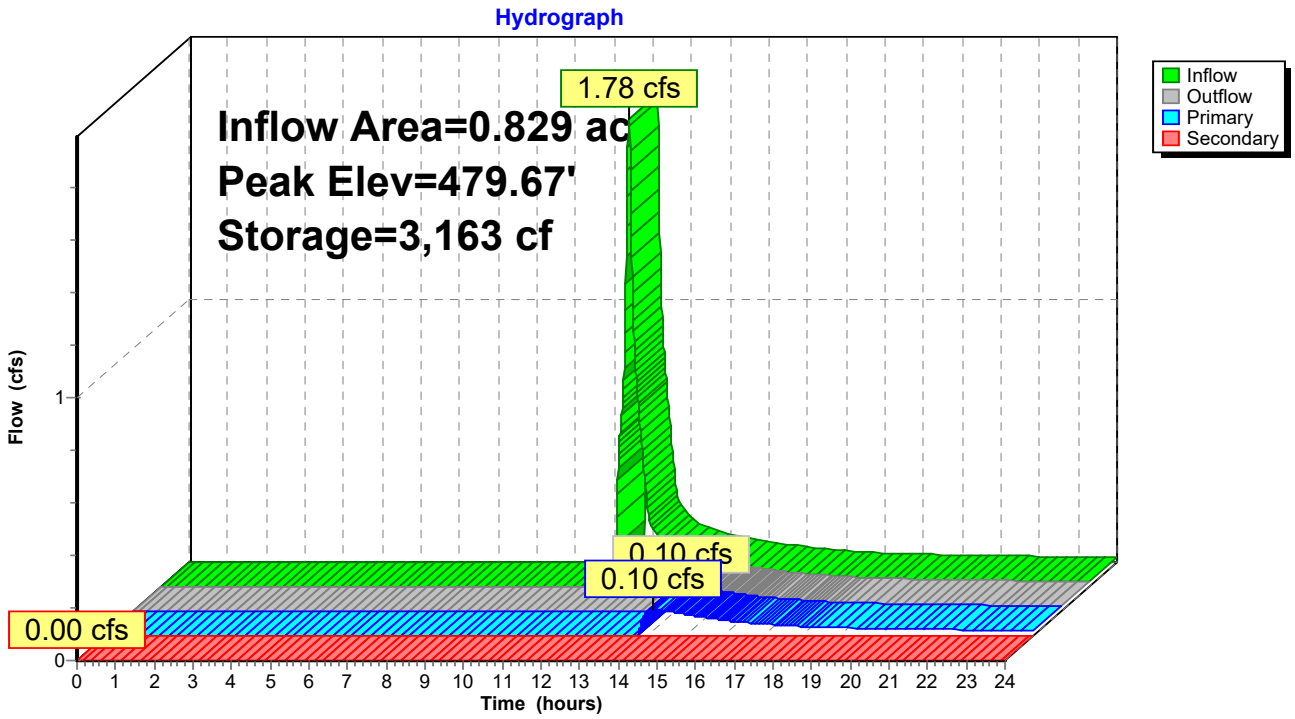
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 478.00 | 1,031 | 336.0 | 0 | 0 | 1,031 |
| 480.00 | 3,410 | 443.0 | 4,211 | 4,211 | 7,710 |
| 482.00 | 6,222 | 490.0 | 9,492 | 13,703 | 11,322 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 478.00' | **8.0" Round Culvert**<br>L= 264.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 478.00' / 428.60' S= 0.1871 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.35 sf |
| #2 | Device 1 | 479.65' | **30.0" x 42.0" Horiz. Orifice/Grate**<br>C= 0.600 in 42.0" x 60.0" Grate (50% open area)<br>Limited to weir flow at low heads |
| #3 | Secondary | 481.00' | **20.0' long x 8.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74 |

**Primary OutFlow** Max=0.10 cfs @ 14.18 hrs HW=479.67' (Free Discharge)
└**1=Culvert** (Passes 0.10 cfs of 1.94 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.45 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=478.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WP: WP


Hydrograph
Inflow Area=0.829 ac
Peak Elev=479.67'
Storage=3,163 cf
1.78 cfs
0.10 cfs
0.10 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment POST: Basin 1 Post** Runoff Area=36,110 sf 75.52% Impervious Runoff Depth>3.84"
Tc=6.0 min CN=92 Runoff=3.56 cfs 0.265 af

**Subcatchment PRE: Basin 1 Pre** Runoff Area=36,110 sf 0.00% Impervious Runoff Depth>2.33"
Flow Length=184' Tc=7.5 min CN=76 Runoff=2.14 cfs 0.161 af

**Pond SB: SEDIMENT BASIN** Peak Elev=483.12' Storage=1,163 cf Inflow=3.56 cfs 0.265 af
Outflow=3.53 cfs 0.243 af

**Pond WP: WP** Peak Elev=479.88' Storage=3,826 cf Inflow=3.53 cfs 0.243 af
Primary=2.09 cfs 0.171 af Secondary=0.00 cfs 0.000 af Outflow=2.09 cfs 0.171 af

**Total Runoff Area = 1.658 ac Runoff Volume = 0.426 af Average Runoff Depth = 3.08"**
**62.24% Pervious = 1.032 ac 37.76% Impervious = 0.626 ac**

## Summary for Subcatchment POST: Basin 1 Post

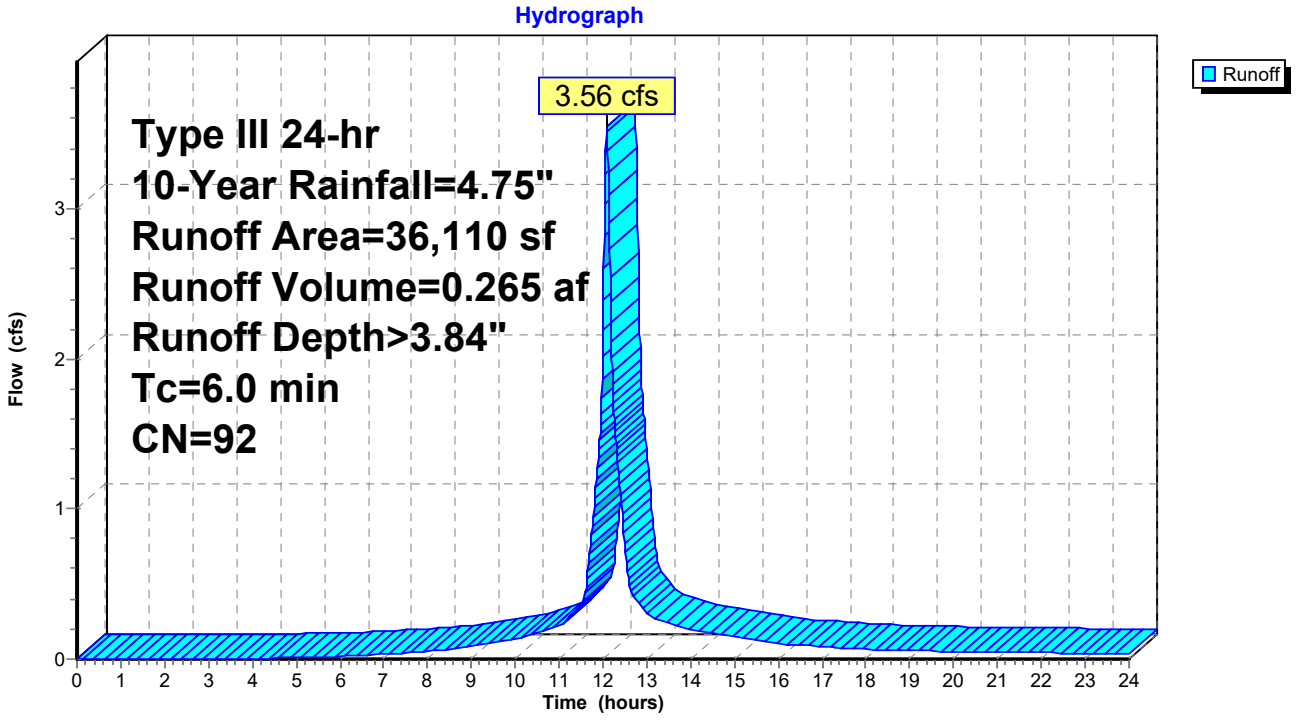
Runoff = 3.56 cfs @ 12.08 hrs, Volume= 0.265 af, Depth> 3.84"
Routed to Pond SB : SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.75"

| Area (sf) | CN | Description |
|---|---|---|
| 27,269 | 98 | Paved parking, HSG C |
| 8,841 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 92 | Weighted Average |
| 8,841 | | 24.48% Pervious Area |
| 27,269 | | 75.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Minimum** |

## Subcatchment POST: Basin 1 Post



## Summary for Subcatchment PRE: Basin 1 Pre

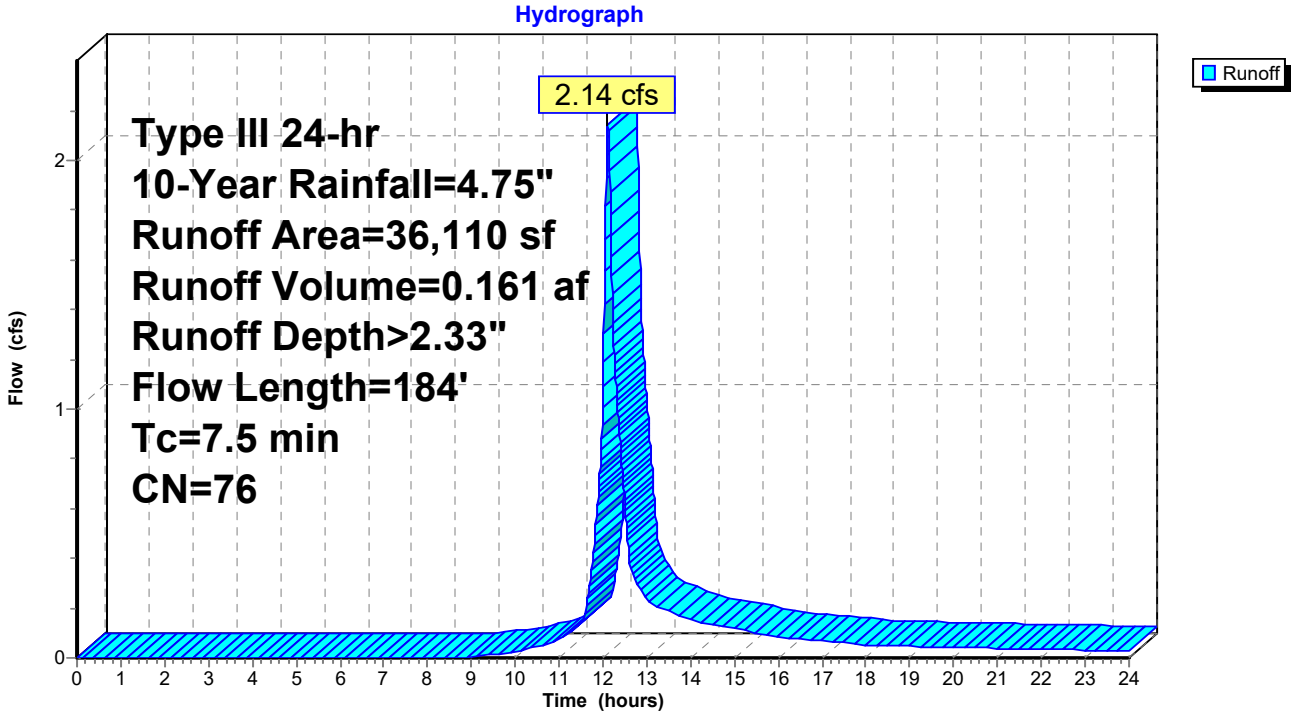
Runoff = 2.14 cfs @ 12.11 hrs, Volume= 0.161 af, Depth> 2.33"
Routed to nonexistent node AP-PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.75"

| Area (sf) | CN | Description |
|---|---|---|
| 6,073 | 87 | Dirt roads, HSG C |
| 30,037 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 76 | Weighted Average |
| 36,110 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.0450 | 0.24 | | **Sheet Flow, Sheet Flow, Woods: Light Underbrush** Grass: Short n= 0.150 P2= 3.25" |
| 0.5 | 84 | 0.1800 | 2.97 | | **Shallow Concentrated Flow, Shallow Concentrated Flow, Wood** Short Grass Pasture Kv= 7.0 fps |
| 7.5 | 184 | Total | | | |

### Subcatchment PRE: Basin 1 Pre



## Summary for Pond SB: SEDIMENT BASIN

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 3.84" for 10-Year event
Inflow = 3.56 cfs @ 12.08 hrs, Volume= 0.265 af
Outflow = 3.53 cfs @ 12.09 hrs, Volume= 0.243 af, Atten= 1%, Lag= 0.6 min
Primary = 3.53 cfs @ 12.09 hrs, Volume= 0.243 af
Routed to Pond WP : WP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 483.12' @ 12.09 hrs Surf.Area= 1,496 sf Storage= 1,163 cf
Flood Elev= 484.00' Surf.Area= 2,419 sf Storage= 2,865 cf

Plug-Flow detention time= 70.6 min calculated for 0.243 af (91% of inflow)
Center-of-Mass det. time= 27.3 min ( 811.0 - 783.7 )

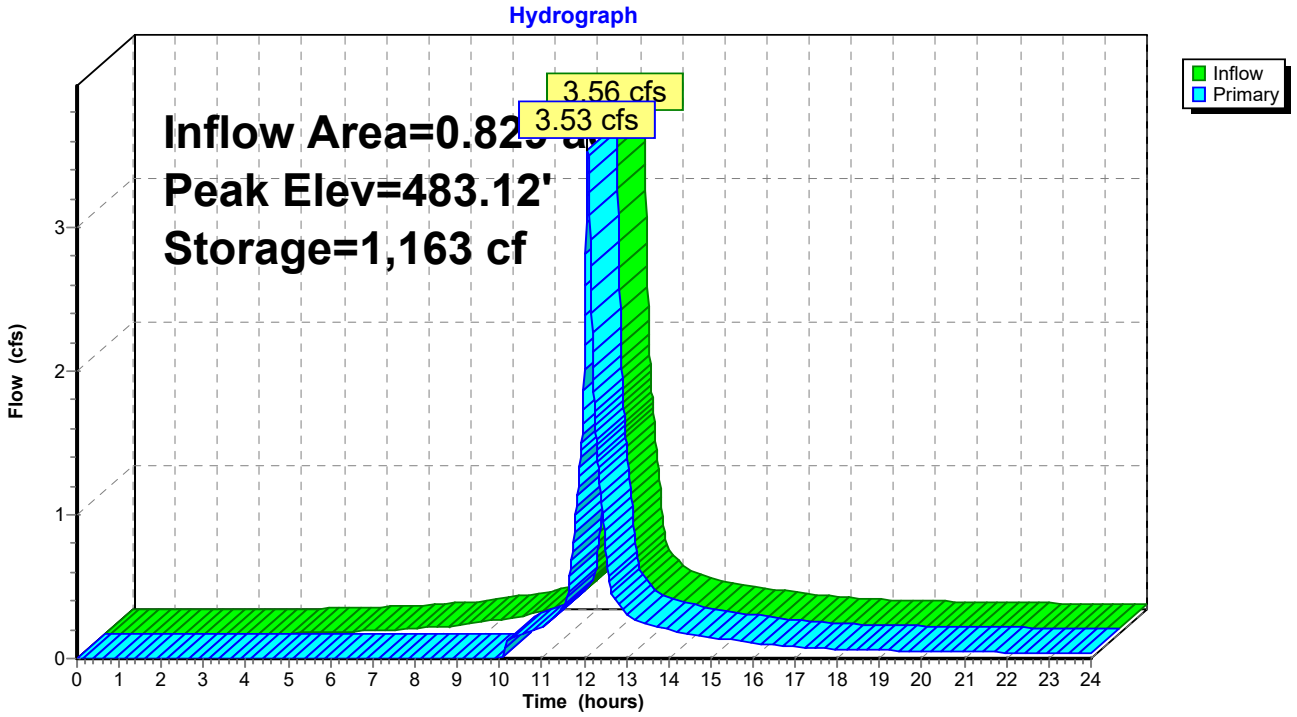
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 482.00' | 2,865 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 482.00 | 637 | 245.0 | 0 | 0 | 637 |
| 484.00 | 2,419 | 327.0 | 2,865 | 2,865 | 4,413 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 483.00' | **35.0' long + 2.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=3.53 cfs @ 12.09 hrs HW=483.12' TW=479.78' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 3.53 cfs @ 0.82 fps)

## Pond SB: SEDIMENT BASIN



## Summary for Pond WP: WP

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 3.51" for 10-Year event
Inflow = 3.53 cfs @ 12.09 hrs, Volume= 0.243 af
Outflow = 2.09 cfs @ 12.20 hrs, Volume= 0.171 af, Atten= 41%, Lag= 6.6 min
Primary = 2.09 cfs @ 12.20 hrs, Volume= 0.171 af
Routed to nonexistent node DP N-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 479.88' @ 12.20 hrs Surf.Area= 3,235 sf Storage= 3,826 cf
Flood Elev= 482.00' Surf.Area= 6,222 sf Storage= 13,703 cf

Plug-Flow detention time= 141.9 min calculated for 0.171 af (70% of inflow)
Center-of-Mass det. time= 54.0 min ( 865.1 - 811.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 478.00' | 13,703 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

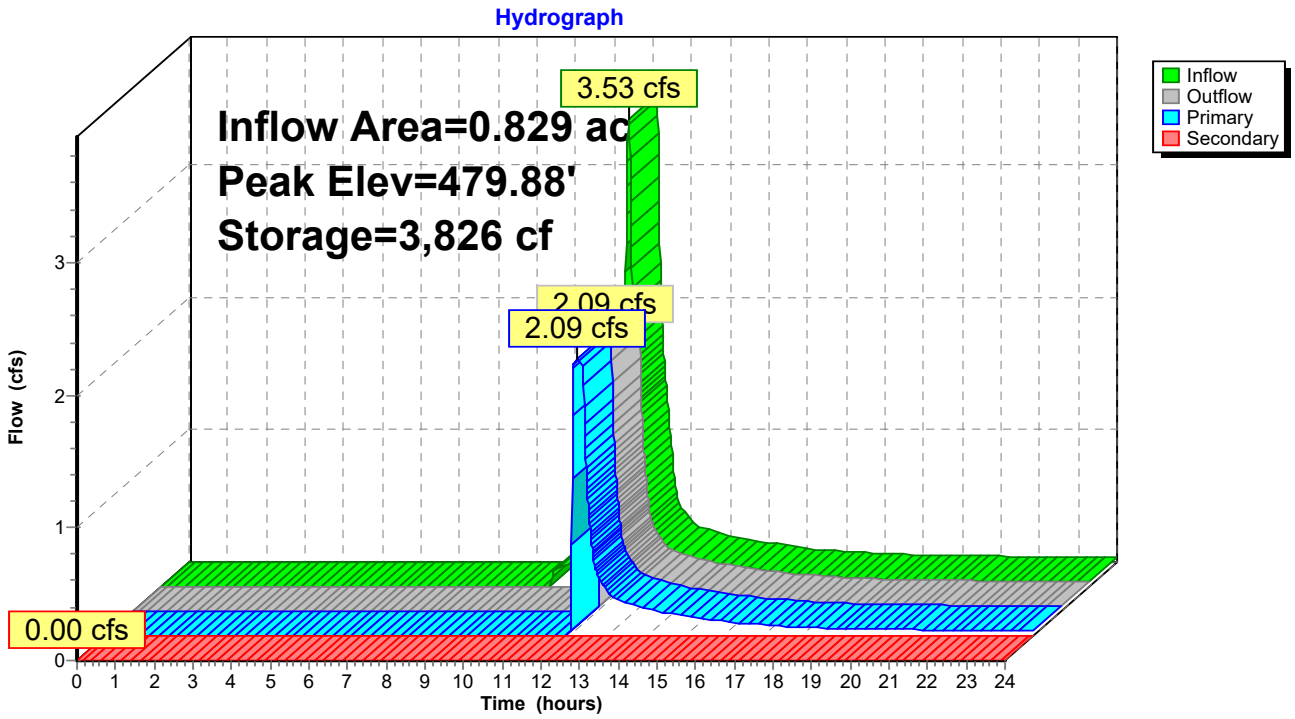
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 478.00 | 1,031 | 336.0 | 0 | 0 | 1,031 |
| 480.00 | 3,410 | 443.0 | 4,211 | 4,211 | 7,710 |
| 482.00 | 6,222 | 490.0 | 9,492 | 13,703 | 11,322 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 478.00' | **8.0" Round Culvert**<br>L= 264.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 478.00' / 428.60' S= 0.1871 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.35 sf |
| #2 | Device 1 | 479.65' | **30.0" x 42.0" Horiz. Orifice/Grate**<br>C= 0.600 in 42.0" x 60.0" Grate (50% open area)<br>Limited to weir flow at low heads |
| #3 | Secondary | 481.00' | **20.0' long x 8.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74 |

**Primary OutFlow** Max=2.09 cfs @ 12.20 hrs HW=479.88' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.09 cfs @ 6.00 fps)
└**2=Orifice/Grate** (Passes 2.09 cfs of 4.45 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=478.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WP: WP


Hydrograph
Inflow Area=0.829 ac
Peak Elev=479.88'
Storage=3,826 cf
3.53 cfs
2.09 cfs
2.09 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment POST: Basin 1 Post** Runoff Area=36,110 sf 75.52% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=92 Runoff=6.72 cfs 0.520 af

**Subcatchment PRE: Basin 1 Pre** Runoff Area=36,110 sf 0.00% Impervious Runoff Depth>5.61"
Flow Length=184' Tc=7.5 min CN=76 Runoff=5.14 cfs 0.387 af

**Pond SB: SEDIMENT BASIN** Peak Elev=483.19' Storage=1,262 cf Inflow=6.72 cfs 0.520 af
Outflow=6.68 cfs 0.497 af

**Pond WP: WP** Peak Elev=480.60' Storage=6,491 cf Inflow=6.68 cfs 0.497 af
Primary=2.53 cfs 0.425 af Secondary=0.00 cfs 0.000 af Outflow=2.53 cfs 0.425 af

**Total Runoff Area = 1.658 ac Runoff Volume = 0.908 af Average Runoff Depth = 6.57"**
**62.24% Pervious = 1.032 ac 37.76% Impervious = 0.626 ac**

## Summary for Subcatchment POST: Basin 1 Post

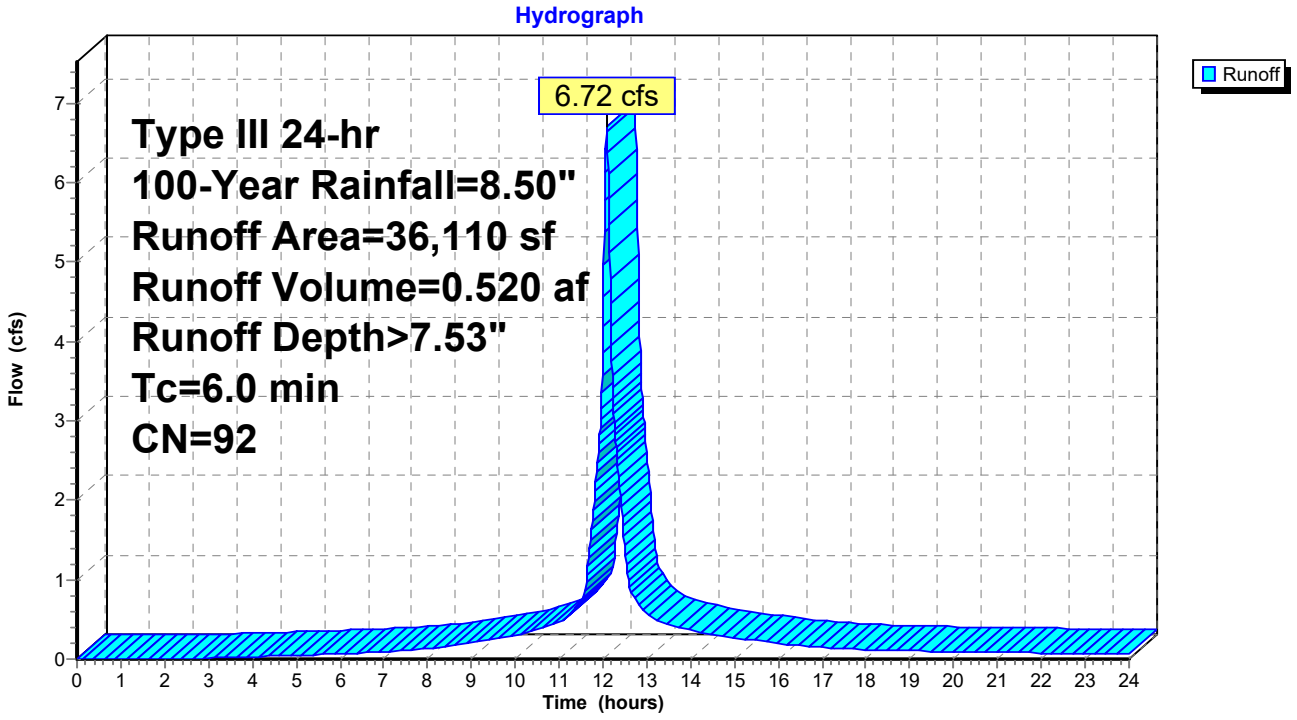
Runoff = 6.72 cfs @ 12.08 hrs, Volume= 0.520 af, Depth> 7.53"
Routed to Pond SB : SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

| Area (sf) | CN | Description |
|---|---|---|
| 27,269 | 98 | Paved parking, HSG C |
| 8,841 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 92 | Weighted Average |
| 8,841 | | 24.48% Pervious Area |
| 27,269 | | 75.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Minimum** |

## Subcatchment POST: Basin 1 Post



## Summary for Subcatchment PRE: Basin 1 Pre

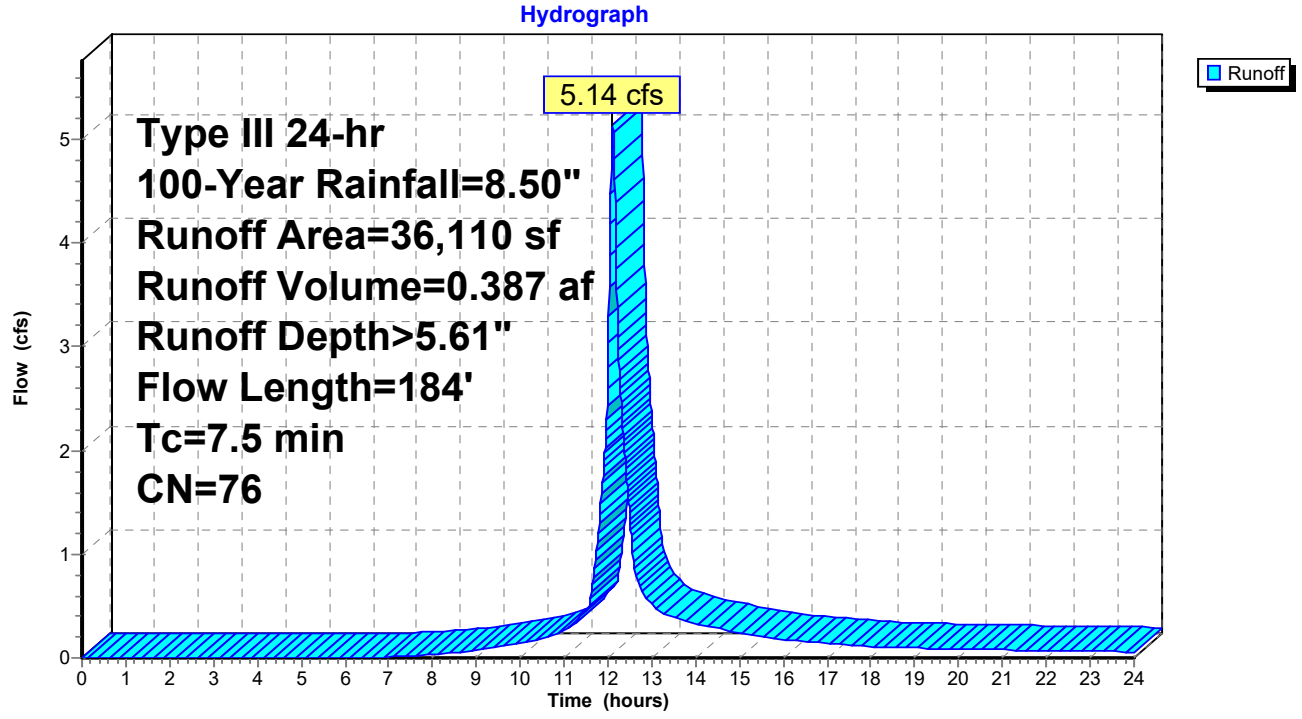
Runoff = 5.14 cfs @ 12.11 hrs, Volume= 0.387 af, Depth> 5.61"
Routed to nonexistent node AP-PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

| Area (sf) | CN | Description |
|---|---|---|
| 6,073 | 87 | Dirt roads, HSG C |
| 30,037 | 74 | >75% Grass cover, Good, HSG C |
| 36,110 | 76 | Weighted Average |
| 36,110 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.0450 | 0.24 | | **Sheet Flow, Sheet Flow, Woods: Light Underbrush** Grass: Short n= 0.150 P2= 3.25" |
| 0.5 | 84 | 0.1800 | 2.97 | | **Shallow Concentrated Flow, Shallow Concentrated Flow, Wood** Short Grass Pasture Kv= 7.0 fps |
| 7.5 | 184 | Total | | | |

## Subcatchment PRE: Basin 1 Pre



## Summary for Pond SB: SEDIMENT BASIN

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 7.53" for 100-Year event
Inflow = 6.72 cfs @ 12.08 hrs, Volume= 0.520 af
Outflow = 6.68 cfs @ 12.09 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.5 min
Primary = 6.68 cfs @ 12.09 hrs, Volume= 0.497 af
Routed to Pond WP : WP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 483.19' @ 12.09 hrs Surf.Area= 1,556 sf Storage= 1,262 cf
Flood Elev= 484.00' Surf.Area= 2,419 sf Storage= 2,865 cf

Plug-Flow detention time= 45.1 min calculated for 0.497 af (96% of inflow)
Center-of-Mass det. time= 19.6 min ( 786.5 - 766.9 )

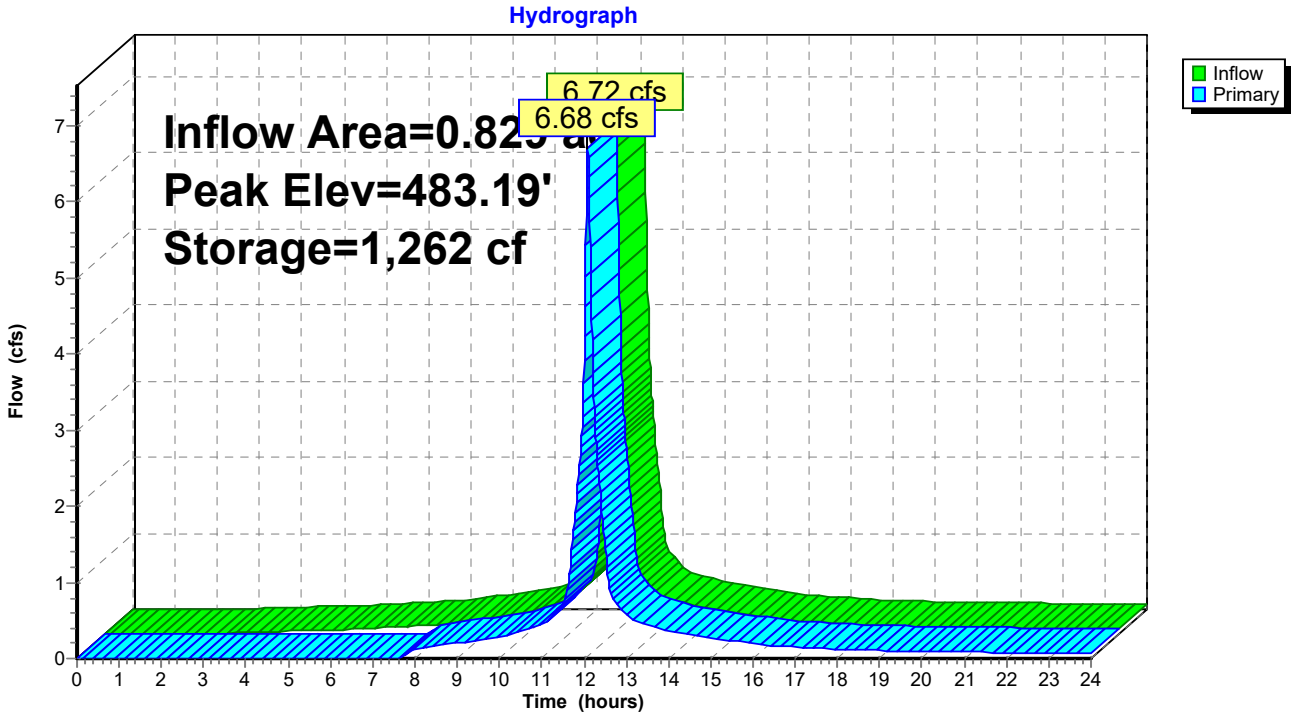
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 482.00' | 2,865 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 482.00 | 637 | 245.0 | 0 | 0 | 637 |
| 484.00 | 2,419 | 327.0 | 2,865 | 2,865 | 4,413 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 483.00' | **35.0' long + 2.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=6.68 cfs @ 12.09 hrs HW=483.19' TW=480.23' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 6.68 cfs @ 1.01 fps)

## Pond SB: SEDIMENT BASIN



## Summary for Pond WP: WP

Inflow Area = 0.829 ac, 75.52% Impervious, Inflow Depth > 7.20" for 100-Year event
Inflow = 6.68 cfs @ 12.09 hrs, Volume= 0.497 af
Outflow = 2.53 cfs @ 12.33 hrs, Volume= 0.425 af, Atten= 62%, Lag= 14.3 min
Primary = 2.53 cfs @ 12.33 hrs, Volume= 0.425 af
Routed to nonexistent node DP N-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 480.60' @ 12.33 hrs Surf.Area= 4,169 sf Storage= 6,491 cf
Flood Elev= 482.00' Surf.Area= 6,222 sf Storage= 13,703 cf

Plug-Flow detention time= 103.0 min calculated for 0.425 af (85% of inflow)
Center-of-Mass det. time= 42.4 min ( 828.9 - 786.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 478.00' | 13,703 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

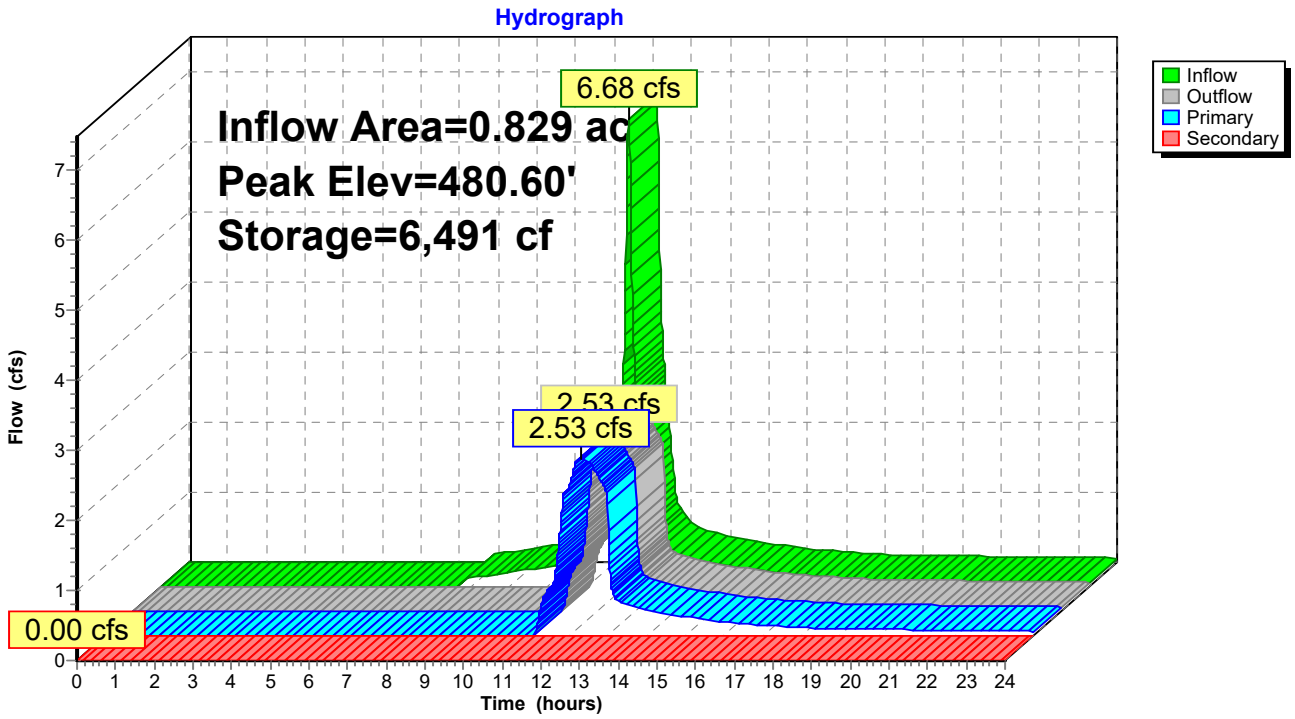
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 478.00 | 1,031 | 336.0 | 0 | 0 | 1,031 |
| 480.00 | 3,410 | 443.0 | 4,211 | 4,211 | 7,710 |
| 482.00 | 6,222 | 490.0 | 9,492 | 13,703 | 11,322 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 478.00' | **8.0" Round Culvert**<br>L= 264.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 478.00' / 428.60' S= 0.1871 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.35 sf |
| #2 | Device 1 | 479.65' | **30.0" x 42.0" Horiz. Orifice/Grate**<br>C= 0.600 in 42.0" x 60.0" Grate (50% open area)<br>Limited to weir flow at low heads |
| #3 | Secondary | 481.00' | **20.0' long x 8.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74 |

**Primary OutFlow** Max=2.53 cfs @ 12.33 hrs HW=480.60' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.53 cfs @ 7.25 fps)
└**2=Orifice/Grate** (Passes 2.53 cfs of 36.50 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=478.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WP: WP


Hydrograph
Inflow
Outflow
Primary
Secondary
6.68 cfs
Inflow Area=0.829 ac
Peak Elev=480.60'
Storage=6,491 cf
2.53 cfs
2.53 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

## TABLE OF CONTENTS

# APPENDIX C

SWPPP CONSTRUCTION INSPECTION REPORTS

# ATTACHMENT 1

## Construction Stormwater Compliance Inspection Report

| | | |
|---|---|---|
| Project Name and Location: | Date: | Page 1 of 2 |
| | Permit # (if any): **NYR** | |
| Municipality: County: | Entry Time: | Exit Time: |
| On-site Representative(s) and contact information: | Weather Conditions: | |
| Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes □ No □ | | |

## INSPECTION CHECKLIST

**SPDES Authority**

| | Yes | No | N/A | | Law, rule or permit citation |
|---|---|---|---|---|---|
| 1. | □ | □ | □ | Is a copy of the NOI posted at the construction site for public viewing? | |
| 2. | □ | □ | □ | Is an up-to-date copy of the signed SWPPP retained at the construction site? | |
| 3. | □ | □ | □ | Is a copy of the SPDES General Permit retained at the construction site? | |

**SWPPP Content**

| | Yes | No | N/A | | Law, rule or permit citation |
|---|---|---|---|---|---|
| 4. | □ | □ | □ | Does the SWPPP describe and identify the erosion & sediment control measures to be employed? | |
| 5. | □ | □ | □ | Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures? | |
| 6. | □ | □ | □ | Does the SWPPP describe and identify the post-construction SW control measures to be employed? | |
| 7. | □ | □ | □ | Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure? | |
| 8. | □ | □ | □ | Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements? | |
| 9. | □ | □ | □ | Is the SWPPP signed/certified by the permittee? | |

**Recordkeeping**

| | Yes | No | N/A | | Law, rule or permit citation |
|---|---|---|---|---|---|
| 10. | □ | □ | □ | Are inspections performed as required by the permit (every 7 days and after ½" rain event)? | |
| 11. | □ | □ | □ | Are the site inspections performed by a qualified professional? | |
| 12. | □ | □ | □ | Are all required reports properly signed/certified? | |
| 13. | □ | □ | □ | Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status? | |

**Visual Observations**

| | Yes | No | N/A | | Law, rule or permit citation |
|---|---|---|---|---|---|
| 14. | □ | □ | □ | Are all erosion and sediment control measures installed/constructed? | |
| 15. | □ | □ | □ | Are all erosion and sediment control measures maintained properly? | |
| 16. | □ | □ | □ | Have all disturbances of 5 acres or more been approved prior to the disturbance? | |
| 17. | □ | □ | □ | Are stabilization measures initiated in inactive areas? | |
| 18. | □ | □ | □ | Are permanent stormwater control measures implemented? | |
| 19. | □ | □ | □ | Was there a discharge into the receiving water on the day of inspection? | |
| 20. | □ | □ | □ | Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2) | |

| | |
|---|---|
| **Overall Inspection Rating:** ❑ Satisfactory ❑ Marginal ❑ Unsatisfactory | |
| **Name/Agency of Lead Inspector:** | **Signature of Lead Inspector:** |
| **Names/Agencies of Other Inspectors:** | |

**Water Quality Observations**

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] _____

Describe the quality of the receiving water(s) both upstream and downstream of the discharge_____

Describe any other water quality standards or permit violations _____

Additional Comments:_____

☐ Photographs attached

# APPENDIX H

**STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES**

# CONSTRUCTION SITE LOG BOOK

## Table of Contents



Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

## I. PRE-CONSTRUCTION MEETING DOCUMENTS

**Project Name** _____

**Permit No.** _____ **Date of Authorization** _____

**Name of Operator** _____

**Prime Contractor** _____

### a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

**b. Operators Certification**

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

**Name (please print):** _____

**Title** _____ **Date:** _____

**Address:** _____

**Phone:** _____ **Email:** _____

**Signature:** _____

**c. Qualified Professional's Credentials & Certification**

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

**Name (please print):** _____

**Title** _____ **Date:** _____

**Address:** _____

**Phone:** _____ **Email:** _____

**Signature:** _____

**d. Pre-construction Site Assessment Checklist**
**(NOTE: Provide comments below as necessary)**

1. Notice of Intent, SWPPP, and Contractors Certification:

**Yes No NA**

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

**Yes No NA**

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

**Yes No NA**

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

**Yes No NA**

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

**Yes No NA**

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

**Yes No NA**

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

## II. CONSTRUCTION DURATION INSPECTIONS

**a. Directions:**
**Inspection Forms will be filled out during the entire construction phase of the project.**
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass
water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

**SITE PLAN/SKETCH**

_____ _____

**Inspector (print name)** **Date of Inspection**

_____ _____

**Qualified Professional (print name)** **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

**Maintaining Water Quality**

**Yes No NA**
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

**Housekeeping**

1. General Site Conditions
**Yes No NA**
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
**Yes No NA**
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

**Runoff Control Practices**

1. Excavation Dewatering
**Yes No NA**
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
**Yes No NA**
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
**Yes No NA**
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam
**Yes No NA**
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
**Yes No NA**
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

**Soil Stabilization**

1. Topsoil and Spoil Stockpiles
**Yes No NA**
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
**Yes No NA**
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

**Sediment Control Practices**

1. Stabilized Construction Entrance
**Yes No NA**
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence
**Yes No NA**
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

**Sediment Control Practices (continued)**

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

**Yes No NA**

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

**Yes No NA**

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

**Yes No NA**

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

## CONSTRUCTION DURATION INSPECTIONS

**b. Modifications to the SWPPP (To be completed as described below)**

The Operator shall amend the SWPPP whenever:
1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

**Modification & Reason:**

## III. Monthly Summary of Site Inspection Activities

| Name of Permitted Facility: | Today's Date: | Reporting Month: |
|---|---|---|
| Location: | Permit Identification #: | |
| Name and Telephone Number of Site Inspector: | | |

| Date of Inspection | Regular / Rainfall based Inspection | Name of Inspector | Items of Concern |
|---|---|---|---|
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***Owner/Operator Certification:***

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

# APPENDIX D

NOI, NOI ACCEPTANCE FORM & NOT

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

# SWPPP Preparer Certification Form

*SPDES General Permit for Stormwater Discharges From Construction Activity (GP-0-20-001)*

## Project Site Information

### Project/Site Name

Orange County Medical Examiners Building

## Owner/Operator Information

### Owner/Operator (Company Name/Private Owner/Municipality Name)

Orange County, New York

## Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

| Alfred | A | Fusco, Jr. |
|---|---|---|
| First name | MI | Last Name |

Signature

10/10/22

Date

Revised: January 2020

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

# Owner/Operator Certification Form

**SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001)**

**Project/Site Name:** Orange County Medical Examiners Building

**eNOI Submission Number:** HPJ-YT93-VJJQJ

**eNOI Submitted by:** ☐ **Owner/Operator** ☑ **SWPPP Preparer** ☐ **Other**

## Certification Statement - Owner/Operator

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Alfred — Owner/Operator First Name

A. — M.I.

Fusco, Jr. P.E. — Last Name

Signature

10/10/22

Date

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

**NYS Department of Environmental Conservation**
**Division of Water**
**625 Broadway, 4th Floor**
**Albany, New York 12233-3505**

# MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

**for**

**Construction Activities Seeking Authorization Under SPDES General Permit**

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

| | |
|---|---|
| **I. Project Owner/Operator Information** | |
| 1. Owner/Operator Name: | Orange County |
| 2. Contact Person: | Erik Denega, PE |
| 3. Street Address: | 2455-2459 Route 17M |
| 4. City/State/Zip: | Goshen, NY 10924 |
| **II. Project Site Information** | |
| 5. Project/Site Name: | Orange County Medical Examiners Building |
| 6. Street Address: | 22 Wells Farm Road |
| 7. City/State/Zip: | Goshen, NY 10924 |
| **III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information** | |
| 8. SWPPP Reviewed by: | Erik Denega, PE |
| 9. Title/Position: | Commissioner Orange County DPW |
| 10. Date Final SWPPP Reviewed and Accepted: | 10/25/2022 |
| **IV. Regulated MS4 Information** | |
| 11. Name of MS4: | Orange County |
| 12. MS4 SPDES Permit Identification Number: NYR20A | |
| 13. Contact Person: | Erik Denega, PE |
| 14. Street Address: | 2455-2459 Route 17M |
| 15. City/State/Zip: | Goshen, NY 10924 |
| 16. Telephone Number: | 845-291-2750 |

## MS4 SWPPP Acceptance Form - continued

**V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative**

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name: Alan J Sorensen, AICP

Title/Position: Orange County Planning Commissioner

Signature:

Date:

**VI. Additional Information**

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

# APPENDIX E

CONSTRUCTION WASTE MANAGEMENT PLAN

## CONSTRUCTION WASTE MANAGEMENT & SPILL PREVENTION PLAN

At the commencement of construction, land clearing materials will be collected and stored on-site for reuse. Construction debris such as cardboard, concrete, metal, wood and similar garbage will be collected in dumpsters and disposed of properly. An open top container will be on site during construction. The contractor will be responsible for organizing and placing containers on site and timely removal/replacement when containers are filled to capacity.

On-site storage of fuel chemicals shall be equipped with a spill kit. The contractor must provide secondary containment for storing any hazardous chemicals on site.

All equipment stored on site shall be inspected daily by the contractor for any oil or lubricant spills or leaks. Any leaks shall be repaired immediately. In addition, all equipment must be closely inspected prior to working in any R.O.W.

The contractor shall clean all spills immediately and shall report all spills to the New York State Department of Environmental Conservation.

This plan will be displayed in the construction jobsite trailer at all times.

# APPENDIX F

CONTRACTOR CERTIFICATION STATEMENT

# Contractor Certification Statement

| Name of Construction Site | NYR_____ DEC Permit ID | Municipality (MS4) |
|---|---|---|

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version New York State Pollution Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of State of New York and could subject me to criminal, civil and /or administrative proceedings.

Name _____ Title _____

Signature _____ Date _____

Company Name & Address _____ Phone_____

_____

Project Site Address _____

Provisions Responsible for _____

_____

_____

## Information on the Trained Certified Contractor or Subcontractor

| Name of Trained Employee | Title of Trained Employee | NYSDEC SWT# |
|---|---|---|

*A copy of this signed contractor certification statement must be maintained in the SWPPP on site.*

# APPENDIX G

STORMWATER MAINTENANCE AND MANAGEMENT INSPECTON CHECKLIST

# STORMWATER
# OPERATION, MAINTENANCE AND MANAGEMENT INSPECTION CHECKLIST

**Project:** *****
**Location:** ****

**Site Status:** _____

**Date:** _____

**Time:** _____

**Inspector:** _____

| Maintenance Item | Satisfactory / Unsatisfactory | Comments |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

**Comments:**

_____
_____
_____
_____
_____
_____
_____
_____

**Actions to be taken:**

_____
_____
_____
_____
_____
_____
_____

# ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

ORANGE COUNTY MEDICAL EXAMINER
22 WELLS FARM RD.
GOSHEN, NY 10924

## BID SET

11/18/2022

**HHA PROJ. NO.: 20071**

**CLIENT PROJ. NO.:**


## DRAWING LIST




**OWNER**

ORANGE COUNTY NEW YORK 1 NOVEMBER 1683

**ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER**

HYMAN HAYES ASSOCIATES
HHA
800 Troy-Schenectady Road, Suite 103
Latham, NY, 12110
(518) 452-3470
www.hymanhayes.com

**CONSTRUCTION MANAGER**

the Palombo Group
CONSTRUCTION MANAGEMENT & GENERAL CONTRACTING
170 Washington St.
Poughkeepsie, NY 12601
(845) 575-6700
www.thepalombogroup.com

**MEP ENGINEER**

FELLENZER ENGINEERING LLP

**CIVIL ENGINEER**

Fusco Engineering & Land Surveying PC

**FORENSIC**

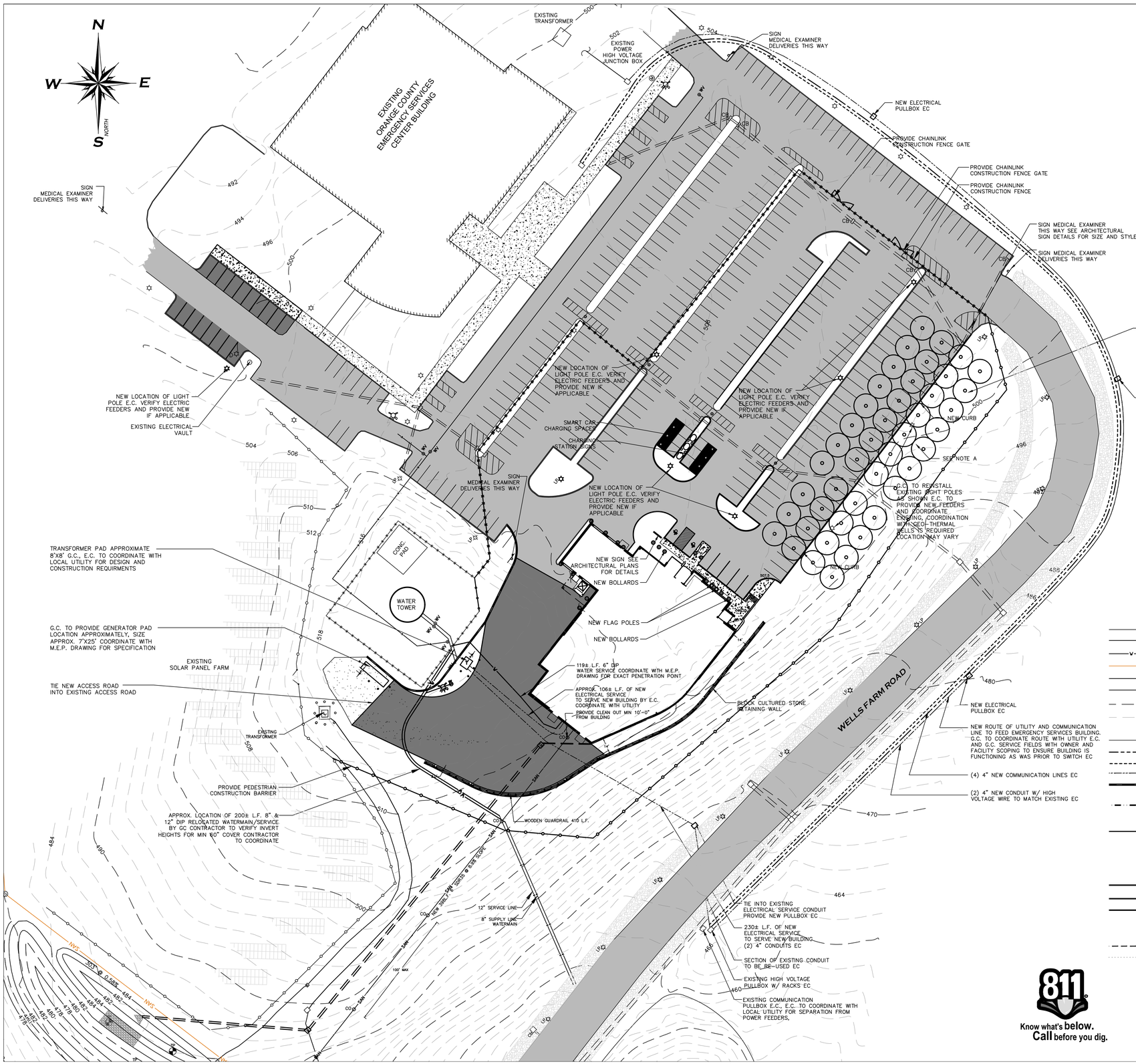
crime lab design

**I.T./SECURITY**

CONVERGENT TECHNOLOGIES DESIGN GROUP, INC.

**FF&E**

Classic Contract Interiors, LLC




PROJECT CONTRACTS:
G.C. GENERAL CONTRACTOR
E.C. ELECTRICAL CONTRACTOR
M.C. MECHANICAL CONTRACTOR
P.C. PLUMBING CONTRACTOR

NOTES:
A. LOCATION OF GEOTHERMAL WELLS ARE APPROXIMATE. G.C. TO COORDINATE WITH M.C. AND P.C. FOR EXACT LOCATION AND ROUTING OF PIPE. SEE MEP DRAWINGS FOR DETAILS OF THERMAL WELL DEPTH AND COVERAGE. ROUTING OF PIPE BACK TO BUILDING G.C.
B. CONCRETE CURB ISLANDS TO BE GRASS TO MATCH EXISTING.
C. ALL UNDERGROUND UTILITIES ARE CONSIDERED PRIVATELY OWNED. THEREFORE GC IS RESPONSIBLE FOR LOCATING AND MARKING UTILITIES AS NEEDED.

## LEGEND

- EXISTING BOLLARD
- EXISTING UTILITY POLE
- EXISTING SIGN
- EXISTING CATCH BASIN
- EXISTING ELECTRICAL PULL BOXES
- EXISTING LIGHT POLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED PAVEMENT (21,050 ± S.F.)
- EXISTING PAVEMENT
- EXISTING SIDEWALK
- EXISTING DIRT ROAD
- CHAIN LINK FENCE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING WATER LINE
- EXISTING SEWER LINE
- UNDERGROUND FIBER OPTICS
- UNDERGROUND TELEPHONE
- CONTOUR LINE MAJOR
- CONTOUR LINE MINOR
- FLAG POLE
- PROPOSED CONTOUR LINE
- RELOCATED UNDERGROUND FIBER OPTICS
- RELOCATED UNDERGROUND TELEPHONE
- RELOCATED UNDERGROUND ELECTRIC
- RETAINING WALL
- CONCRETE BOLLARD
- SILT FENCE
- NEW SIGN (4)
- SANITARY
- EXISTING LIGHT POLE WITHIN A.O.D. TO REMAIN
- EXISTING LIGHT POLE TO BE DISASSEMBLED (SEE NOTE E & H)
- RELOCATED VALVE & HYDRANT
- REMOVE UNDERGROUND ELECTRIC
- REMOVE UNDERGROUND FIBER OPTICS
- REMOVE UNDERGROUND TELEPHONE
- EXISTING PAVING TO BE REMOVED (APPROXIMATELY 56,000 ±S.F.) CONTRACTOR TO VERIFY EXISTING SUBBASE MEETS REQUIREMETNS AS PER DETAIL SHOWN ON PAVEMENT DETAIL SHEET D101
- LIMITS OF SAWCUT OF PAVEMENT
- LIMITS OF DISTURBANCE

Know what's below. Call before you dig.

GRAPHIC SCALE
40 0 20 40 80 160
( IN FEET )
1 inch = 40 ft.

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| 1 | BID SET | 11/18/22 |
| 2 | REVISED RFB D | 1/5/23 |

SEAL

ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER
HYMAN HAYES ASSOCIATES
160 Troy-Schenectady Road
Suite 103
Latham, NY 12110
(518) 452-3470
www.hymanhayes.com

| | |
|---|---|
| COST CONSULTANT | STUART-LYNN COMPANY |
| FF&E CONSULTANT | CLASSIC CONTRACT INTERIORS, LLC |
| IT-SECURITY CONSULTANT | CONVERGENT TECHNOLOGIES |
| CIVIL CONSULTANT | Fusco Engineering & Land Surveying P.C. |
| M&P CONSULTANT | FELLENZER PE |
| FORENSIC CONSULTANT | |

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ORANGE COUNTY, NEW YORK

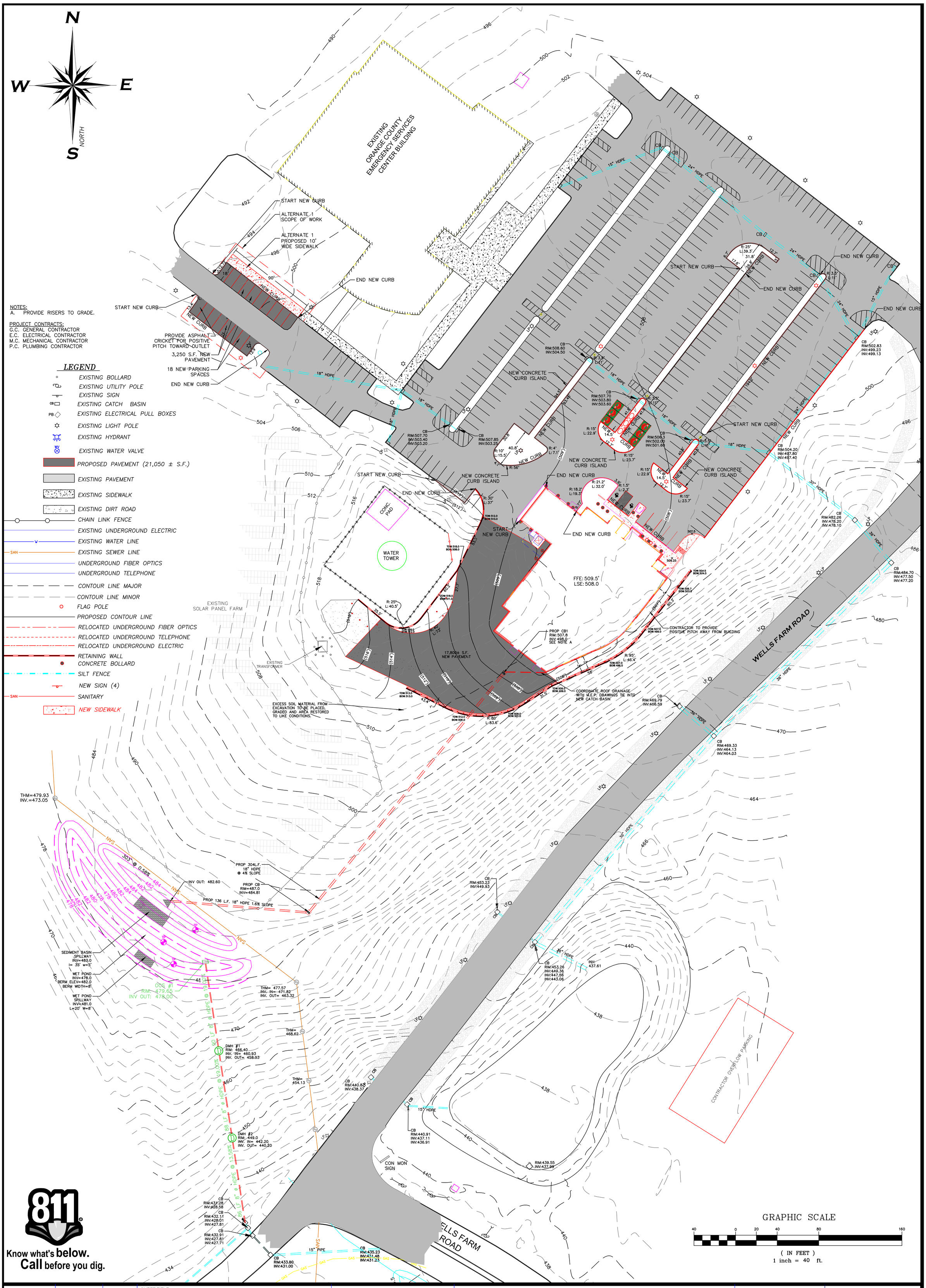
ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

SHEET TITLE
UTILITY PLAN

| | |
|---|---|
| DATE: | 11/1/22 |
| SCALE: | 1"=40' |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
C101




| | |
|---|---|
| SHEET NUMBER | C102 |
| DATE: | 11/1/22 |
| SCALE: | 1"=30' |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET TITLE

# SITE PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

ORANGE COUNTY, NEW YORK

ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER

HYMAN HAYES ASSOCIATES

800 Troy-Schenectady Road
Suite 103
Latham, NY, 12110
(518) 452-3470
www.hymanhayes.com

| FORENSIC CONSULTANT | M/E/P CONSULTANT | CIVIL CONSULTANT | I.T./SECURITY CONSULTANT | FF&E CONSULTANT | COST CONSULTANT |
|---|---|---|---|---|---|
| | FELLENZER ENGINEERING LLP | Fusco Engineering & Land Surveying PC | CONVERGENT TECHNOLOGIES DESIGN GROUP, INC. | CLASSIC CONTRACT INTERIORS, LLC | STUART-LYNN COMPANY |

SEAL

LICENSED PROFESSIONAL ENGINEER ALFRED A. PUGLISI, JR. IND. 054404 STATE OF NEW YORK

**REVISION SCHEDULE**

| # | DESCRIPTION | DATE |
|---|---|---|
| 1 | FOR BID | 11/1/22 |
| 2 | REVISED RFP D | 1/6/23 |

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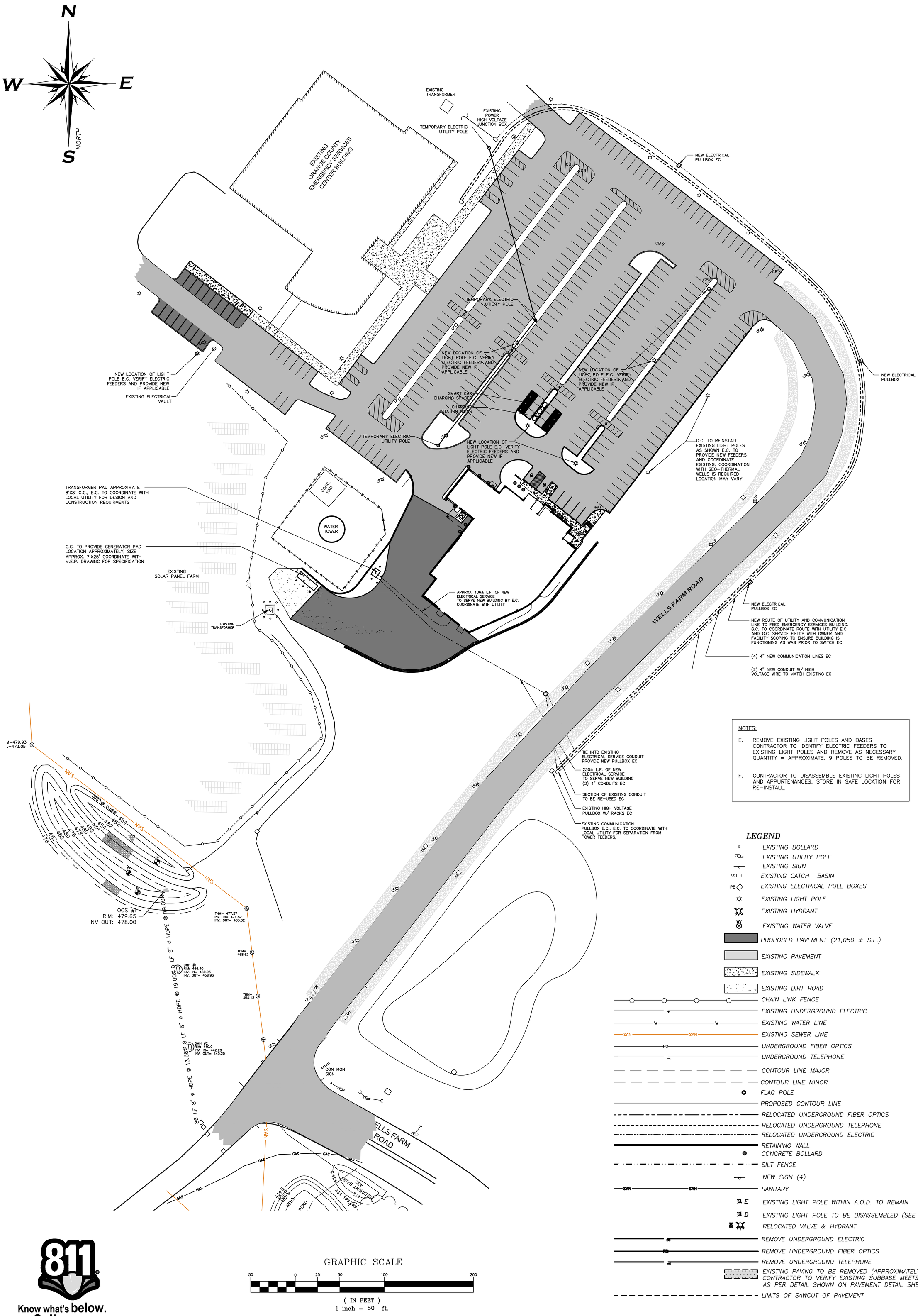


NOTES:

E. REMOVE EXISTING LIGHT POLES AND BASES. CONTRACTOR TO IDENTIFY ELECTRIC FEEDERS TO EXISTING LIGHT POLES AND REMOVE AS NECESSARY QUANTITY = APPROXIMATE. 9 POLES TO BE REMOVED.

F. CONTRACTOR TO DISASSEMBLE EXISTING LIGHT POLES AND APPURTENANCES, STORE IN SAFE LOCATION FOR RE-INSTALL.

## LEGEND

- EXISTING BOLLARD
- EXISTING UTILITY POLE
- EXISTING SIGN
- EXISTING CATCH BASIN
- EXISTING ELECTRICAL PULL BOXES
- EXISTING LIGHT POLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED PAVEMENT (21,050 ± S.F.)
- EXISTING PAVEMENT
- EXISTING SIDEWALK
- EXISTING DIRT ROAD
- CHAIN LINK FENCE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING WATER LINE
- EXISTING SEWER LINE
- UNDERGROUND FIBER OPTICS
- UNDERGROUND TELEPHONE
- CONTOUR LINE MAJOR
- CONTOUR LINE MINOR
- FLAG POLE
- PROPOSED CONTOUR LINE
- RELOCATED UNDERGROUND FIBER OPTICS
- RELOCATED UNDERGROUND TELEPHONE
- RELOCATED UNDERGROUND ELECTRIC
- RETAINING WALL
- CONCRETE BOLLARD
- SILT FENCE
- NEW SIGN (4)
- SANITARY
- EXISTING LIGHT POLE WITHIN A.O.D. TO REMAIN
- EXISTING LIGHT POLE TO BE DISASSEMBLED (SEE NOTE E & H)
- RELOCATED VALVE & HYDRANT
- REMOVE UNDERGROUND ELECTRIC
- REMOVE UNDERGROUND FIBER OPTICS
- REMOVE UNDERGROUND TELEPHONE
- EXISTING PAVING TO BE REMOVED (APPROXIMATELY 56,000 ±S.F.) CONTRACTOR TO VERIFY EXISTING SUBBASE MEETS REQUIREMETNS AS PER DETAIL SHOWN ON PAVEMENT DETAIL SHEET D101
- LIMITS OF SAWCUT OF PAVEMENT

811 Know what's below. Call before you dig.

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

SHEET NUMBER CE101

| | |
|---|---|
| DATE: | 11/1/22 |
| SCALE: | 1"=50' |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET TITLE

# ELECTRICAL SITE PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

ORANGE COUNTY, NEW YORK

ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER

HYMAN HAYES ASSOCIATES

800 Troy-Schenectady Road
Suite 103
Latham, NY, 12110
(518) 452-3470
www.hymanhayes.com

| FORENSIC CONSULTANT | M/E/P CONSULTANT | CIVIL CONSULTANT | I.T./SECURITY CONSULTANT | FF&E CONSULTANT | COST CONSULTANT |
|---|---|---|---|---|---|
| | FELLENZER ENGINEERING LLP | Fusco Engineering & Land Surveying PC | CONVERGENT TECHNOLOGIES DESIGN GROUP, INC. | CLASSIC CONTRACT INTERIORS, LLC | STUART-LYNN COMPANY |

SEAL

LICENSED PROFESSIONAL ENGINEER ALFRED A. SCRIBO, JR. NO. 054404 STATE OF NEW YORK

**REVISION SCHEDULE**

| # | DESCRIPTION | DATE |
|---|---|---|
| 1 | BID SET | 11/18/22 |
| 2 | REVISED RFP D | 1/6/23 |

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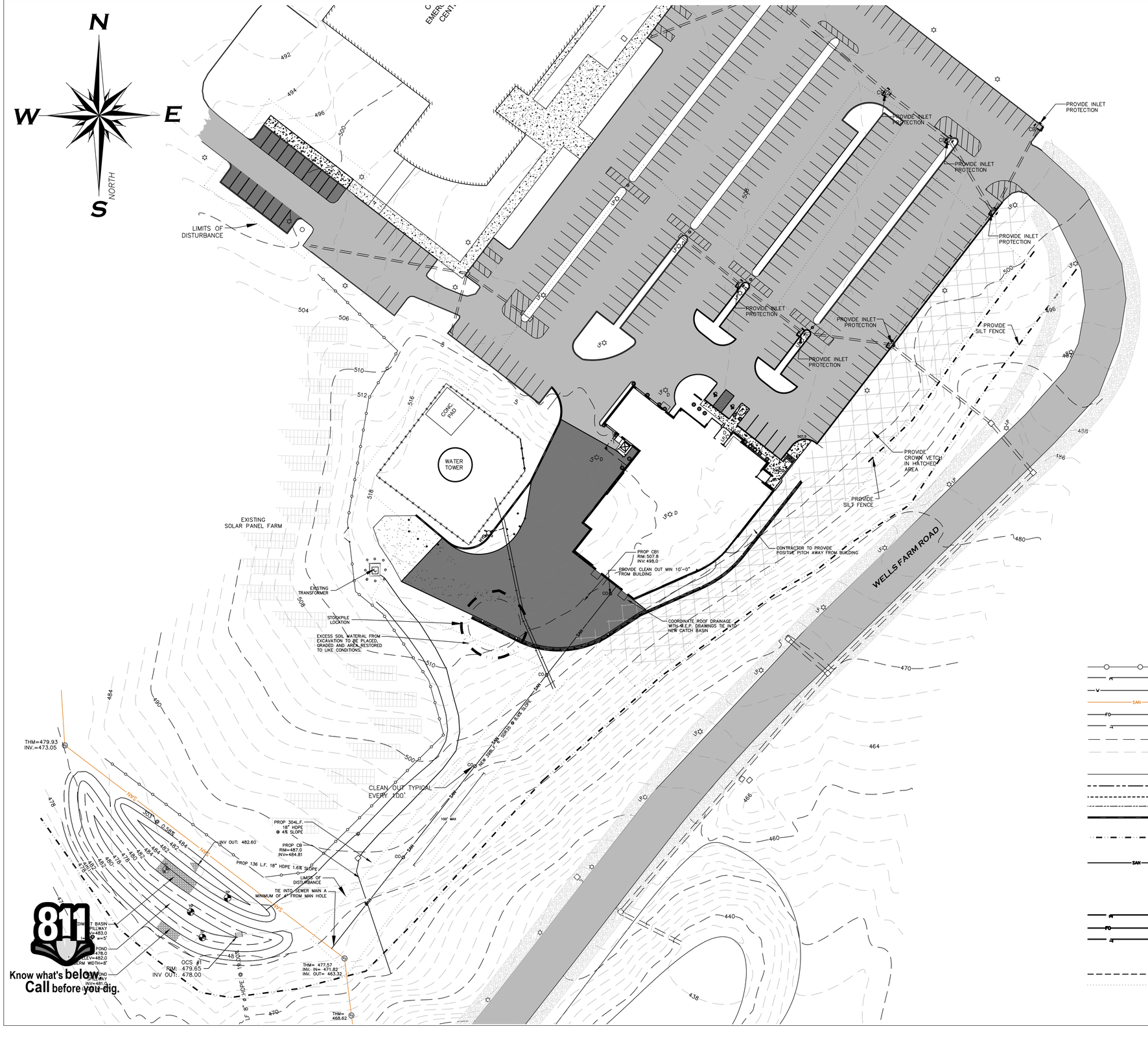


## DEEP SOIL TEST

TPA — 10/7/22

| | |
|---|---|
| 0–10" | 10" TOPSOIL |
| 10"–38" | 28" BROWN SILT W/ COBBLES |
| 38"–90" | 52" BROWN CLAY W/ COBBLES |
| 90"–166" | 76" GREY SILTY CLAY W/ COBBLES |
| 166" | NO WATER SEEPAGE AT 76" |

TPB — 10/7/22

| | |
|---|---|
| 0–70" | TOPSOIL<br>34" BROWN CLAY (LOOSE) W/ COBBLES |
| 70"–140" | 70" HARDPAN BROWN CLAY SOME GREY CLAY |
| 140" | NO WATER SEEPAGE AT 70" |

## DEEP SOIL TEST

TPC — 10/7/22

| | |
|---|---|
| 0–28" | TOPSOIL<br>28" BROWN COBBLE LOAM W/ SOME MOTTLING |
| 28"–62" | 34" LOAM GRAVEL |
| 62"–108" | 46" GREY CLAY COBBLES |
| 108"–182" | 74" BROWN HARDPAN CLAY |
| 182" | NO WATER SEEPAGE AT 76" |

TPD — 10/7/22

| | |
|---|---|
| 0–32" | TOPSOIL<br>32" BROWN CLAY (LOOSE) W/ COBBLES |
| 32"–88" | 56" BROWN HARDPAN CLAY |
| 88" | NO WATER SEEPAGE AT 56" |

## LEGEND

- EXISTING BOLLARD
- EXISTING UTILITY POLE
- EXISTING SIGN
- EXISTING CATCH BASIN
- EXISTING ELECTRICAL PULL BOXES
- EXISTING LIGHT POLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED PAVEMENT (21,050 ± S.F.)
- EXISTING PAVEMENT
- EXISTING SIDEWALK
- EXISTING DIRT ROAD
- CHAIN LINK FENCE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING WATER LINE
- EXISTING SEWER LINE
- UNDERGROUND FIBER OPTICS
- UNDERGROUND TELEPHONE
- CONTOUR LINE MAJOR
- CONTOUR LINE MINOR
- FLAG POLE
- PROPOSED CONTOUR LINE
- RELOCATED UNDERGROUND FIBER OPTICS
- RELOCATED UNDERGROUND TELEPHONE
- RELOCATED UNDERGROUND ELECTRIC
- RETAINING WALL
- CONCRETE BOLLARD
- SILT FENCE
- NEW SIGN (4)
- SANITARY
- E EXISTING LIGHT POLE WITHIN A.O.D. TO REMAIN
- D EXISTING LIGHT POLE TO BE DISASSEMBLED (SEE NOTE E & H)
- RELOCATED VALVE & HYDRANT
- REMOVE UNDERGROUND ELECTRIC
- REMOVE UNDERGROUND FIBER OPTICS
- REMOVE UNDERGROUND TELEPHONE
- EXISTING PAVING TO BE REMOVED (APPROXIMATELY 56,000 ±S.F.) CONTRACTOR TO VERIFY EXISTING SUBBASE MEETS REQUIREMETNS AS PER DETAIL SHOWN ON PAVEMENT DETAIL SHEET D101
- LIMITS OF SAWCUT OF PAVEMENT
- LIMITS OF DISTURBANCE

**REVISION SCHEDULE**

| # | DESCRIPTION | DATE |
|---|---|---|
| 1 | BID SET | 11/18/22 |
| 2 | REVISED RFB D. | 1/5/23 |

SEAL


HYMAN HAYES ASSOCIATES
ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER
100 Troy-Schenectady Road
Suite 103
Latham, NY 12110
(518) 452-3470
www.hymanhayes.com


| | |
|---|---|
| FORENSIC CONSULTANT | |
| M.E.P. CONSULTANT | FELLENZER PE |
| CIVIL CONSULTANT | Fusco Engineering & Land Surveying P.C. |
| I.T. SECURITY CONSULTANT | CONVERGENT TECHNOLOGIES |
| FF&E CONSULTANT | CLASSIC CONTRACT INTERIORS, LLC |
| COST CONSULTANT | STUART-LYNN COMPANY |

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ORANGE COUNTY, NEW YORK

SHEET TITLE
# EROSION & SEDIMENT CONTROL PLAN

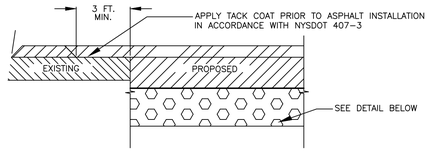
ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/1/22 |
| SCALE: | 1"=40' |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER

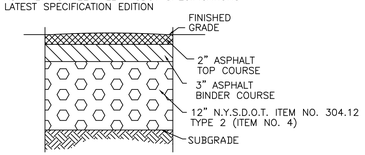
ESCP

24X48 BLOCK RETAINING WALL TO MATCH BUILDING COLOR.

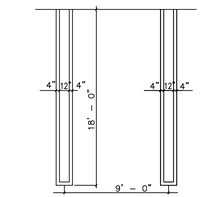



## PAVEMENT CONNECTION DETAIL
N.T.S.

NOTE:
ASPHALT TO MEET ALL NYSDOT SPECIFICATIONS LATEST SPECIFICATION EDITION



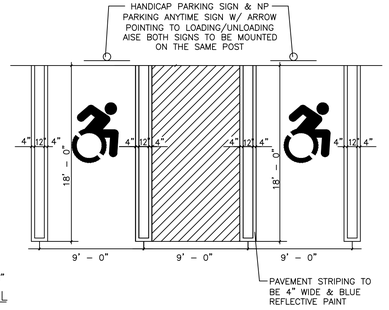

## PAVEMENT DETAIL
N.T.S.



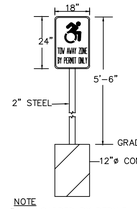

NOTE
THE HANDICAP SIGNS SHALL STATE "BY PERMIT ONLY"

TYPICAL PAVEMENT STRIPING DETAIL
N.T.S.

## STRIPING DETAIL




## TYPICAL HANDICAP PARKING PAVEMENT STRIPING DETAIL
N.T.S.




NOTE
"HANDICAPPED BY PERMIT ONLY" SIGN TO BE FACING THE HANDICAPPED PARKING SPACE.

## HANDICAP SIGN DETAIL
N.T.S.

STANDARD COUNTY NOTE:

NO SITE PREPARATION ION OR CONSTRUCTION, INCLUDING UTILITY CONNECTIONS, SHALL COMMENCE UNTIL A VALID HIGHWAY WORK PERMIT HAS BEEN SECURED FROM THE ORANGE COUNTY DEPARTMENT OF PUBLIC WORKS UNDER SECTION 136 OF THE HIGHWAY LAW

MONUMENTATION : WHERE A PARCEL ABUTTING THE COUNTY HIGHWAY IS SUBDIVIDED , THE OWNER/APPLICANT SHALL BE REQUIRED TO PROVIDE PERMANENT MONUMENTATION OF THE HIGHWAY BOUNDARY IN A MANNER ACCEPTABLE TO THE COMMISSIONER OF PUBLIC WORKS OR HIS REPRESENTATIVE. WE REQUIRE THAT MONUMENTS BE SET AT THE MAJOR COMERS. MONUMENTATION SHALL BE INSTALLED BY A PROFESSIONAL LAND SURVEYOR LICENSED TO PRACTICE IN NEW YORK STATE

SEE THE ATTACHED PRECAST SURVEY CONCRETE MONUMENT CUT SHEET WITH SPECIFICATIONS, AND APPROVED EQUAL IS ACCEPTABLE, ONLY AFTER IT HAS BEEN SUBMITTED FOR REVIEW AND APPROVAL BY ORANGE COUNTY DEPARTMENT OF PUBLIC WORKS. THE PRECAST MONUMENT IS REQUIRED TO HAVE THE PROPERTY CORNER SCRIBED IN THE SURFACE OF THE CONCRETE MONUMENT.

MAINTENANCE AND PROTECTION OF TRAFFIC

ALL CONSTRUCTION SIGNAGE IS REQUIRED TO BE IN PLACE PRIOR TO COMMENCING ANY WORK WITHIN THE COUNTY RIGHT OF WAY.

THE MORE STRINGENT SIGN REQUIREMENTS OF ORANGE COUNTY SUPERSEDE ANY MUNCIPAL REQUIREMENTS.

THE FOLLOWING SIGNS ARE REQUIRED TO BE PLACED IN EACH DIRECTION WHEN ONE LANE IS CLOSED TO PERFORM THE WORK: ROAD WORK 1500 FT, ROAD WORK 1000 FT, ROAD WORK 500 FT, ONE LANE ROAD AHEAD , FLAGGER SYMBOL ON EACH APPROACH WHEN TAKING A TRAVEL LANE AS PER ORANGE COUNTY REQUIREMENTS.

THE FOLLOWING SIGNS ARE REQUIRED WHEN WORK IS PERFORMED ON THE SHOULDER: ROAD WORK 1500 FT, ROAD WORK 1,000 ROAD WORK 500 FT, NO SHOULDER AS PER ORANGE COUNTY REQUIREMENTS. FLAGGER SYMBOLS ARE REQUIRED TO BE AVAILABLE FOR A NO SHOULDER WORK ZONE IN CASE FLAGGERS ARE USED TO DIRECT TRAFFIC.

ALL CONSTRUCTION SIGNAGE IS REQUIRED TO MEET THE REQUIREMENTS AS PER THE "NATIONAL MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND NYS SUPPLEMENT LATEST EDITION AND REVISIONS. THE CONSTRUCTION SIGNAGE SHALL BE INSTALLED ON BREAKAWAY POSTS OR ON WIND-MASTERS AND COVERED AND UNCOVERED ON A DAILY BASIS. THE CONTRACTOR MUST HAVE ALL THE NECESSARY CONSTRUCTION SIGNS TO PERFORMANCE THE WORK SAFELY.

ALL CONSTRUCTION SIGNAGE IS REQUIRED TO BE 730-05.02 - ASTM TYPE III (CLASS B) AS PER NYS STANDARD SPECIFICATIONS: CONSTRUCTION AND MATERIALS. HI-INTENSITY REFLECTIVE SHEETING OFTEN REFERRED TO AS HIGH INTENSITY. WORK ZONE IS REQUIRED TO BE PROPERLY DELINEATED WITH CONES AND/OR CONSTRUCTION BARRELS.

ORANGE COUNTY RESERVES THE RIGHT TO PRECLUDE ALL WORK AND LANE CLOSURES DURING ANY INCLEMENT WEATHER OR OTHER UNFORESEEN CIRCUMSTANCES (I.E. WET, ICY CONDITIONS, REDUCED VISIBILITY, TRAFFIC ACCIDENTS ON STATE, COUNTY, TOWN OR VILLAGE ROAD, OR OTHER EMERGENCIES).

NO LANES CLOSURES WILL BE PERMITTED FROM 12 NOON PRIOR TO A HOLIDAY AND UNTIL 10 AM THE DAY AFTER THE HOLIDAY. FLAGGERS SHALL NOT CONTROL MORE THAN ONE APPROACH AT ANYTIME THROUGHOUT THE DURATION OF THE WORK ZONE. ADDITIONAL IONAL FLAGGERS ARE REQUIRED TO CONTROL ALL APPROACHES IN A WORK ZONE.

ALL CONSTRUCTION PERSONNEL ARE REQUIRED TO WEAR HARD HATS AND SAFETY VESTS. EIGHTEEN (18) INCH STOP AND SLOW PADDLES ARE REQUIRED TO DIRECT TRAFFIC.

TWO WAY RADIOS ARE REQUIRED FOR FLAGGERS TO COMMUNICATE WITH EACH OTHER.

ALL OF THE NECESSARY MEANS ARE REQUIRED TO BE ON SITE TO PROPERLY COMPACT ALL TRENCHES OR EARTHWORK WITHIN THE COUNTY RIGHT OF WAY ON A DAILY BASIS.

- -VIBRATORY TRENCH ROLLER; PRIMARY COMPACTION EQUIPMENT
- -JUMPING JACK COMPACTOR; SECONDARY COMPACTION EQUIPMENT FOR USE IN TIGHT AREAS, WHERE THE VIBRATORY TRENCH ROLLER CANNOT BE USED
- -ASPHALT ROLLER IS REQUIRED TO COMPACT ASPHALT FOR ANY PAVING INSTALLED IN THE COUNTY RIGHT OF WAY.

ASPHALT RESTORATION:

ALL PAVEMENT IS REQUIRED TO BE RESTORED ON A DAILY BASIS.

RAGGED TRENCH EDGES MUST SAW CUT PRIOR TO ANY PAVING (TEMPORARY OR PERMANENT).

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN THE 5" OF BINDER COURSE FLUSH WITH THE EXIST EXISTING PAVEMENT SURFACE THROUGHOUT THE DURATION OF THE PROJECT. FINAL ASPHALT RESTORATION IS TO BE COMPLETED AT THE COMPLETION OF THE PROJECT.

ALL TEMPORARY ASPHALT IS REQUIRED TO BE FIVE (5) INCHES THICK AND PLACED IN TWO (2) LIFTS OF 2 YI INCHES.

ALL EDGES OF EXISTING ASPHALT ARE REQUIRED TO BE SWEPT AND TACK COATED PRIOR TO PAVING.

ALL ASPHALT IS REQUIRED TO BE SAW CUT PARALLEL OR PERPENDICULAR TO THE TRENCH OR TO THE EXISTING ASPHALT. NO RAGGED EDGES ARE ACCEPTABLE.

ALL SAW CUTTING IS REQUIRED TO BE PERFORMED PRIOR TO PLACING ASPHALT BINDER. MILLING OUT THE JAGGED EDGES ON THE TOP COURSE OR FINAL ASPHALT IS NOT ACCEPTABLE BY ORANGE COUNTY.

ALL ASPHALT JOINTS ARE REQUIRED TO BE CRACK SEALED UPON COMPLETING FINAL PAVING.

LANDSCAPING:

NO PLANTINGS (SHRUBS/TREES) OR LANDSCAPING FEATURES (GATES, FENCES, STONE PILLARS, STONE WALLS, SIGNS, ETC.) SHALL BE PLACED WITHIN THE COUNTY RIGHT OF WAY.

ALL DISTURBED AREAS ARE TO BE GRADED , SEEDED, AND STRAWED ON A DAILY BASIS.

UTILITIES:

THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A VERTICAL SEPARATION OF 18 INCHES. BETWEEN EXISTING UTILITIES AND ANY PROPOSED UTILITIES.

GENERAL NOTES:

CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS, GUIDE RAILS, GUIDE POSTS, CULVE11 PIPES, MAILBOXES, HEADWALLS, ETC. WHICH MUST BE REMOVED FOR CONSTRUCTION. CONTRACTOR SHALL REINSTALL ANY REMOVED ITEMS ON A DAILY BASIS. ANY ITEMS DAMAGED BY REMOVAL OR REINSTALLATION SHALL BE REPLACED AND REINSTALLED BY THE CONTRACTOR WITH A NEW ITEM.

NO UTILITY WORK (WATER, SEWER STORM DRAINAGE) IS ALLOWED TO BE PERFORMED BETWEEN NOVEMBER 15 AND MARCH 15 WITHIN THE COUNTY RIGHT OF WAY.

NO TRACK EQUIPMENT IS ALLOWED ON THE COUNTY ROAD WITHOUT PLACING MATS, PLYWOOD, TIRES, ETC. TO PROTECT THE ASPHALT ROAD.

NO OPEN TRENCHES ARE ALLOWED TO REMAIN OPEN OVERNIGHT. ALL OPEN TRENCHES ARE REQUIRED TO BE BACKFILLED ON A DAILY BASIS.

NO ROAD PLATES ARE ALLOWED TO BE USED OVERNIGHT. ROAD PLATES ARE ONLY ALLOWED TO BE USED DURING DAILY OPERATIONS TO MAINTAIN TRAFFIC ON THE ROADWAY AND AT RESIDENTIAL/COMMERCIAL DRIVEWAYS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER COORDINATION WITH HOMEOWNERS AND BUSINESSES TO ENSURE THAT THEY CAN ENTER AND EXIT THEIR DRIVEWAYS DURING THE COURSE OF DAY TO DAY OPERATIONS.

GRADING & DRAINAGE:

A. ALL DITCHES AND SWALES ARE REQUIRED TO BE REGRADED TO ENSURE POSITIVE DRAINAGE UPON COMPLETION OF THE INSTALLATION OF THE PROPOSED CULERT PIPE. NO EXISTING DRAINAGE CHANNEL, SWALE, DITCH, STREAM OR STRUCTURE AFFECTING THE COUNTY ROAD SHALL BE BLOCKED OR FILLED. NOR THE FLOW TO OR FROM AN EXISTING DRAINAGE CHANNEL, SWALE, DITCH STREAM, OR STRUCTURE BE MADE WITHOUT AN APPVED DESIGN.

ALL DISTURBED AREAS ARE TO BE GRADED, SEEDED, AND STRAWED ON A DAILY BASIS.

PROVIDE A TYPICAL CROSS SECTION WITH DIMENSIONS FOR THE PROPOSED SWALES, INCLUDE RESTORATION REQUIREMENTS (I.E. RIP RAP LINED SWALE, JUTE MAT, SEED AND MULCH).

BACKFILL MATERIALS:

ALL BACKFILL REQUIRED TO BE PLACED AND COMPACTED IN 12 LIFTS MAXIMUM.

PROVIDE CROSS SECTION DETAILS FOR BACKFILL REQUIREMENTS WITHIN THE ASPHALT, WITHIN 8 FEET OF THE EDGE OF PAVEMENT AND 8 FEET BEYOND THE EDGE OF PAVEMENT.

DRY K-CRETE SHALL BE USED AT ALL ROAD CROSSINGS (TOWN ROADS), COMEMERCIAL ENTRANCES, AND ALL TRENCHES WITHIN THE ASPHALT OR AS DIRECTED BY THE ORANGE COUNTY INSPECTOR.

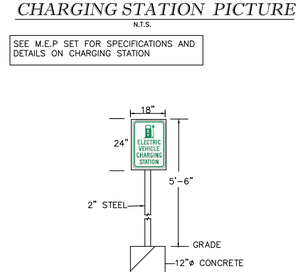
ITEM NO. 4: ITEM 304.12 SUBBASE COURSE TYPE 2 IS REQUIRED TO BE USED AS BACKFILL FROM EDGE OF PAVEMENT OUT EIGHT FEET.

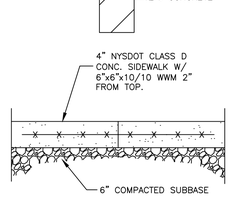
EXCAVATED MATERIAL IS ALLOWED TO BE USED AS BACKFILL MATERIAL BEYOND 8 FEET FROM THE EDGE OF PAVEMENT. NO BOULDERS/ROCKS OVER 6 INCHES ARE ALLOWED TO BE USED AS BACKFILL.

MATERIAL TICKETS ARE REQUIRED TO BE PROVIDED TO THE ORANGE COUNTY INSPECTOR ON A DAILY BASIS FOR ALL MATERIAL USED IN THE COUNTY RIGHT OF WAY.

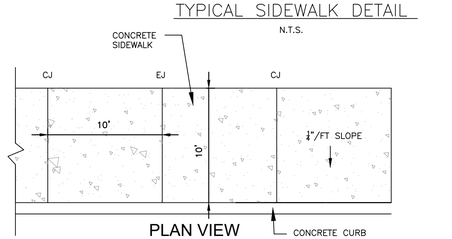

## CHARGING STATION PICTURE
N.T.S.

SEE M.E.P SET FOR SPECIFICATIONS AND DETAILS ON CHARGING STATION

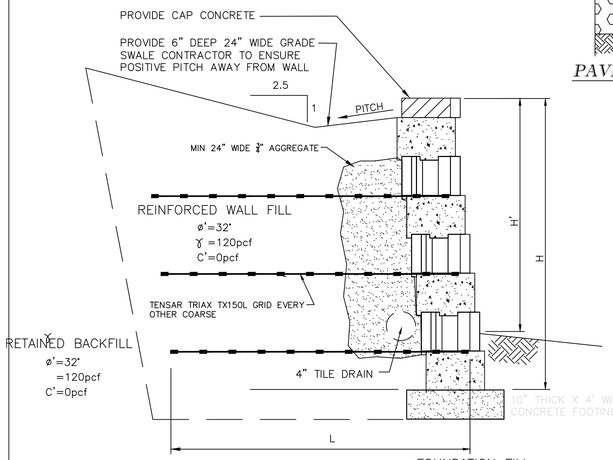



## TYPICAL SIDEWALK DETAIL
N.T.S.




## TYPICAL DROP CURB SIDEWALK ACCESS RAMP DETAIL
N.T.S.



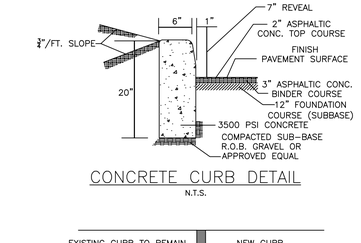

## SOIL TYPE B/CASE 2

SOIL TYPE SILT/SILTY CLAY

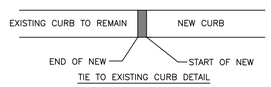
FOUNDATION FILL
ø'=32°
γ =120pcf
C'=0pcf

| TOTAL HEIGHT | EXPOSED HEIGHT | GEOGRID | | |
|---|---|---|---|---|
| H | H' | NO. LAYERS | L | TYPE |
| 2'-0" | 1'-4" | 0 | N/A | N/A |
| 2'-8" | 2'-0" | 0 | N/A | N/A |
| 4'-8" | 4'-0" | 2 | 4'-0" | A |
| 6'-8" | 6'-0" | 2 | 5'-0" | B |
| 9'-8" | 8'-0" | 4 | 6'-6" | B |
| 10'-8" | 10'-0" | 6 | 9'-6" | B |
| 14'-8" | 12'-0" | 8 | 11'-6" | B |

GENERAL NOTES
1. FACTOR OF SAFTY FOR SLIDING: 1.5
2. FACTOR OF SAFTY FOR OVERTURNING: 2.0
3. ALLOWABLE BEARING PRESSURE: 3000PSF
4. COMPACTION 95% STANDARD PROCTOR 12" LIFTS
5. MIN 2 FT. DRAINAGE FILL BEHIND WALL
6. PROVIDE LATERAL DRAINAGE
7. WEIGHT OF SOIL = 120 PCF




## CONCRETE CURB DETAIL
N.T.S.




TIE TO EXISTING CURB DETAIL

## CONCRETE CURB DETAIL
N.T.S.


## SIDE ELEVATION

## TIMBER GUIDE RAIL DETAIL
(NTS)



NOTES:

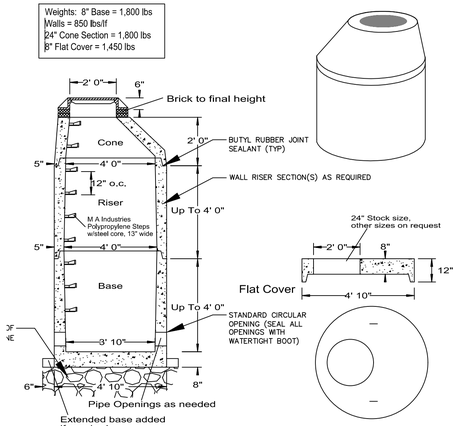
ALL FASTENER HARDWARE SHALL BE MANUFACTURED FROM STEEL CONFORMING TO ASTM A449.

TIMBER RAILS AND POSTS SHALL BE PRESSURE TREATED LUMBER.

STEEL SPLICE PLATE NOT REQUIRED ON END POSTS.

TIMBER GUIDE RAIL OR APPROVED EQUAL SHALL BE INSTALLED ALONG DRIVEWAY AS INDICATED ON PLAN.

Weights: 8" Base = 1,800 lbs
Walls = 850 lbs/lf
24" Cone Section = 1,800 lbs
8" Flat Cover = 1,450 lbs



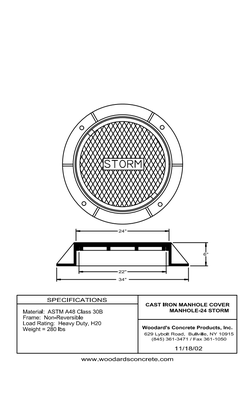

NOTES:

1. CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
2. REINFORCEMENT TO BE IN CONFORMANCE WITH ASTM A615 GRADE 60 AND ASTM A185 GRADE 65.
3. CONTRACTOR TO ORDER MANHOLE SECTIONS FROM MANUFACTURER TO MATCH REQUIRED ELEVATIONS AND INVERTS PER PLAN.

| SPECIFICATIONS | PRECAST MANHOLES 4' ID BASE, RISER & TOP |
|---|---|
| Concrete Min. Strength: 4,000 psi at 28 days<br>Reinforcement: ASTM C478 / 4x4 Mesh<br>Air Entrainment: 5%<br>Construction Joint: Butyl Rubber Sealant<br>Pipe Connections: Rubber Boots available<br>Volume: 94 gallons / vertical foot<br>Load Rating: H20 / ASTM C857 | Woodard's Concrete Products, Inc.<br>629 Lybolt Road, Bullville, NY 10915<br>(845) 361-3471 / Fax 361-1050<br>Page 2J 2/3/05 |

www.woodardsconcrete.com

DRAINAGE MANHOLE
NOT TO SCALE




| SPECIFICATIONS | CAST IRON MANHOLE COVER MANHOLE-24 STORM |
|---|---|
| Material: ASTM A48 Class 30B<br>Frame: Non-Reversible<br>Load Rating: Heavy Duty, H20<br>Weight = 220 lbs | Woodard's Concrete Products, Inc.<br>629 Lybolt Road, Bullville, NY 10915<br>(845) 361-3471 / Fax 361-1050<br>11/18/02 |

www.woodardsconcrete.com

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| 1 | BID SET | 11/18/22 |
| 2 | REVISED RFB D | 1/5/23 |

SEAL


ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER
HYMAN HAYES ASSOCIATES
800 Troy-Schenectady Road
Suite 103
Latham, NY 12110
(518) 465-3470
www.hymanhayes.com

COST CONSULTANT: STUART-LYNN COMPANY
FF&E CONSULTANT: CLASSIC INTERIORS, LLC
IT/SECURITY CONSULTANT: ONWARD TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M.E.P. CONSULTANT: FELLENZER
FOUNDING CONSULTANT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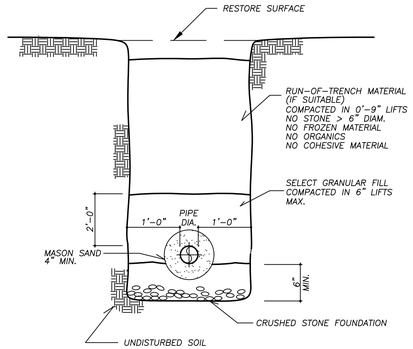
ORANGE COUNTY, NEW YORK

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
SCOMEN, NY 10924

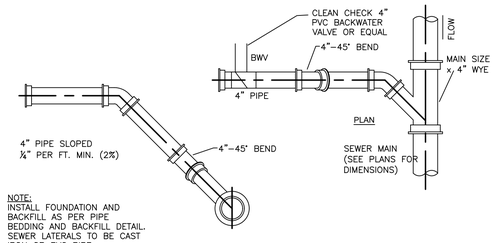
SHEET TITLE: DETAILS

| | |
|---|---|
| DATE: | 11/1/22 |
| SCALE: | As indicated |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SWH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
D101



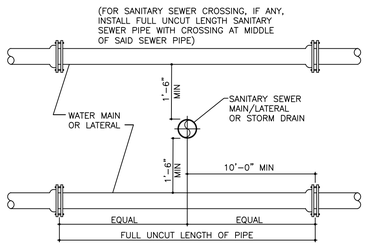

## TRENCH RESTORATION DETAIL
N.T.S.



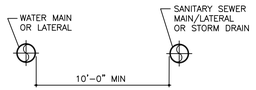

NOTE:
INSTALL FOUNDATION AND BACKFILL AS PER PIPE BEDDING AND BACKFILL DETAIL. SEWER LATERALS TO BE CAST IRON OR PVC PIPE.

MINIMUM 4'-0" OF COVER

## SANITARY SEWER LATERAL DETAIL
N.T.S.




VERTICAL SEPARATION

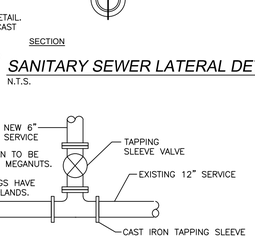



HORIZONTAL SEPARATION

NOTE: NO DEVIATION IN THE SEPARATION REQUIREMENTS WILL BE PERMITTED WITHOUT THE EXPRESS APPROVAL OF THE ORANGE COUNTY DEPARTMENT OF HEALTH.

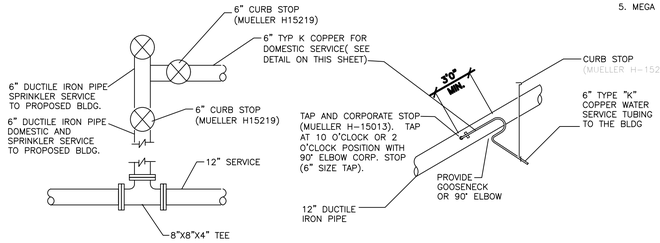
## SEPERATION DETAIL

NOTE:
SEWAGE SPECIFICATIONS, DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH CHAPTER A252 OF TOWN CODE, A252-2 MATERIALS.




NOTES:
1. CONNECTION TO BE MADE WITH MEGANUTS.
2. ALL FITTINGS HAVE LOCKING GLANDS.

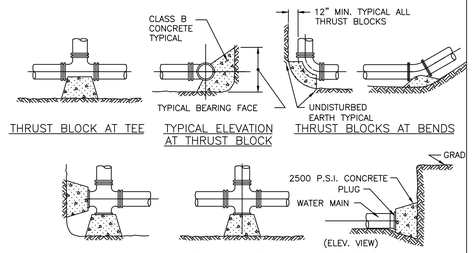
## TAPPING SLEEVE & VALVE DETAIL
N.T.S.




## WATER SERVICE CONNECTION
N.T.S.

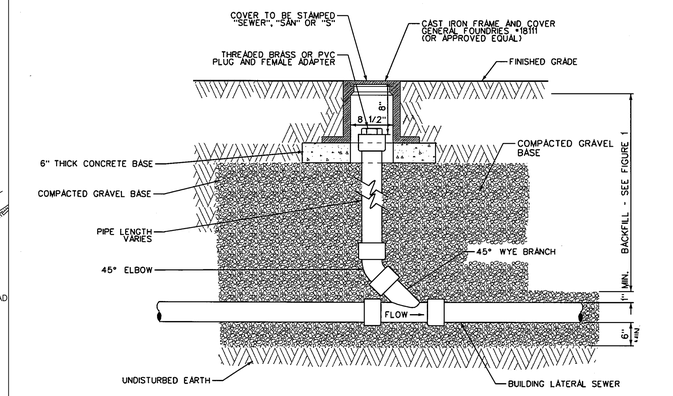
| AREA OF BEARING FACE OF CONC. THRUST BLOCK IN SQ.FT. BLOCKS TO BE POURED AGAINST UNDISTURBED EARTH. | | | | | | |
|---|---|---|---|---|---|---|
| PIPE SIZE | 90° BEND | 45° BEND | 22-1/2° BEND | 11-1/4° BEND | TEE OR BEND | TEE OR |
| 4" & 6" | 6 | 3 | 3 | 3 | 4 | 5 |
| 8" | 10 | 6 | 3 | 3 | 8 | 8 |
| 12" | 14 | 10 | 3 | 3 | 12 | 10 |

AREAS BASED ON AN INTERNAL PRESSURE OF 150 P.S.I.G. AND A SOIL BEARING PRESSURE OF 2000 P.S.F.



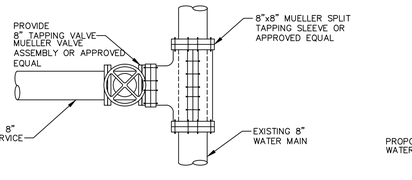

NOTES:
1. THRUST BLOCKS SHALL BE PLACED AT ALL BENDS.
2. THRUST BLOCKS SHALL BE PLACED AT ALL TAPPING SLEEVE AND VALVE CONNECTIONS AS SHOWN ABOVE FOR TEE.
3. PIPE AND FITTINGS MUST BE PROTECTED FROM CONTACT WITH CONCRETE BY PLASTIC SHEETING OR OTHER APPROVED EQUIVALENT METHOD.
4. RETAINING GLADS ON ALL MECHANICAL JOINTS.
5. MEGA LUGS TO BE USED IN ALL LOCATIONS

## THRUST BLOCK FOR BENDS
N.T.S.



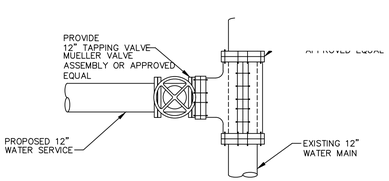

NOTES:
1.) EACH BUILDING LATERAL SEWER SHALL HAVE A CLEANOUT INSTALLED APPROXIMATELY 2' DOWNSTREAM OF THE BUILDING PIPE TO BUILDING LATERAL SEWER CONNECTION. THEREAFTER, CLEANOUTS SHALL BE INSTALLED ALONG THE BUILDING LATERAL SEWER APPROXIMATELY EVERY 100' (MAXIMUM). FOR THE PURPOSE OF CLEANOUT LOCATIONS, DISTANCE SHALL BE MEASURED FROM THE FIRST CLEANOUT LOCATED DOWNSTREAM OF THE BUILDING PIPE TO BUILDING LATERAL SEWER CONNECTION, HENCE DOWNSTREAM ALONG THE BUILDING LATERAL SEWER TO THE CENTER OF THE SEWER MAIN LINE (GENERALLY LOCATED IN THE CENTER OF STREET).
2.) A CLEANOUT LOCATED IN A ROAD, DRIVEWAY OR PARKING AREA SHALL REQUIRE A CAMBELL FOUNDRY CAST IRON FRAME AND COVER, (OR APPROVED EQUAL)

FIGURE 4: BUILDING LATERAL SEWER CLEANOUT
N.T.S.



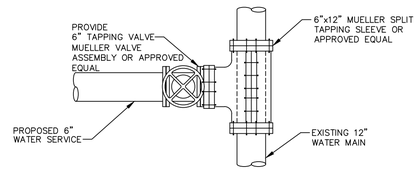

NOTES:
1. WET TAP TO BE PERFORMED BY CONTRACTOR WITH CONSTRUCTION ENGINEER ON-SITE.

## WET TAP DETAIL
(NOT TO SCALE)



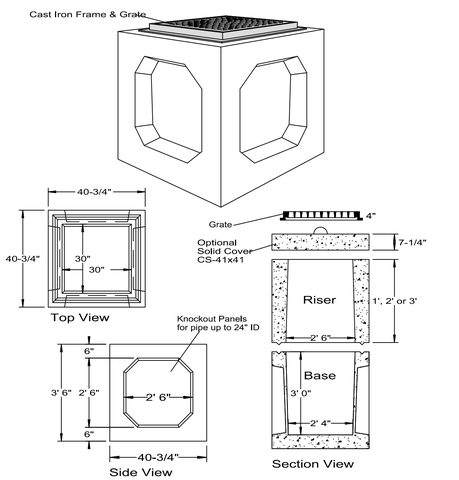

NOTES:
1. WET TAP TO BE PERFORMED BY CONTRACTOR WITH CONSTRUCTION ENGINEER ON-SITE.

## WET TAP DETAIL
(NOT TO SCALE)

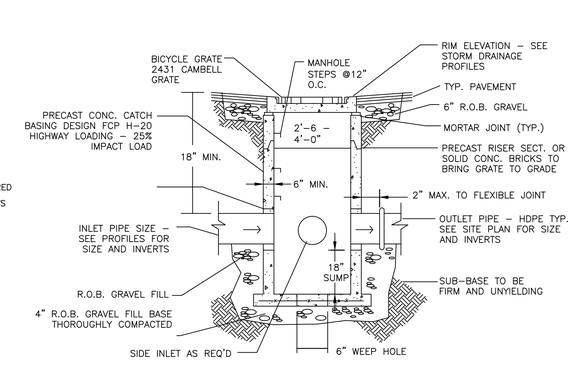



NOTES:
1. WET TAP TO BE PERFORMED BY CONTRACTOR WITH CONSTRUCTION ENGINEER ON-SITE.

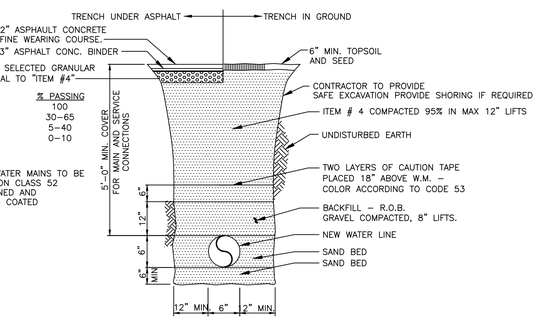
## WET TAP DETAIL
(NOT TO SCALE)




| SPECIFICATIONS | PRECAST CATCH BASIN MODEL CB-30X30 |
|---|---|
| Concrete Min. Strength: 4,000 psi at 28 days<br>Reinforcement: #4 Rebar / ASTM A615<br>Air Entrainment: 5%<br>Construction Joint: Butyl Rubber Sealant<br>Weights: Base = 2,200 lbs, Riser = 950 lbs/vf<br>Load Rating: H20 / ASTM C857 | |



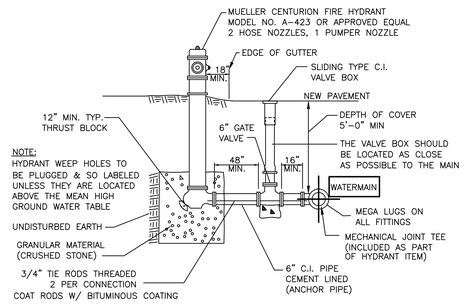

## TYP. CATCH BASIN DETAIL
N.T.S.




| SIEVE SIZE | % PASSING |
|---|---|
| 2 INCH | 100 |
| 1/4 INCH | 30-65 |
| No. 40 | 5-40 |
| No. 200 | 0-10 |

NOTE:
ALL NEW WATER MAINS TO BE DUCTILE IRON CLASS 52 CEMENT-LINED AND BITUMINOUS COATED

## TYP. WATER MAIN & TRENCH DETAIL
N.T.S.




NOTES
1. ALL FLANGES ON FIRE HYDRANT LEG TO BE MECHANICAL JOINT RETAINING TYPE OF FLANGES
2. THE USE OF CONCRETE THRUST BLOCKS FOR THE PURPOSE OF RESTRAINING HYDRANTS, TEES & ELBOWS IS PROHIBITED. ONLY RESTRAINING GLANDS OR TIE RODS, OR BOTH MAYBE USED AT CHANGES OF DIRECTION FOR FIRE HYDRANTS AND WATER MAINS.

## RE-LOCATED FIRE HYDRANT ASSEMBLY - COMPLETE

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| 1 | BID SET | 11/18/22 |
| 2 | REVISED RFB D. | 1/5/23 |

SEAL


HYMAN HAYES ASSOCIATES
ARCHITECT/INTERIOR DESIGN/STRUCTURAL ENGINEER
800 Troy-Schenectady Road
Suite 103
Latham, NY 12110
(518) 452-3470
www.hymanhayes.com

COST CONSULTANT: STUART-LYNN COMPANY
FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
IT/SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M/E/P CONSULTANT: FELLENZER
FORENSIC CONSULTANT: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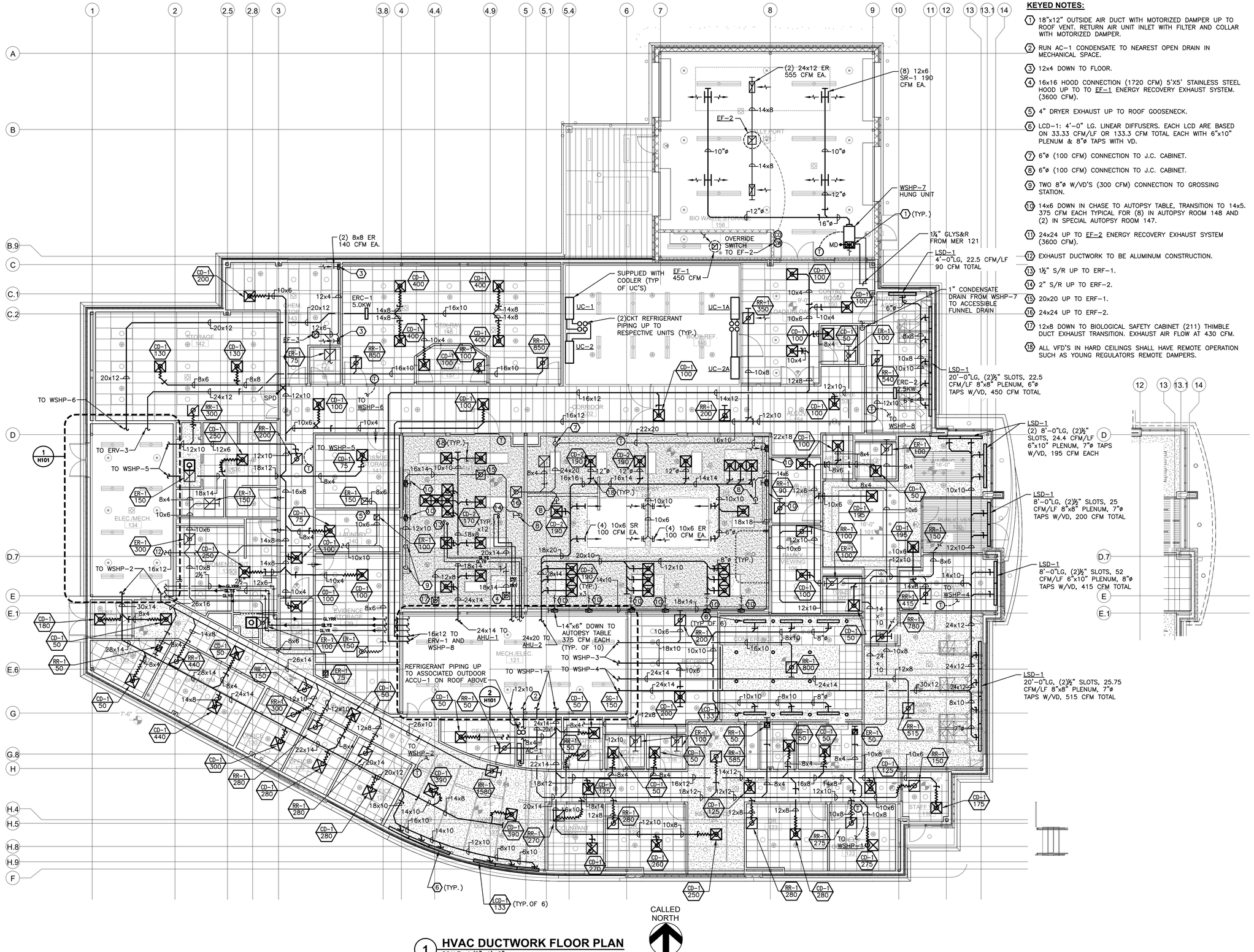
ORANGE COUNTY, NEW YORK

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

SHEET TITLE: DETAILS

| DATE: | 11/1/22 |
|---|---|
| SCALE: | As indicated |
| DRAWN BY: | JMK |
| CHECKED BY: | MD |
| APPROVED: | SMH |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
D102




1 **HVAC DUCTWORK FLOOR PLAN**
SCALE: 1/8"=1'-0"

## KEYED NOTES:

1. 18"x12" OUTSIDE AIR DUCT WITH MOTORIZED DAMPER UP TO ROOF VENT. RETURN AIR UNIT INLET WITH FILTER AND COLLAR WITH MOTORIZED DAMPER.
2. RUN AC-1 CONDENSATE TO NEAREST OPEN DRAIN IN MECHANICAL SPACE.
3. 12x4 DOWN TO FLOOR.
4. 16x16 HOOD CONNECTION (1720 CFM) 5'X5' STAINLESS STEEL HOOD UP TO TO EF-1 ENERGY RECOVERY EXHAUST SYSTEM. (3600 CFM).
5. 4" DRYER EXHAUST UP TO ROOF GOOSENECK.
6. LCD-1: 4'-0" LG. LINEAR DIFFUSERS. EACH LCD ARE BASED ON 33.33 CFM/LF OR 133.3 CFM TOTAL EACH WITH 6"x10" PLENUM & 8"ø TAPS WITH VD.
7. 6"ø (100 CFM) CONNECTION TO J.C. CABINET.
8. 6"ø (100 CFM) CONNECTION TO J.C. CABINET.
9. TWO 8"ø W/VD'S (300 CFM) CONNECTION TO GROSSING STATION.
10. 14x6 DOWN IN CHASE TO AUTOPSY TABLE, TRANSITION TO 14x5. 375 CFM EACH TYPICAL FOR (8) IN AUTOPSY ROOM 148 AND (2) IN SPECIAL AUTOPSY ROOM 147.
11. 24x24 UP TO EF-2 ENERGY RECOVERY EXHAUST SYSTEM (3600 CFM).
12. EXHAUST DUCTWORK TO BE ALUMINUM CONSTRUCTION.
13. 1½" S/R UP TO ERF-1.
14. 2" S/R UP TO ERF-2.
15. 20x20 UP TO ERF-1.
16. 24x24 UP TO ERF-2.
17. 12x8 DOWN TO BIOLOGICAL SAFETY CABINET (211) THIMBLE DUCT EXHAUST TRANSITION. EXHAUST AIR FLOW AT 430 CFM.
18. ALL VFD'S IN HARD CEILINGS SHALL HAVE REMOTE OPERATION SUCH AS YOUNG REGULATORS REMOTE DAMPERS.

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| | ADDENDUM D | 1/6/23 |

SEAL


ARCHITECT/STRUCTURAL ENGINEER
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(518) 456-3410
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FORENSIC CONSULTANT: crime lab design
M&P CONSULTANT: FELLENZER ENGINEERING
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
COST CONSULTANT: STUART-LYNN COMPANY


FE PROJECT #: 20-335

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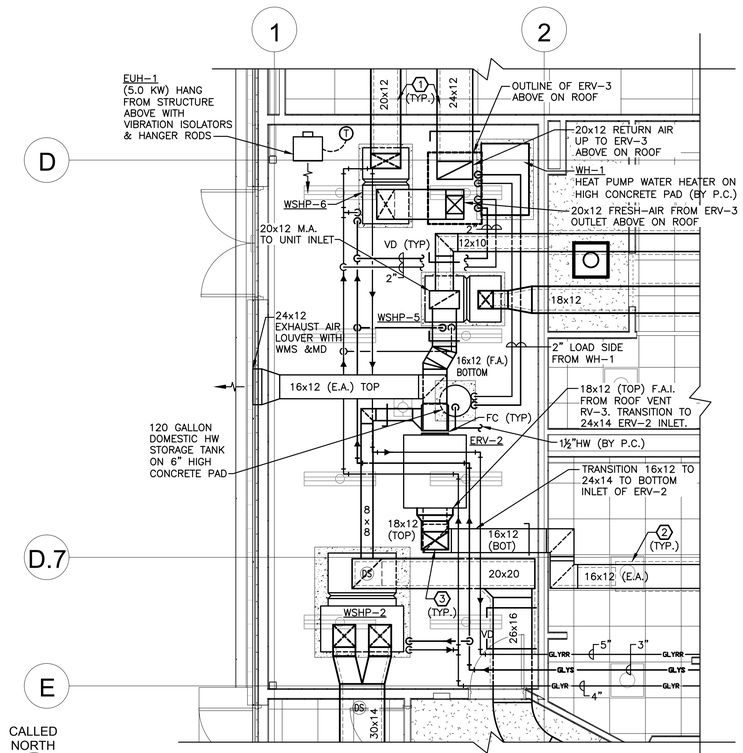
ORANGE COUNTY, NEW YORK

SHEET TITLE
HVAC DUCTWORK FLOOR PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | WPB |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

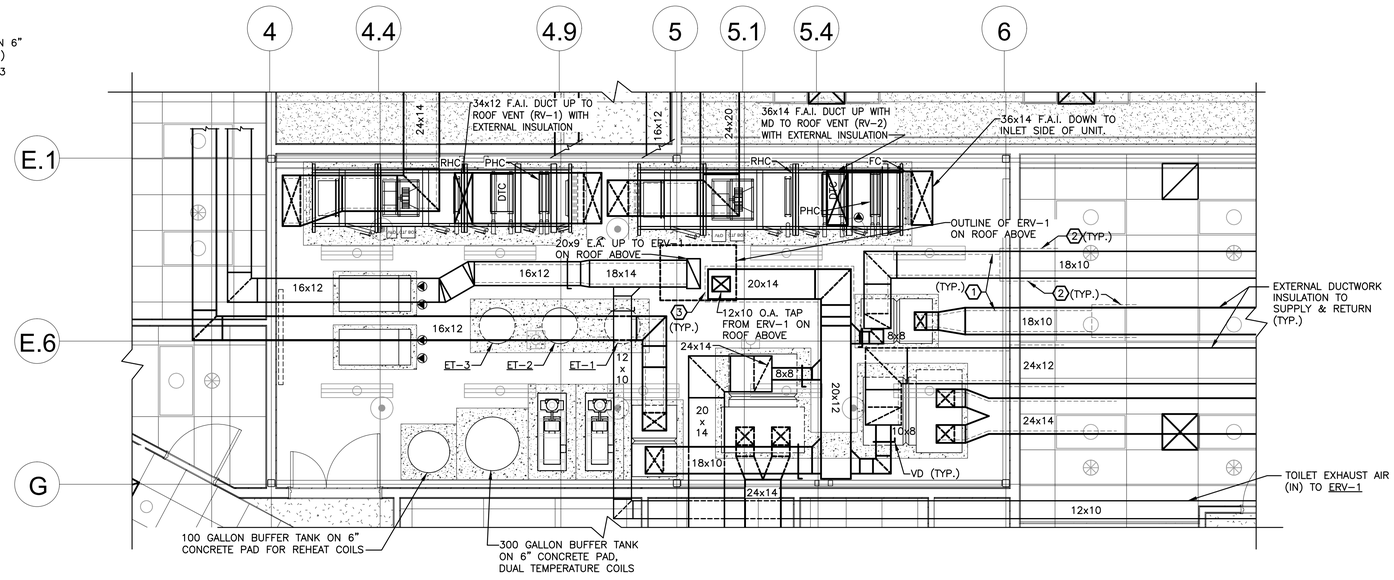
SHEET NUMBER
H100




CALLED NORTH

## 1 HVAC DUCTWORK FLOOR PLAN @ ELEC./MECH. RM. 134

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



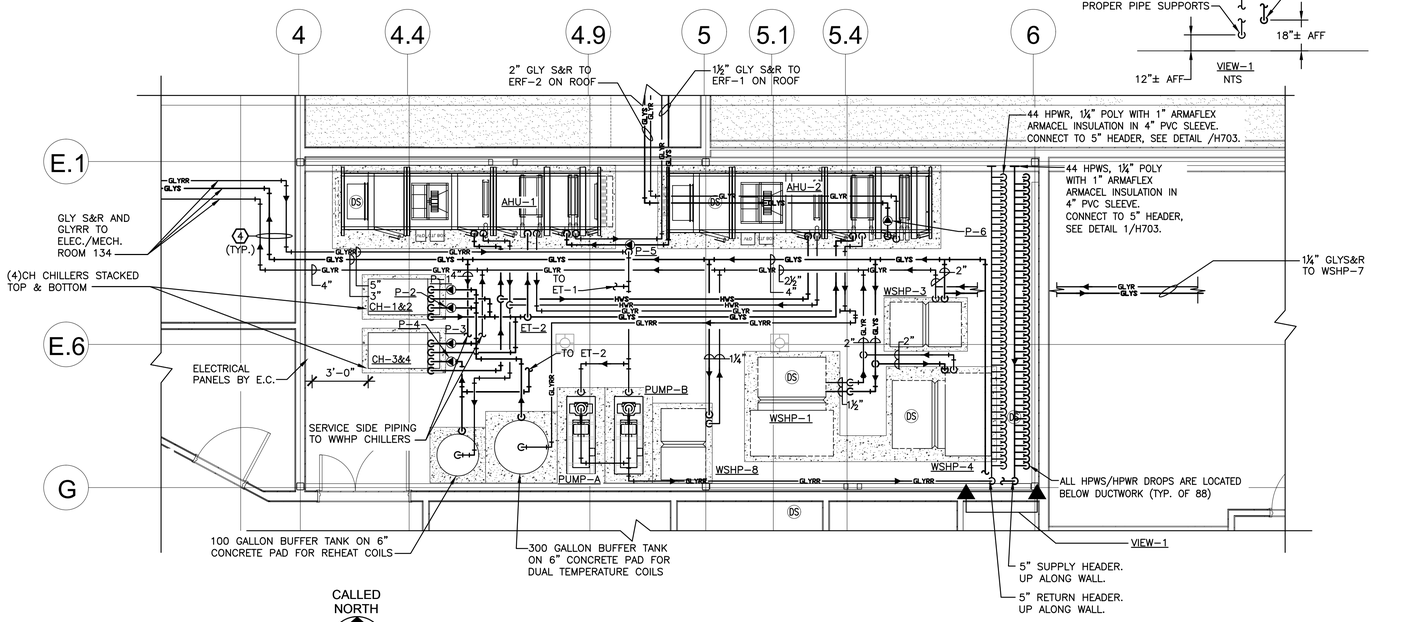

CALLED NORTH

## 2 HVAC DUCTWORK FLOOR PLAN @ MECH./ELEC. RM. 121

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

**KEYED NOTES:**

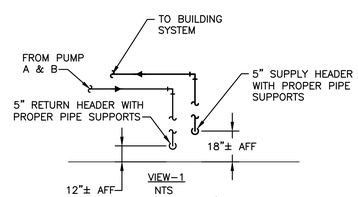
1. ALL SUPPLY & RETURN DUCTWORK SHALL BE ACOUSTICALLY INSULATED (APPROXIMATELY 10') INTERNAL LINING SHALL BE 1" THICK WITH ANTIMICROBIAL COATING.
2. ALL SUPPLY & RETURN DUCTWORK TO BE EXTERNALLY INSULATED. REFER TO COMMERCIAL DUCT INSULATION SCHEDULE.
3. ALL OUTSIDE AIR DUCTWORK TO BE EXTERNALLY INSULATED. REFER TO COMMERCIAL DUCT INSULATION SCHEDULE.
4. ALL PIPING TO BE INSULATED AS PER PIPE INSULATION SCHEDULE.




CALLED NORTH

## 3 HVAC PIPING FLOOR PLAN @ MECH./ELEC. RM. 121

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




| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| | ADDENDUM D | 1/6/23 |

SEAL

DANIEL STEINBERG, P.E.

NY PROFESSIONAL ENGINEER NO. 076975-1

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FE PROJECT #: 20-335

| | |
|---|---|
| COST CONSULTANT | STUART-LYNN COMPANY |
| FP&E CONSULTANT | CLASSIC CONTRACT INTERIORS, LLC |
| I.T./SECURITY CONSULTANT | CONVERGENT TECHNOLOGIES |
| CIVIL CONSULTANT | Fusco Engineering & Land Surveying P.C. |
| M&P CONSULTANT | FELLENZER ENGINEERING |
| FORENSIC CONSULTANT | crime lab design |

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ORANGE COUNTY, NEW YORK

SHEET TITLE
HVAC DUCTWORK FLOOR PLAN @ ROOMS 134 & 121

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | WPB |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER

H101

## WATER TO WATER AIR HANDLING SCHEDULE

| Unit | | | | | | Initial Filter | | | | Hot Water Coil (1) (Preliminary Runaround Loop Data) - 30% PG | | | | | | | | | | Dual Temperature Coil - Cooling Performance (30%PG) | | | | | | | | | | | | | | Dual Temperature Coil - Heating Performance (30%PG) | | | | | | | | | | Hot Water Reheat Coil - for Dehumidification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tag | Model | Length (in) | Weight (lb) | External Dimensions* Supply Height (in) | External Dimensions* Supply Width (in) | Type | Filter Qty - Sizes | Depth | Mean PD (inH2O) | Total Capacity (Btu/hr) | EAT-DB °F | LAT-DB °F | F.V. (ft/min) | A.P.D. (inH2O) | EWT °F | LWT °F | Flow Rate (GPM) | W.P.D. (ftH2O) | Rows | FPI | Sensible Capacity (Btu/hr) | Total Capacity (Btu/hr) | EAT-DB °F | EAT-WB °F | LAT-DB °F | LAT-WB °F | A.P.D. (inH2O) | EWT °F | LWT °F | Flow Rate (GPM) | W.P.D. (ftH2O) | Rows | FPI | Total Capacity (Btu/hr) | EAT-DB °F | LAT-DB °F | A.P.D. (inH2O) | EWT °F | LWT °F | Flow Rate (GPM) | W.P.D. (ftH2O) | Rows | FPI | Total Capacity (Btu/hr) | EAT-DB °F | LAT-DB °F | A.P.D. (inH2O) | EWT °F | LWT °F | Flow Rate (GPM) | W.P.D. (ftH2O) | Rows | FPI |
| AHU-1 SPEC Autopsy 2300 | CAH009GDGM | 174 | 2549.34 | 58 | 38 | Pleated (MERV 8) | 2 - 24.00 x 24.00 | 2 | 0.56 | | -9 | | 315 | 0.43 | | | 12.5 | 2.4 | 6 | 10 | 115671 | 191374 | 92 | 73 | 46 | 45.8 | 0.75 | 42 | 50.3 | 48 | 11.9 | 10 | 12 | 266831 | 2 | 108 | 0.51 | 110 | 94.4 | 35.9 | 5.7 | 10 | 12 | 56854 | 48 | 70.6 | 0.05 | 110 | 101.9 | 14 | 0.4 | 2 | 7 |
| AHU-2 HP-5 Autopsy 3700 | CAH010GDGM | 178 | 2745.27 | 58 | 40 | Pleated (MERV 8) | 2 - 24.00 x 12.00<br>2 - 24.00 x 24.00 | 2 | 0.57 | | -9 | | 470 | 0.85 | | | 19.5 | 5.4 | 6 | 10 | 179257 | 293219 | 92 | 73 | 47.7 | 47.5 | 1.41 | 42 | 49.6 | 80 | 15.5 | 10 | 12 | 388092 | 2 | 106 | 0.86 | 110 | 94.6 | 53.1 | 5.9 | 10 | 12 | 90600 | 48 | 70.4 | 0.11 | 110 | 100.9 | 20 | 0.8 | 2 | 9 |

| Supply Fan | | | | | | | | | Combination Filter | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fan | | | | | | Motor | | | Panel Filter | | | | Bag Filter | | | | | |
| Type | Airflow (CFM) | RPM | BHP | E.S.P. (inH2O) | T.S.P. (inH2O) | Voltage | Power (HP) | RPM | Control | Type | Filter Qty - Sizes | Depth | Mean PD (inH2O) | Type | Filter Qty - Sizes | Depth | Efficiency | Mean PD (inH2O) |
| DDPL15-12BL | 2300 | 3286 | 3.6 | 1.5 | 5.64 | 200/60/3 | 5 | 3500 | VFD | Pre Pleat (MERV 13) | 2 - 24.00 x 24.00 | 2 | 0.58 | HEPA | 2 - 24.00 x 24.00 | 12 | MERV 17 | 1.77 |
| DDPL16-9BL | 3700 | 3210 | 6.62 | 1.5 | 7.13 | 200/60/3 | 10 | 3500 | VFD | Pre Pleat (MERV 13) | 2 - 24.00 x 24.00 | 2 | 0.66 | HEPA | 2 - 24.00 x 24.00 | 12 | MERV 17 | 2.04 |

NOTE:
1. ALL FANS TO HAVE VFD'S AND PIEZO RING AIRFLOW INDICATOR.

## ENERGY RECOVERY VENTILATOR SCHEDULE

| Basis of Design | Model | Location | Tag # | Fan Data: Supply Airflow: Supply CFM | ESP | Motor HP | VFD | Fan Data: Return Airflow: Return CFM | ESP | Motor HP | VFD | Wheel Data: Summer/Cooling: Outdoor: Dry Bulb | Wet Bulb | Grains | Supply: Dry Bulb | Wet Bulb | Grains | Min Latent Eff % | Max PD (in/w g) | Return: Dry Bulb | RH | Wet Bulb | Grains | Max PD (in/w g) | Exhaust: Dry Bulb | Grains | Unit Information: Electrical (includes preheater load): Voltage/Phase | FLA | MCA | MOCP | Electric Preheat (1) | Minimum RER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMCO | FV-2000 | Outdoor Unit | ERV-1 | 1,760 | 1.00 | 2.00 | Yes | 1,590 | 1.00 | 2.00 | Yes | 92.0 | 73.0 | 91.9 | 78.2 | 64.4 | 68.7 | 0.76 | 0.54 | 72.0 | 50% | 60.0 | 58.3 | 0.47 | 87.3 | 84.0 | 208V/3Ph | 23.5 | 25.5 | 35.0 | 0.0 KW | Cooling 102.6 |
| | | | | Winter/Heating: Return Airflow: Outdoor: Dry Bulb | Wet Bulb | Grains | Supply: Dry Bulb | Wet Bulb | Grains | Min Latent Eff % | Max PD (in/w g) | Return: Dry Bulb | RH | Wet Bulb | Grains | Max PD (in/w g) | Exhaust: Dry Bulb | Grains | Filters: Outdoor: Type | Depth | Rating | Return: Type | Depth | Rating | | | | | | | | | | Heating 200.0 |
| | | | | 2.0 | 1.2 | 4.6 | 49.0 | 39.2 | 20.0.5 | 0.76 | 0.48 | 70.0 | 25% | 51.4 | 27.0 | 0.44 | 18.0 | 9.9 | Pleated | 2" | MERV 13 | Pleated | 2" | MERV 8 | | | | | | | | | | |
| SEMCO | FV-2000 | Outdoor Unit | ERV-3 | 1,710 | 1.50 | 2.00 | Yes | 1,710 | 0.57 | 1.50 | Yes | 92.0 | 73.0 | 91.9 | 77.9 | 64.2 | 68.3 | 0.70 | 0.52 | 72.0 | 50% | 60.0 | 58.3 | 0.51 | 86.1 | 82.0 | 208V/3Ph | 20.0 | 22.0 | 30.0 | 0.0 KW | Cooling 98.3 |
| | | | | Winter/Heating: Return Airflow: Outdoor: Dry Bulb | Wet Bulb | Grains | Supply: Dry Bulb | Wet Bulb | Grains | Min Latent Eff % | Max PD (in/w g) | Return: Dry Bulb | RH | Wet Bulb | Grains | Max PD (in/w g) | Exhaust: Dry Bulb | Grains | Filters: Outdoor: Type | Depth | Rating | Return: Type | Depth | Rating | | | | | | | | | | Heating 191.5 |
| | | | | 2.0 | 1.2 | 4.6 | 49.8 | 39.8 | 20.3.5 | 0.70 | 0.46 | 70.0 | 25% | 51.4 | 27.0 | 0.48 | 22.2 | 11.3 | Pleated | 2" | MERV 13 | Pleated | 2" | MERV 8 | | | | | | | | | | |

## PUMP SCHEDULE

"TACO" AS STANDARD OR APPROVED EQUAL

| UNIT NO. | LOCATION | SYSTEM | CIRCULATING FLUID: FLUID | SPEC. GRAVITY | TEMP. (°F) | GPM | HEAD (FT.) | MOTOR HP (WATTS) | MOTOR RPM | MOTOR SPEED | IMPELLER DIAMETER (IN.) | MIN. EFF. (%) | ELECTRICAL DATA VOLT/PH | WEIGHT (LB) | MODEL NO. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | MER 121 | LOAD IN CH-1 | 30% PG | 1.026 | 42-110 | 42.6 | 60 | 2.0 | 1760 | VFD | 7.75 | 49 | 208/3 | – | 1919 | SEE NOTES |
| P-2 | MER 121 | LOAD IN CH-2 | 30% PG | 1.026 | 42-110 | 42.6 | 60 | 2.0 | 1760 | VFD | 7.75 | 49 | 208/3 | – | 1919 | SEE NOTES |
| P-3 | MER 121 | LOAD IN CH-3 | 30% PG | 1.026 | 42-110 | 42.6 | 60 | 2.0 | 1760 | VFD | 7.75 | 49 | 208/3 | – | 1919 | SEE NOTES |
| P-4 | MER 121 | LOAD IN CH-4 | PLAIN WATER | 1.0 | 32-110 | 34 | 40 | 1.0 | 1760 | VFD | 6.55 | 47 | 208/3 | – | 1919 | SEE NOTES |
| P-5 | MER 121 | AHU-1 PHC/ERF-1 | 30% PG | 1.026 | 25 | 12.5 | 35 | 0.75 | 1760 | VFD | 5.8 | 40 | 208/3 | – | 1915 | SEE NOTES |
| P-6 | MER 121 | AHU-2 PHC/ERF-2 | 30% PG | 1.026 | 46 | 19.5 | 40 | 0.75 | 1750 | VFD | 6.2 | 41 | 208/3 | – | 1915 | SEE NOTES |
| P-A | MER 121 | GEO SYSTEM SOURCE | 30% PG | 1.026 | 25 | 300 | 180 | 25 | 1760 | VFD | 7.15 | 77 | 208/3 | – | F13013D | SEE NOTES |
| P-B | MER 121 | GEO SYSTEM SOURCE | 30% PG | 1.026 | 25 | 300 | 180 | 25 | 1760 | VFD | 7.15 | 77 | 208/3 | – | F13013D | SEE NOTES |

NOTES:
1. IMPELLER DIAMETER INDICATED IS APPROXIMATE. FINAL IMPELLER DIAMETER TO BE DETERMINED BY PUMP MFTR. CONTRACTOR SHALL TRIM IMPELLER AFTER INITIAL FLOW BALANCING TO ACHIEVE OPTIMAL PUMP PERFORMANCE.
2. M.C. TO FURNISH. E.C. TO INSTALL AND WIRE VFD'S.

## ENERGY RECOVERY VENTILATOR SCHEDULE

| Basis of Design | Model | Location | Tag# | Fan Data: Supply Air Airflow: Elevation (ft) | Fresh Air CFM | ESP | Motor HP | VFD | FLA | Exhaust Air Airflow: Exhaust Air CFM | ESP | Motor HP | VFD | FLA | Energy Recovery Data: Summer/Cooling: Outdoor Air: Dry Bulb | Wet Bulb | Grains/lb | Fresh Air: Dry Bulb | Wet Bulb | Grains/lb | Return Air: Dry Bulb | Wet Bulb | Grains/lb | Winter/Heating: Outdoor Air: Dry Bulb | Wet Bulb | Grains/lb | Fresh Air: Dry Bulb | Wet Bulb | Grains/lb | Return Air: Dry Bulb | Wet Bulb | Grains/lb | Performance Effectiveness: Sensible (%) | Summer Total (%) | Winter Total (%) | Unit Information: Electrical: Voltage/Phase/HZ | MCA | MOPD | Filters: Outdoor Air: Type | Depth | Rating | Return Air: Type | Depth | Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RenewAire | HE2X | Indoor Unit | ERV-2 | 364 | 1275 | 1 | 1.5 | YES | 4.6-4.8 | 1175 | 1 | 1.5 | YES | 4.6-4.8 | 92 | 73 | 93.1 | 78 | 66.7 | 81.4 | 72 | 60 | 59.1 | 2 | 1.2 | 4.8 | 49.5 | 39.2 | 19.4 | 70 | 51.4 | 27.4 | 75.9 | 55.9 | 74.7 | 208-230V / 3 Phase / 60 HZ | 11.9 | 15 | Pleated | 2" | MERV-13 | Pleated | 2" | MERV-8 |

## WATER SOURCE HEAT PUMP UNIT SCHEDULE

| TAG | Diakin Model | Airflow (CFM) | Outdoor Airflow (CFM) | OA From ERV | External Static Pressure (in$H_2O$) | Fluid Flow (gpm) | Fluid Type | Antifreeze (%) | Cooling: EWT (°F) | LWT (°F) | EAT: EDB (°F) | EAT: EWB (°F) | LAT: LDB (°F) | LAT: LWB (°F) | Total (Btu/hr) | Sensible (Btu/hr) | Heat of Rejection (Btu/hr) | EER (Design) | EER (AHRI) | Heating: EWT (°F) | LWT (°F) | EAT: EDB (°F) | LAT: LDB (°F) | Total (Btu/hr) | Heat of Absorption (Btu/hr) | COP (Design) | COP (AHRI) | Electrical: Voltage | Compressor: RLA | Fan Motor: FLA | Total Unit: FLA | MCA (A) | Max Fuse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WSHP 001 | WLVW1072 | 2200 | 220 | ERV-1 | 1.28 | 15.00 | Propylene Glycol | 30.00 | 77.0 | 88.6 | 72.6 | 60.8 | 52.0 | 49.6 | 66235 | 49067 | 83580 | 12.6 | 14.6 | 32.0 | 26.6 | 67.0 | 90.1 | 55424 | 38595 | 3.2 | 3.4 | 208/60/3 | 13.2 | 5.0 | 31.4 | 34.7 | 45 |
| WSHP 002 | WLVW1096 | 3210 | 200 | ERV-2 | 1.22 | 20.00 | Propylene Glycol | 30.00 | 77.0 | 87.5 | 72.4 | 60.6 | 55.2 | 51.8 | 77294 | 59560 | 100149 | 11.2 | 14.6 | 32.0 | 26.9 | 68.0 | 88.0 | 69869 | 48781 | 3.2 | 3.6 | 208/60/3 | 13.7 | 6.4 | 33.8 | 37.2 | 50 |
| WSHP 003 | WGTV0321 | 1000 | 195 | ERV-1 | 0.7 | 6.50 | Propylene Glycol | 30.00 | 77.0 | 88.9 | 73.3 | 61.6 | 53.1 | 50.6 | 30030 | 21970 | 36597 | 15.6 | 18.9 | 32.0 | 26.5 | 65.0 | 86.3 | 23112 | 17029 | 3.8 | 4.1 | 208-230/60/3 | 8.7 | 5.0 | 13.7 | 15.9 | 20 |
| WSHP 004 | WLVW1072 | 2310 | 255 | ERV-1 | 1.24 | 18.00 | Propylene Glycol | 30.00 | 77.0 | 86.8 | 72.6 | 60.8 | 52.4 | 50.1 | 66857 | 50516 | 84381 | 12.63 | 14.6 | 32.0 | 27.2 | 67.0 | 90.1 | 58256 | 41118 | 3.27 | 3.4 | 208/60/3 | 13.2 | 5.0 | 31.4 | 34.7 | 45 |
| WSHP 005 | WGTV0381 | 1575 | 150 | ERV-2 | 14 | 14.00 | Propylene Glycol | 30.00 | 77.0 | 88.7 | 76.1 | 64.7 | 53.1 | 50.2 | 61167 | 37505 | 72425 | 18.6 | 19.7 | 32.0 | 26.6 | 55.0 | 84.2 | 47496 | 35687 | 4 | 3.9 | 208-230/60/3 | 16.5 | 9.4 | 25.9 | 30.0 | 45 |
| WSHP 006 | WGTV0721 | 1710 | 1710 | ERV-3 | 0.7 | 18.00 | Propylene Glycol | 30.00 | 77.0 | 86.6 | **77.9** | **64.2** | 51.3 | 49.8 | 68353 | 49421 | 82299 | 16.7 | 18.1 | 32.0 | 27.0 | **50.0** | 79.7 | 55222 | 42701 | 4.4 | 3.7 | 208-230/60/3 | 17.6 | 9.4 | 27.0 | 31.4 | 45 |
| WSHP 007 | WGTH0491 | 1600 | 150 | N/A | 0.7 | 12.00 | Propylene Glycol | 30.00 | 77.0 | 86.7 | 72.6 | 60.9 | 52.5 | 50.5 | 45353 | 34808 | 55063 | 15.9 | 19.2 | 32.0 | 27.4 | 62.0 | 82.4 | 35506 | 26418 | 3.9 | 4 | 208-230/60/3 | 14.0 | 7.3 | 21.3 | 24.8 | 35 |
| WSHP 008 | WGTV0381 | 1090 | 1090 | ERV-1 | 0.7 | 9.00 | Propylene Glycol | 30.00 | 77.0 | 89.0 | 78.0 | 66.6 | 54.8 | 52.6 | 43049 | 26473 | 51415 | 17.5 | 19.8 | 32.0 | 26.4 | 50.0 | 77.0 | 30779 | 23784 | 4.4 | 4 | 208-230/60/3 | 14.2 | 7.3 | 21.5 | 25.0 | 35 |

NOTE:
1. PROVIDE NEXUS COIL PACK FOR EACH WATER SOURCE HEAT PUMP BASED ON THEIR RESPECTIVE FLOW RATE OF EACH UNIT.

## WATER TO WATER HEAT PUMP CHILLERS/BOILERS

| General Unit Data: Tag | Quantity | Bosch Model Number | Unit Size | Description | Cooling: Total Capacity | Input Watts | EER | Heat of Rejection | Heating: Total Capacity | Input Watts | COP | Heat of Absorbtion | Cooling Source: Fluid Flow | EWT | PCT Glycol | LWT | WPD | Cooling Load: Fluid Flow | EWT | PCT Glycol | LWT | WPD | Heating Source: Fluid Flow | EWT | PCT Glycol | LWT | Freeze Point | WPD | Heating Load: Fluid Flow | EWT | PCT Glycol | LWT | WPD | Unit MCA | Unit MFS | Unit Voltage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | BtuH | W | BtuH/W | BtuH | BtuH | W | W/W | BtuH | GPM | F | % | F | ft H2O | GPM | F | % | F | ft H2O | GPM | F | % | F | | ft H2O | GPM | F | % | F | ft H2O | | | V |
| CH-1 2 3 | 3 | WW210-3USC-RXXXCA-XDGDEHM | 210 | WW - Water2Water High Efficiency | 158613 | 11205 | 14.2 | 196846 | 151873 | 14383 | 14.2 | 102798 | 40 | 77 | 30 | 87.4 | 15.8 | 40 | 50 | 30 | 41.7 | 19.8 | 40 | 32 | 30 | 26.6 | 8 | 22 | 40 | 101 | 30 | 109 | 14.1 | 69.7 | 125 | 3 - 208-230/60/3 |
| CH-4 | 1 | WW180-3USC-RXXXCA-XDGDEHM | 180 | WW - Water2Water High Efficiency | 126892 | 8295 | 15.3 | 155195 | 120639 | 10703 | 15.3 | 84121 | This WWHP is dedicated to the reheat coils in the 2 Autopsy AHUs. Those coils are for dehumidification during shoulder seasons and the geothermal (source) loop is expected to be warmer than the design condition shown here: | | | | | | | | | | 34 | 32 | 30 | 26.8 | 8 | 16.4 | 34 | 101 | 0 | 108.1 | 8.5 | 60.1 | 100 | 3 - 208-230/60/3 |

NOTE:
1. PROVIDE NEXUS COIL PACK FOR EACH WATER TO WATER HEAT PUMP CHILLERS BASED ON THEIR RESPECTIVE FLOW OF EACH UNIT.

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| | ADDENDUM D | 1/6/23 |

SEAL
DANIEL STEINBERG, P.E.
NY PROFESSIONAL ENGINEER NO. 076975-1


HYMAN HAYES ASSOCIATES
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COST CONSULTANT: STUART-LYNN COMPANY
FP&E CONSULTANT: CLASSIC CONSULTANT INTERIORS, LLC
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M&P CONSULTANT: FELLENZER ENGINEERING
FORENSIC CONSULTANT: prime lab design

FE PROJECT #: 20-335


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ORANGE COUNTY, NEW YORK

SHEET TITLE: HVAC SCHEDULES

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
CROSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | WPB |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 2071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
H801

## GENERAL NOTES:

1. ALL CONDUITS ARE SHOWN DIAGRAMMATICALLY, EXACT RUNS SHALL BE DETERMINED IN FIELD EXCEPT WHERE SPECIFICALLY DIMENSIONED ON CONDUIT LAYOUTS. CONTRACTOR SHALL FOLLOW MINIMUM SPACING REQUIREMENTS TO REDUCE ELECTROMAGNETIC INTERFERENCE. COORDINATE CONDUIT ROUTING WITH ALL OTHER TRADES.
2. ALL EXPOSED CONDUIT SHALL BE RUN PARALLEL TO BUILDING WALLS AND BEAMS EXCEPT WHERE OTHERWISE SHOWN. CONTRACTOR SHALL INSTALL CONDUIT IN SUCH A MANNER TO AVOID ALL INTERFERENCES.
3. DEFLECTION/EXPANSION FITTINGS SHALL BE PROVIDED WHERE RIGID METAL CONDUIT CROSSES STRUCTURAL EXPANSION JOINTS.
4. EXPOSED CONDUIT SHALL BE SUPPORTED ON WALLS OR CEILINGS BY APPROVED HANGERS OF ANGLE OR CHANNEL CONSTRUCTION. CONDUITS SHALL BE SUPPORTED AT LEAST EVERY EIGHT (8) FEET.
5. ALL SPARE CONDUITS SHALL BE TERMINATED AS SHOWN ON CONDUIT LAYOUTS AND SHALL BE CAPPED 3" ABOVE FINISHED FLOOR.
6. NO CONDUIT SHALL BE SMALLER THAN ¾" UNLESS NOTED OTHERWISE ON PLANS.
7. EXACT CONDUIT STUB-UP LOCATIONS ARE TO BE DETERMINED BY THE ELECTRICAL CONTRACTOR BASED ON CERTIFIED MANUFACTURER'S DRAWINGS OF THE RESPECTIVE EQUIPMENT. CONDUIT SHALL BE INSTALLED TO AGREE WITH EQUIPMENT FURNISHED.
8. ALL LIGHTING WIRING SHALL BE #12AWG. UNLESS OTHERWISE NOTED. THE NUMBER OF WIRES SHOWN ON THE DRAWINGS IS NOT NECESSARILY THE CORRECT NUMBER REQUIRED. THE CONTRACTOR SHALL INSTALL AS MANY AS ARE NECESSARY FOR PROVIDING A COMPLETE ELECTRICAL SYSTEM IN EACH CASE.
9. CONDUITS PASSING THROUGH BUILDING FLOORS OR WALLS BELOW GRADE ARE TO BE INSTALLED WITH WATERTIGHT THRU WALL CONDUIT SEAL FITTINGS.
10. EQUIPMENT FURNISHED BY OTHERS SHALL BE INSTALLED & ENERGIZED BY THE ELECTRICAL CONTRACTOR.
11. THE ELECTRICAL CONTRACTOR SHALL NOT ENDANGER THE STABILITY OF THE STRUCTURE OR ANY PART THEREOF BY CUTTING, DRILLING OR OTHERWISE, AND SHALL NOT IN ANY WAY CUT OR ALTER THE WORK OF ANY OTHER CONTRACTOR, EXCEPT WITH THE WRITTEN CONSENT OF AND UNDER THE DIRECTION OF THE ARCHITECT AND/OR GENERAL CONTRACTOR.
12. THE ELECTRICAL CONTRACTOR SHALL SECURE ALL APPROVALS AND CERTIFICATES AND PAY ALL FEES FOR ALL THE WORK INSTALLED. CERTIFICATES SHALL BE DELIVERED TO THE GENERAL CONTRACTOR BEFORE FINAL PAYMENT WILL BE MADE.
13. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST APPLICABLE VERSION OF THE NEC AS WELL AS ALL STATE AND LOCAL CODES.
14. THE DRAWINGS INDICATE AND THE SPECIFICATIONS DESCRIBE THE GENERAL ARRANGEMENTS AND LOCATION OF OUTLET BOXES, ETC. THE CONTRACTOR SHALL, WITHOUT EXTRA COST TO THE OWNER, MAKE ALL REASONABLE MODIFICATIONS IN THE WORK AS MAY BE REQUIRED TO PREVENT CONFLICT WITH EXISTING CONDITIONS, THE WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF THE WORK.
16. ARRANGE FOR SITE VISIT WITH THE BLDG. OWNER REPRESENTATIVE AND GENERAL CONTRACTOR.
17. CLAIMS FOR ADDITIONAL COMPENSATION ARISING DUE TO THE FAILURE OF THE CONTRACTOR TO FULLY UNDERSTAND THE SITE CONDITIONS SHALL NOT BE PAID FOR BY ANY OTHER PARTY.
18. LEAVE WIRE SUFFICIENTLY LONG TO PERMIT MAKING FINAL CONNECTIONS. CONDUIT OVER 10 FEET IN WHICH WIRING IS NOT INSTALLED-FURNISH PULL STRING.
19. DO NOT PULL THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F (0 DEG C). PROVIDE CABLE SUPPORTS FOR WIRE IN RISER CONDUITS AS REQUIRED BY CODE.
20. LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS AT OR NEAR DOORS. INSTALL SWITCH ON SIDE OPPOSITE HINGE; VERIFY FINAL DOOR HINGE LOCATION IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.
21. SUPPORT PANEL, JUNCTION & PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON CONDUIT.
22. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
23. FOR EACH LOCATION OF OTHER TRADES EQUIPMENT, SEE RESPECTIVE TRADE DRAWINGS.
24. FOR RECEPTACLE & OUTLETS MOUNTING HEIGHTS AND POSITION (HORIZONTAL, VERTICAL), COORDINATE WITH ARCHITECT, OWNER, REPRESENTATIVE & DATA/ COMMUNICATION CONSULTANT.
25. CONTRACTOR SHALL PROVIDE AND INSTALL ALL COMPONENTS INDICATED ON DETAILS SHEETS, PLANS, SPECIFICATIONS AND ALL PERTINENT EQUIPMENT REQUIRED FOR A COMPLETE WORKABLE SYSTEM.
26. ALL CONDUITS, TRANSFORMERS ETC. SHALL BE SUPPORTED FROM STRUCTURAL STEEL ONLY. COORDINATE WITH GENERAL CONTRACTOR.
27. ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT IN ELECTRICAL AND SERVICE SWITCHBOARD ROOM SHALL BE INSTALLED ON 4" CONCRETE PAD AS REQUIRED TO SUPPORT EACH SECTION OF EQUIPMENT. COORDINATE WITH GENERAL CONTRACTOR.
28. PROVIDE BARRIERS IN ALL PULL BOXES FOR CONDUIT SETS.
29. PAINT AND RUST PROOF ALL HARDWARE & CONDUITS ON ROOF AND IN EXPOSED AREAS AS DIRECTED BY GENERAL CONTRACTOR.
30. NUMBER SHOWN ADJACENT TO LIGHTING FIXTURES, RECEPTACLES, OUTLETS, JUNCTION BOXES ETC. INDICATES CIRCUIT NUMBER.
31. ALL GROUND CONNECTIONS TO THE BUILDING STEEL SHALL BE EXOTHERMIC WELDED.
32. FLEXIBLE CONNECTIONS IN EXPOSED AREAS SHALL NOT EXCEED 18" MAXIMUM.
33. ALL EQUIPMENT DEVICES, WIRING, ETC. SHOWN ON THE DRAWINGS IS NEW UNLESS OTHERWISE NOTED.
34. ELECTRICAL CONTRACTOR SHALL PROVIDE SLEEVES/ OPENINGS FOR ALL CONDUIT RISERS PENETRATING WALLS, ROOF & FLOOR SLABS. ALL ROOF AND MECH. ROOMS SLAB PENETRATIONS SHALL BE WATERPROOF. METHOD OF PENETRATIONS & FIRE/WATER WATER PROOFING SHALL BE APPROVED BY ARCHITECT AND STRUCTURAL ENGINEER, COORDINATE WITH GENERAL CONTRACTOR.
35. ELECTRICAL CONTRACTOR SHALL BECOME FAMILIAR AND COMPLY WITH OWNERS BUILDING STANDARDS FOR CONSTRUCTION.
36. ALL FINAL CONNECTIONS TO VIBRATING EQUIPMENT (MOTORS, GENERATORS ETC.) SHALL BE THROUGH A LIQUID TIGHT FLEXIBLE METAL CONDUIT.
37. CONTRACTOR SHALL WIRE NO MORE THAN EIGHT CONVENIENCE RECEPTACLES TO A 20A SINGLE POLE CIRCUIT. UTILIZE 2-#12&1 #12 GND IN ¾" CONDUIT & 1-20A SINGLE POLE CIRCUIT BREAKER FOR EACH CIRCUIT. INSTALL ADDITIONAL CIRCUIT AS NECESSARY TO MEET THIS REQUIREMENT.
38. ALL PENETRATIONS THROUGH FIRE RATED PARTITIONS SHALL BE SEALED FIRE AND SMOKE TIGHT WITH AN APPROPRIATE U.L. LISTED FIRESTOPPING MATERIAL AND OR SYSTEM.
39. THE TERMS "PROVIDE" OR "FURNISH", AS USED ON THESE PLANS, INDICATE THAT THE CONTRACTOR IS TO FURNISH AND INSTALL THE REFERENCED EQUIPMENT OR SYSTEMS IN THEIR ENTIRETY AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.
40. CONTRACT CLOSE OUT: IN THE PRESENCE OF THE OWNER, ENGINEER OR ARCHITECT; DEMONSTRATING OPERATION OF SYSTEMS AND THAT ALL SPECIFICATIONS HAVE BEEN MET TO THE SATISFACTION OF ALL PARTIES.
41. IT IS THE INTENT AND PURPOSE OF THESE SPECIFICATIONS AND DRAWINGS TO INCLUDE AND PROVIDE FOR ALL MATERIALS, APPLIANCES AND LABOR TO PROPERLY COMPLETE AND LEAVE IN PERFECT WORKING CONDITION THE ENTIRE SYSTEM HEREINAFTER SPECIFIED. ANY MATERIAL, LABOR OR APPLIANCE NOT SPECIFICALLY MENTIONED IN THESE SPECIFICATIONS OR SHOWN ON THE DRAWINGS, BUT NECESSARY FOR A COMPLETE INSTALLATION MUST BE FURNISHED BY THIS CONTRACTOR.
42. JUNCTION & PULL BOXES: DO NOT LOCATE EXPOSED IN FINISH SPACES UNLESS REQUIRED BY NEC. WHERE NECESSARY, REROUTE CONDUIT OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. PROVIDE PULL BOXES AS INDICATED AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE AND COORDINATE LOCATIONS WITH OTHER TRADES. COVERS OF JUNCTION AND PULL BOXES SHALL BE ACCESSIBLE. FOR EMPTY CONDUITS, INSTALL PULL BOXES EVERY 100 FEET AND AS INDICATED. COORDINATE LOCATIONS WITH OTHER TRADES.
43. UPSIZE WIRE WHERE NECESSARY PER NATIONAL ELECTRICAL CODE TO COMPENSATE FOR VOLTAGE DROP.

## LEGEND AND SCHEDULE OF FIRE ALARM EQUIPMENT

| SYMBOL | MANUFACTURER | CATALOG # | DESCRIPTION |
|---|---|---|---|
| FACP | FIRE-LITE | MS-9600UDLS(E) | FIRE ALARM CONTROL PANEL WITH ON-BOARD DIGITAL ALARM COMMUNICATOR TRANSMITTER, UP TO 318 ADDRESSABLE DEVICES PER LOOP AND FOUR ON-BOARD NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL APPURTENANCES FOR A COMPETE SYSTEM. |
| P | | BG-12 | ADDRESSABLE MANUAL DUAL-ACTION PULL STATION WITH HEX LOCK. RED |
| CO | SYSTEM SENSOR | CO1224TR | CARBON MONOXIDE DETECTOR WITH DUAL COLOR LED INDICATOR THAT BLINKS TO INDICATE NORMAL STANDBY, ALARM, OR END-OF-LIFE. WHEN THE SENSOR SUPERVISION IS IN A TROUBLE CONDITION, THE DETECTOR SHALL SEND A TROUBLE SIGNAL TO THE PANEL. |
| DS | FIRE-LITE | D335PL | ADDRESSABLE NON-RELAY PHOTOELECTRIC DUCT SMOKE DETECTOR. PROVIDE WITH APPROPRIATELY SIZED METAL SAMPLING TUBE AND ALL OTHER APPURTENANCES NECESSARY FOR A COMPLETE SYSTEM. DUCT SMOKE DETECTOR, SUPPLIED AND WIRED BY E.C. INSTALLED BY M.C. COORDINATE INSTALLATION WITH M.C. |
| S | SYSTEM SENSOR | SRL | STROBE WITH SELECTABLE 15,30,75,95,110, 135, AND 185 cd OUTPUT. RED INDOOR USE ONLY. |
| H/S | | P2RL | HORN-STROBE WITH SELECTABLE 15,30,75, 95,110,135, AND 185 cd STROBE OUTPUT AND SELECTABLE 83-90 db HORN OUTPUT. RED. INDOOR USE ONLY. |
| RA | FIRE-LITE | ANN-80 | REMOTE ANNUNCIATOR WITH 80-CHARACTER BACKLIT LCD DISPLAY. |

NOTES:
1. PROVIDE APPURTENANCES NECESSARY SUCH THAT IF MORE THEN TWO STROBES ARE VISIBLE THEY SHALL FLASH IN SYNCH.
2. STROBES MUST BE PLACED 15' FROM THE END OF ANY CORRIDOR.

## LEGEND AND SCHEDULE OF LIGHTING EQUIPMENT

| SYMBOL | MANUFACTURER | MODEL # | DESCRIPTION |
|---|---|---|---|
| $ | WATTSTOPPER | LMSW-101 | DLM PUSH-BUTTON WALL SWITCH. COLOR BY ARCHITECT. |
| | | DSW-301 | LINE VOLTAGE PUSH-BUTTON WALL SWITCH WITH INTEGRAL DUAL-TECHNOLOGY VACANCY SENSOR. COLOR BY ARCHITECT. |
| $D | | LMDM-101 | LOW VOLTAGE WALL MOUNTED DIMMING SWITCH. MANUAL ON TO 50% LIGHT LEVEL. COLOR BY ARCHITECT. |
| | | LMDC-100 | DLM DUAL-TECHNOLOGY CEILING SENSOR, SET TO MANUAL-ON OPERATION. |
| D | | LMLS-500 | DAYLIGHT HARVESTING SENSOR, OPEN LOOP WITH ADJUSTABLE DIMMING, MULTIZONE PHOTOSENSOR AND OFF SETPOINTS. LIGHTING LOAD TO BE TURNED OFF AT 100% ABOVE SETPOINT. |
| RC1 | | LMRC-101 | DLM ON/OFF SINGLE RELAY ROOM CONTROLLER. MOUNT ABOVE FINISHED CEILING ABOVE LOCAL LIGHT SWITCH. FOR ROOMS WITHOUT FINISHED CEILING, MOUNT INCONSPICUOUSLY AT/NEAR CEILING. |
| RC2D | | LMRC-212 | DLM ON/OFF/0-10V DIMMING DUAL RELAY ROOM CONTROLLER. MOUNT ABOVE FINISHED CEILING ABOVE LIGHT SWITCH. FOR ROOMS WITHOUT FINISHED CEILING, MOUNT INCONSPICUOUSLY AT/NEAR CEILING. |
| TC-# TC-1, TC-2 | TORK | EWZ-201 | INDOOR/OUTDOOR ASTRONOMIC TIMECLOCK WITH 2 SETS OF 40A SINGLE POLE SINGLE THROW CONTACTS. NEMA 3R RATED. |

## LEGEND & SCHEDULE OF GENERATOR EQUIPMENT

| SYMBOL | MANUFACTURER | MODEL# | DESCRIPTION |
|---|---|---|---|
| G G-1 | GENERAC | SG500 | 500KW 208/120V DIESEL GENERATOR. PROVIDE NEMA 2 SOUND ATTENUATED ENCLOSURE. PROVIDE WITH 1600A MAIN LINE CIRCUIT BREAKER AND 60A, SECONDARY MAIN LINE CIRCUIT BREAKER |
| ATS-1 | ASCO | H-03ATS-A-3-1600-C-G0-C | 1600A, 120/208V, 3ø, 4W SERVICE ENTRANCE RATED AUTOMATIC TRANSFER SWITCH |
| ATS-2 | ASCO | D-03ATS-A-3-0070-C-G0-C | 60A, 120/208V, 3ø, 4W AUTOMATIC TRANSFER SWITCH |

## FIRE ALARM SYMBOLS

- P — FIRE ALARM PULL STATION
- S — SMOKE DETECTOR. A=AUXILIARY CONTACTS.
- S — STROBE ONLY ADA COMPLIANT
- FS — FLOW SWITCH
- TS — TAMPER SWITCH
- H/S or H/S — FIRE ALARM HORN W/STROBE ADA COMPLIANT
- H — HEAT DETECTOR
- DS — DUCT SMOKE DETECTOR. COORDINATE SIZE OF SAMPLING TUBE WITH DUCTWORK. PROVIDE RELAYS AS REQUIRED.
- CO — CARBON MONOXIDE DETECTOR

## POWER SYMBOLS

- SPEC GRADE NEMA 5-20R RECEPTACLE. -GFI INDICATES GROUND FAULT INTERRUPTION -WP INDICATES WEATHER PROOF ENCLOSURE
- SPEC GRADE NEMA 5-20R RECEPTACLE. MOUNT AT 44" AFF OR 6" ABOVE COUNTER, UNO. -GFI INDICATES GROUND FAULT INTERRUPTION -WP INDICATES WEATHER PROOF ENCLOSURE
- 2P, 3 WIRE, 250V GROUNDING NEMA 6-30R RECEPTACLE. -GFI INDICATES GROUND FAULT INTERRUPTION -WP INDICATES WEATHER PROOF ENCLOSURE
- 1P, 3 WIRE, 125V QUAD RECEPTACLE. -GFI INDICATES GROUND FAULT INTERRUPTION -WP INDICATES WEATHER PROOF ENCLOSURE
- SPECIAL PURPOSE CONNECTION.
- J — JUNCTION BOX, SIZE PER N.E.C.
- 3P, FUSED DISCONNECT SWITCH, FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. SHALL HAVE THE SAME # OF POLES & AMPERE RATING AS CONNECTING CIRCUIT UNLESS OTHERWISE NOTED.
- CONDUIT HOME RUN TO DESIGNATED PANEL. REFER TO PANEL SCHEDULE FOR CONDUIT & CABLE QUANTITY AND SIZE.
- DOUBLE HOME RUN
- TRIPLE HOME RUN
- GROUND
- TRANSFORMER
- $m — 120V, OR 208V, 1P, MOTOR STARTER WITH OVERLOADS TO SERVE AS DISCONNECTING MEANS. COORDINATE WITH OTHER TRADES.
- 100A-1P — CIRCUIT BREAKER - 100A TRIP - SINGLE POLE
- 100A-3P — FUSE SWITCH - 100A FUSE - 3 POLE
- MOTOR
- M — ELECTRIC METER
- D0 — AUTOMATIC DOOR OPENER PUSH BUTTON. MOUNTED AT ADA HEIGHT. PROVIDE WIRING TO DOOR OPERATOR PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

## GENERAL SYMBOLS

- POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
- X / XX — INDICATES SECTION LETTER / INDICATES DRAWING NUMBER WHERE LOCATED

## ELECTRICAL LINE TYPES

- NEW DEVICE
- NEW WIRING
- NEW FIXTURE
- UNDERGROUND POWER
- UNDERGROUND COMMUNICATIONS

## WIRE & CONDUIT SCHEDULE

| TAG | FEEDER SIZE | WIRE AND CONDUIT |
|---|---|---|
| P | PRIMARY CONDUCTORS PER UTILITY COMPANY STANDARDS IN 5" CONDUIT | |
| A | 1600A | 4 SETS OF: (4) #600 MCM CU, (1) 3/0 GND, (1) 3 1/2" CONDUIT |
| B | 600A | 2 SETS OF: (4) #350 MCM (1) #1 GND, (1) 2½" CONDUIT |
| C | 400A | (4) #500 KCMIL CU, (1) #3 GND, (1) 4" CONDUIT |
| D | 200A | (4) 3/0 CU, (1) #6 GND, (1) 2" CONDUIT |
| E | 60A | (4) #6, (1) #10 GND, (1) 1" CONDUIT |
| F | - - - | (4) 4" CONDUIT WITH PULL STRING FOR COMMUNICATIONS |
| SS | -- | (6) #14AWG CU, (1) 3/4" CONDUIT |
| RA | -- | REFER TO GENERAL MANUFACTURER'S WRITTEN INSTRUCTIONS. |

* INDICATES SERVICE ENTRANCE CONDUCTORS, GROUNDING CONDUCTOR CAN BE OMITTED.

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| A | AMPERE | LED | LIGHT-EMITTING DIODE |
| ACT | ACOUSTIC CEILING TILE | LP | LIGHTING PANEL |
| AD | AUTOMATIC DAMPER | LTG | LIGHTING |
| AF | AMPERE FRAME | M.C. | MECHANICAL CONTRACTOR |
| AFF | ABOVE FINISHED FLOOR | MCM | THOUSAND CIRCULAR MILS |
| AIC | AMPERE INTERRUPTING CAPACITY | MCB | MAIN CIRCUIT BREAKER |
| AL | ALUMINUM | MECH | MECHANICAL |
| ATS | AUTOMATIC TRANSFER SWITCH | MDP | MAIN DISTRIBUTION PANEL |
| AUTO | AUTOMATIC | MLO | MAIN LUGS ONLY |
| AWG | AMERICAN WIRE GAUGE | MTD | MOUNTED |
| BCW | BARE COPPER WIRE | MTG | MOUNTING |
| C | CONDUIT | N | NEUTRAL |
| CAT | CATALOG | NIC | NOT IN CONTRACT |
| CB | CIRCUIT BREAKER | NEC | NATIONAL ELECTRIC CODE |
| CKT | CIRCUIT | NTS | NOT TO SCALE |
| CLG | CEILING | NM | NON-METALLIC CONDUIT |
| CT | CURRENT TRANSFORMER | P | POLE |
| CU | COPPER | PB | PULL BOX |
| DP | DISTRIBUTION PANEL | ø | PHASE |
| DF | DRINKING FOUNTAIN | PWR | POWER |
| DIV | DIVISION | RECEPT. | RECEPTACLE |
| DS | DISCONNECT (LOCKOUT) SWITCH | REQ. | REQUIRED |
| DWG | DRAWING | RM | ROOM |
| EA | EACH | SCHED. | SCHEDULE |
| E.C. | ELECTRICAL CONTRACTOR | SECT. | SECTION |
| ELEV | ELEVATOR | SPEC. | SPECIFICATION |
| EQUIP. | EQUIPMENT | SPKR. | SPEAKER |
| EMT | ELECTRICAL METALLIC TUBING | SW | SWITCH |
| FA | FIRE ALARM | SWBD | SWITCH BOARD |
| FACP | FIRE ALARM CONTROL PANEL | SYS | SYSTEM |
| FL | FLOOR | TBD | TO BE DETERMINED |
| FT | FEET OR FOOT | TEL | TELEPHONE |
| G, GND | GROUND | TC | TIME CLOCK |
| G.C. | GENERAL CONTRACTOR | TYP | TYPICAL |
| GEN. | GENERATOR | U.N.O. | UNLESS NOTED OTHERWISE |
| GFI | GROUND FAULT INTERRUPTER | UPS | UN-INTERRUPTABLE POWER SUPPLY |
| GRC | GALVANIZED RIGID STEEL CONDUIT | VIF | VERIFY IN FIELD |
| HP | HORSEPOWER | WP | WEATHER PROOF |
| HVAC | HEATING, VENTILATING & AIR CONDITIONING | W | WATT |
| HZ | HERTZ | XFMR/ TRANSF. | TRANSFORMER |
| IC | INTERRUPTING CAPACITY | | |
| IMC | INTERMEDIATE METAL CONDUIT | | |
| KV | KILO VOLT | | |
| KVA | KILO VOLT AMP | | |
| KW | KILO WATT | | |

## FIRE ALARM NOTES:

1. REFER TO THE FLOOR PLANS FOR LOCATION & QUANTITY OF FIRE ALARM DEVICES.
2. ALL FIRE ALARM WIRING SHALL BE IN TEFLON WIRE AND SHALL BE CONCEALED IN CEILING SPACES & WALLS.
3. SYSTEM SCHEMATIC IS A DIAGRAMMATIC REPRESENTATION OF THE FIRE ALARM SYSTEM. THE SYSTEM SHALL BE INSTALLED AND WIRED AS PER THE SYSTEM MANUFACTURER'S RECOMMENDATION FOR A COMPLETE AND OPERABLE SYSTEM.
4. CONTRACTOR IS RESPONSIBLE FOR ALL FILING AND FINAL INSPECTION AS PER THE LOCAL AUTHORITY HAVING JURISDICTION.
5. CONTRACTOR TO PROVIDE AND INSTALL ALL NECESSARY MODULES, INTERFACE MODULES AND DEVICES REQUIRED TO PROVIDE AN OPERABLE ALARM SYSTEM IN COMPLIANCE WITH ALL CODES.
6. FIRE ALARM PANEL SHALL PROVIDE CONTINUOUSLY SUPERVISED MONITORING OF ALL SYSTEMS FOR OPENS, SHORTS AND GROUNDS.
7. ACTIVATION OF THE SMOKE DETECTORS SHALL CAUSE A GENERAL ALARM AFTER THE SMOKE DETECTOR PERFORMS VERIFICATION.
8. ACTIVATION OF ANY PULL STATION OR HEAT DETECTOR SHALL IMMEDIATELY CAUSE THE ALARM PANEL TO ENTER THE ALARM MODE.
9. UPON ENTERING THE PANEL ALARM MODE, THE ALARM INDICATING DEVICE SHALL BE ACTIVATED, AND THE SUPPLY FANS SHALL SHUT-DOWN AND THE DIGITAL COMMUNICATOR SHALL NOTIFY THE CENTRAL RECEIVING STATION. (LOCAL FIRE CONTROL CENTER).
10. CONTRACTOR SHALL PROVIDE ALL NECESSARY ADDITIONAL RELAY DEVICES OR POWER TRANSFORMERS FOR PROPER OPERATION OF THE FAN SHUT-DOWN UNITS AND OTHER RELATED DEVICES.
11. BATTERY BACKUP SHALL PROVIDE A MINIMUM OF 24 HRS. OPERATION WITH A 15 MINUTE ALARM AT THE END OF 24 HRS.
12. NEW FIRE ALARM SYSTEM SHALL BE TESTED IN ACCORDANCE WITH NFPA CODES 70, 70E, 72, BCNYS, FCNYS, LSC101 (2000)-CH.32 NEW BOARD AND CARE OCCUPANCY AS WELL AS ALL LOCAL AND STATE CODE REQUIREMENTS.
13. CONTRACTOR SHALL PROVIDE ALL ADDITIONAL APPURTENANCES AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM. MODEL NUMBERS GIVEN MAY NOT INCLUDE ALL SPECIFIC REQUIRED ACCESSORIES FOR COMPLETE INSTALLATION.
14. PROVIDE APPURTENANCES NECESSARY SUCH THAT IF MORE THEN TWO STROBES ARE VISIBLE THEY SHALL FLASH IN SYNCH.
15. PROVIDE FLOW SWITCH AND TAMPER SWITCH AT SPRINKLER RISER.
16. ENTIRE FIRE DETECTION AND ALARM SYSTEM SHALL BE FURNISHED AND INSTALLED BY A N.Y. STATE LICENSED ALARM CONTRACTOR.
17. FIRE ALARM PANEL SHALL BE PROVIDED WITH A REMOTE DIALER WITH (2) DIRECT CONNECTIONS TO THE LOCAL FIRE CONTROL CENTER.
18. FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL A KNOX BOX AT THE ENTRANCE TO THE BUILDING NEAREST THE FIRE ALARM PANEL WITH SIGNAGE ON THE DOOR TO THE FIRE ALARM CONTROL PANEL ROOM. COORDINATE ALL REQUIREMENTS WITH LOCAL FIRE AND BUILDING DEPARTMENT OFFICIALS.
19. FIRE ALARM CONTRACTOR SHALL INTERCONNECT CO DETECTORS WITH THE NEW FIRE ALARM SYSTEM FOR PRIMARY POWER AND BATTERY BACKUP. CO ALARM SHALL ANNUNCIATE AS A SUPERVISORY CONDITION.
19. ALL AIR HANDLING SYSTEMS RATED 2,000 CFM OR MORE SHALL BE PROVIDED WITH DUCT SMOKE DETECTORS FAN SHUTDOWNS CONNECTED TO THE FIRE ALARM SYSTEM.

**ENERGY CODE STATEMENT:**

TO THE BEST OF THE REGISTERED DESIGN PROFESSIONAL'S KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND/OR SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CODE.

**UNIFORM CODE STATEMENT:**

TO THE BEST OF THE REGISTERED DESIGN PROFESSIONAL'S KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND/OR SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 UNIFORM CODE.

REVISION SCHEDULE

| # | DESCRIPTION | DATE |
|---|---|---|
| | ADDENDUM D | 1/6/23 |

SEAL

DANIEL STEINBERG, P.E.
NY PROFESSIONAL ENGINEER NO. 079979-1


ARCHITECT/STRUCTURAL ENGINEER
HYMAN HAYES ASSOCIATES
800 Troy-Schenectady Road Suite 101 Latham, NY 12110 (518) 456-3410 www.hymanhayes.com

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FP&E CONSULTANT: CLASSIC CONCEPT INTERIORS, LLC
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M&P CONSULTANT: FELLENZER ENGINEERING
FORENSIC CONSULTANT: crime lab design


FE PROJECT #: 20-335

ORANGE COUNTY, NEW YORK

SHEET TITLE: ELECTRICAL SYMBOLS, NOTES AND ABBREVIATIONS

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD. GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SA |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER: E001


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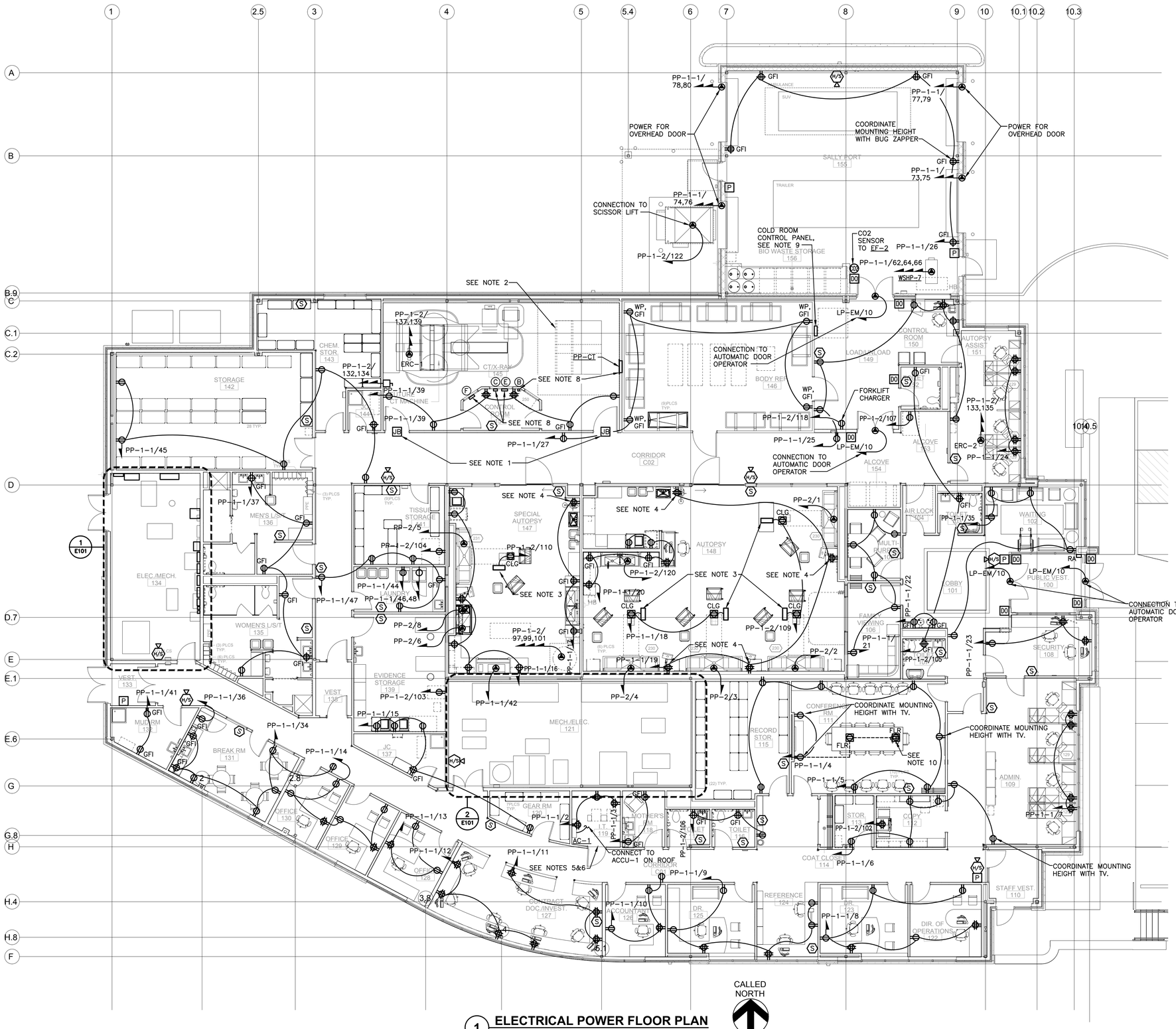


1 **ELECTRICAL POWER FLOOR PLAN**
SCALE: 1/8"–1'–0"

CALLED NORTH

**NOTES:**

1. PROVIDE JUNCTION BOX FOR FUTURE X–RAY LIGHT. PROVIDE EMPTY ¾" CONDUIT TO CONTROL ROOM, TERMINATED AT POINT IN COORDINATION WITH OWNER & EQUIPMENT MANUFACTURER.
2. PROVIDE A 4" CONDUIT IN CEILING SPACE FROM ELEC. RM 134 FOR FUTURE CT MACHINE. TERMINATE AND CAP IN CEILING SPACE.
3. PROVIDE CORD REEL COXREELS MODEL EZ–PC13–5012–B OR EQUAL (TYPICAL 1 PER WORK STATION).
4. COORDINATE MOUNTING HEIGHT WITH WORKSTATION.
5. PROVIDE ¾" FIRE RETARDANT PLYWOOD ALONG WALLS FOR LV EQUIPMENT AND PANELS.
6. PROVIDE 12" LONG, ¼" THICK COOPER GROUND BAR.
7. PROVIDE (4)#12, (1)#12GND, IN ¾"C. COORDINATE TERMINATION WITH OWNER AND EQUIPMENT MANUFACTURER.
8. SEE DETAIL ON E801 FOR ELECTRICAL DIAGRAM AND RACEWAY/WIRING SCHEDULE.
9. COORDINATE EXACT LOCATION WITH MANUFACTURE.
10. SEE DETAIL ON E801

**REVISION SCHEDULE**

| # | DESCRIPTION | DATE |
|---|---|---|
| | ADDENDUM D | 1/6/23 |

SEAL
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NO. 079979–1


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COST CONSULTANT: STUART-LYNN COMPANY
FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M/E/P CONSULTANT: FELLENZER
FORENSIC CONSULTANT: crime lab design


ORANGE COUNTY, NEW YORK

SHEET TITLE
ELECTRICAL POWER FLOOR PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SA |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

FE PROJECT #: 20-336

SHEET NUMBER
E100


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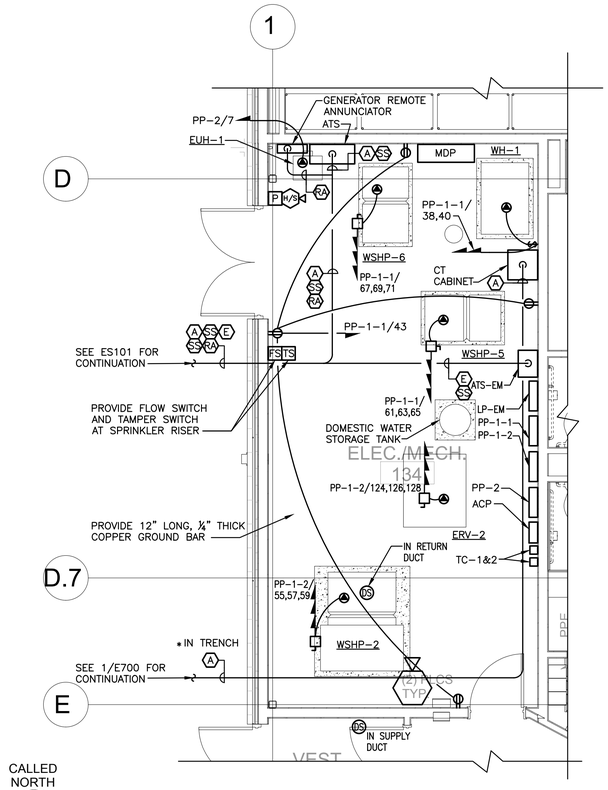
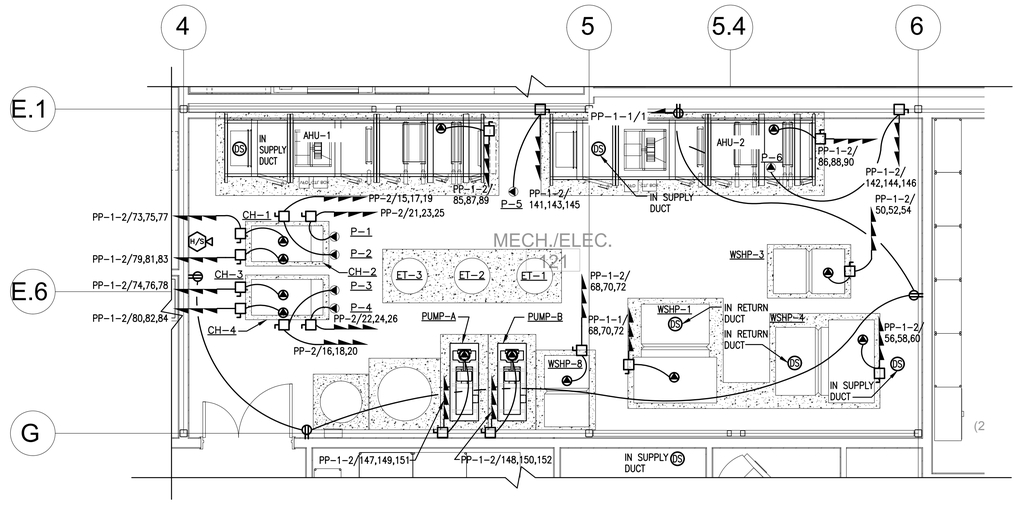



**1 ELECTRICAL POWER FLOOR PLAN @ ELEC./MECH. RM. 134**
SCALE: 1/4"=1'-0"




**2 ELECTRICAL POWER FLOOR PLAN @ MECH./ELEC. RM. 121**
SCALE: 1/4"=1'-0"

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| | ADDENDUM D | 1/6/23 |

SEAL
DANIEL STEINBERG, P.E.
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FORENSIC CONSULTANT: crime lab design
M&P CONSULTANT: FELLENZER
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
COST CONSULTANT: STUART-LYNN COMPANY


FE PROJECT #: 20-335

ORANGE COUNTY, NEW YORK

SHEET TITLE
ELECTRICAL POWER FLOOR PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SA |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 2071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
E101

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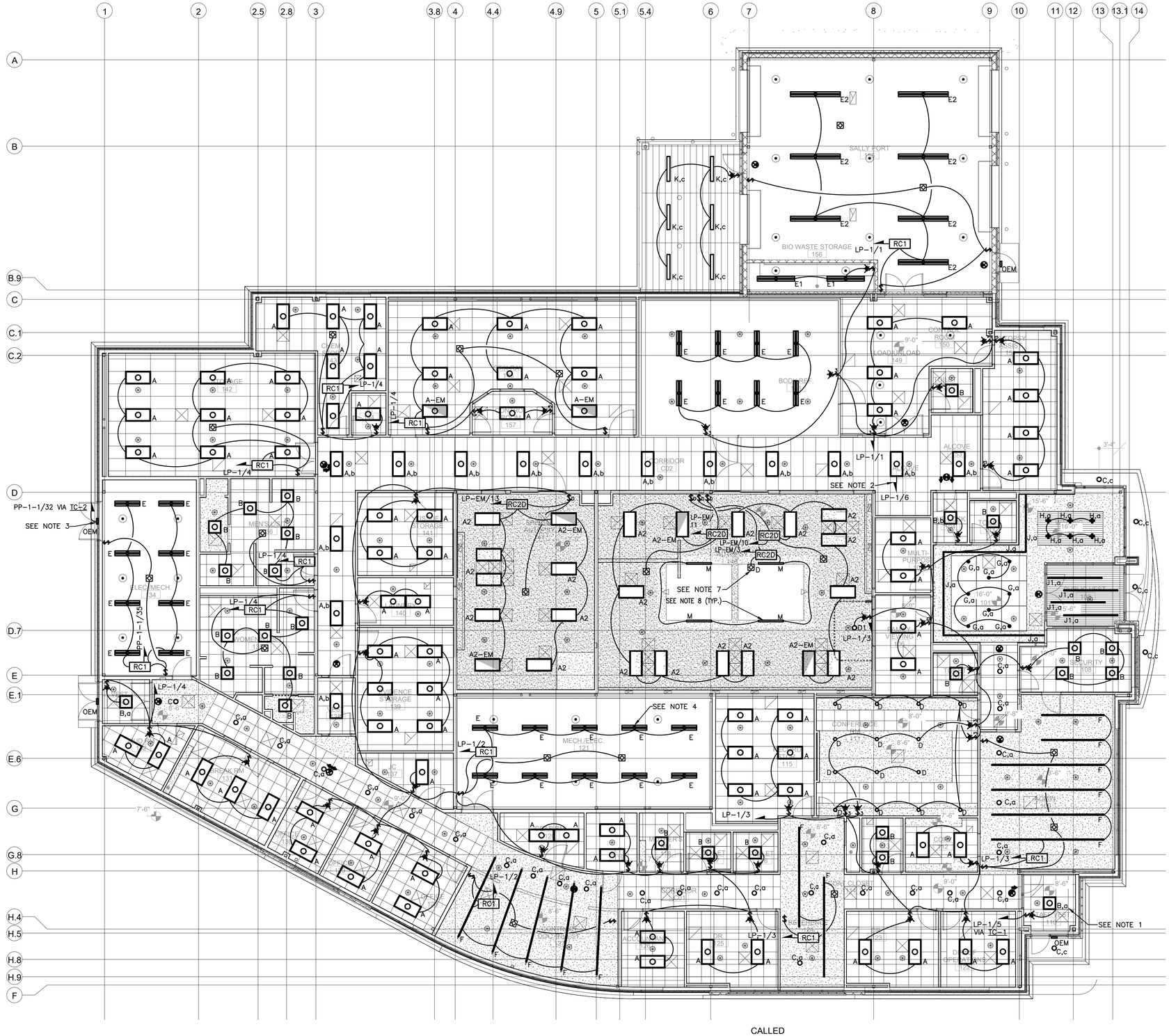


**NOTES:**

1. CIRCUIT ALL FIXTURES LABELED 'a' TO LP-1/5 VIA TC-1.
2. CIRCUIT ALL FIXTURES LABELED 'b' TO LP-1/6 VIA TC-1.
3. CIRCUIT ALL OEM AND ALL FIXTURES LABELED 'c' TO LP-1/7 VIA TC-2.
4. COORDINATE LIGHT FIXTURE MOUNTING HEIGHT WITH HVAC DUCTWORK AND PLUMBING.
5. RECESSED LIGHT IN WALL. COORDINATE EXACT LOCATION WITH ARCHITECT.
6. FIXTURE TO SIT WITHIN AN OPEN SLOT. LENS TO BE LEVEL WITH THE LINEAR PLANKS.
7. MOUNT PHOTOSENSOR WITHIN CLERESTORY OPPOSITE INCOMING LIGHT WELL. AIM LENS TO SEE ONLY DAYLIGHT CONTRIBUTION.
8. TO BE MOUNTED ON CLERESTORY. COORDINATE WITH ARCHITECT FOR EXACT MOUNTING LOCATION AND METHOD.

CALLED NORTH

1 **ELECTRICAL LIGHTING FLOOR PLAN**
SCALE: 1/8"=1'-0"

**REVISION SCHEDULE**

| # | DESCRIPTION | DATE |
|---|---|---|
| | ADDENDUM D | 1/6/23 |

SEAL


ARCHITECT/STRUCTURAL ENGINEER
HYMAN HAYES ASSOCIATES
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MEP/FP CONSULTANT
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CIVIL CONSULTANT
Fusco Engineering & Land Surveying PC

IT/SECURITY CONSULTANT
CONVERGENT TECHNOLOGIES

FF&E CONSULTANT
CLASSIC CONTRACT INTERIORS, LLC

COST CONSULTANT
STUART-LYNN COMPANY

FORENSIC CONSULTANT
crime lab design

FE PROJECT #: 20-335



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ORANGE COUNTY, NEW YORK

SHEET TITLE
# ELECTRICAL LIGHTING FLOOR PLAN

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE

22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SRB |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER

E200

| LOAD | CONDUCTORS | C.B. | A ø B ø C ø | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| PP-1-1 | (4)#500 KCMIL CU, (1)#3 GND, IN 4" CONDUIT | 400 | | 400 | (4)#500 KCMIL CU, (1)#3 GND, IN 4" CONDUIT | PP-CT |
| PP-1-2 | 2 SETS (4)350 MCM, (1)#1 GND, 2 1/2" CONDUIT | 600 | | 60 | (4)#6, (1)#10 GND, 1"C | LP-EM |
| COLD ROOM CONTROL PANEL | (4)#6, (1)#10 GND, 1"C | 60 | | 400 | (4)#500 KCMIL CU, (1)#3 GND, IN 4" CONDUIT | PP-2 |
| SPACE | --- | -- | | -- | --- | SPACE |

TYPE: EATON POW-R-LINE C
RATING: 1600A, 120/208V, 3ø, 4W,
MAINS: MLO
BRACING: 42 KAIC
ENCLOSURE: NEMA 1, SURFACE
AVAILABLE SPACE: 38X

NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.

## MAIN DISTRIBUTION PANEL - (MDP-1)

| LOAD | CONDUCTORS | C.B. | | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| ELECTRICAL ROOM RECEPT | (2)#12, (1)#12 GND, 3/4"C | 20 | 1 2 | 20 | (2)#12, (1)#12 GND, 3/4"C | GEAR ROOM RECEPT |
| MOTHER'S RM/RECORD STOR. RECEPT | | | 3 4 | | | CONFERENCE ROOM RECEPT |
| RECORD STORAGE CONFERENCE ROOM RECEPT | | | 5 6 | | | COPY ROOM/STOR. RECEPT |
| ADMIN RECEPT | | | 7 8 | | | ROOM 122/123 RECEPT |
| ROOM 124/125 RECEPT | | | 9 10 | | | ROOM 126 RECEPT |
| CONTRACT DOC. RECEPT | | | 11 12 | | | CONTRACT DOC. RECEPT |
| OFFICE 128 RECEPT | | | 13 14 | | | ROOM 129/130 RECEPT |
| EVIDENCE STOR. RECEPT | | | 15 16 | | | SPECIAL AUTOPSY RECEPT |
| SPECIAL AUTOPSY RECEPT | | | 17 18 | | | AUTOPSY CLG RECEPT |
| AUTOPSY RECEPT | | | 19 20 | | | AUTOPSY RECEPT |
| VIEWING ROOM RECEPT | | | 21 22 | | | DRINKING FOUNTAIN RECEPT |
| SECURITY RECEPT | | | 23 24 | | | AUTOPSY ASSIST RECEPT |
| CONTROL ROOM RECEPT | | | 25 26 | | | SALLY PORT RECEPT |
| BODY REF RECEPT | | | 27 28 | 20 | --- | SPARE |
| ROOF RECEPT | | | 29 30 | | | |
| ROOF RECEPT | | | 31 32 | | | |
| ROOF RECEPT | | | 33 34 | 20 | (2)#12, (1)#12 GND, 3/4"C | ROOM 131 RECEPT |
| WAITING ROOM RECPT | (2)#12, (1)#12 GND, 3/4"C | 20 | 35 36 | | | 131 ROOM FRIDGE RECEPT |
| MENS/WOMENS L/S/T RECEPT | (2)#12, (1)#12 GND, 3/4"C | | 37 38 | 70 | (4)#4, (1)#8 GND, 1 1/4"C | WH-1 |
| CT/XRAY ROOM RECEPT | | | 39 40 | | | |
| MUD ROOM RECEPT | | | 41 42 | | | |
| ELECTRICAL ROOM RECEPT | | | 43 44 | 20 | (2)#12, (1)#12 GND, 3/4"C | LAUNDRY ROOM RECEPT |
| STORAGE RECEPT | | | 45 46 | 30 | (3)#10, (1)#10 GND, 3/4"C | DRYER RECEPT |
| TISSUE STORAGE RECEPT | | | 47 48 | | | |
| WSHP-1 | (4)#8, (1)#10 GND, 3/4"C | 45 | 49 50 | 20 | (4)#12, (1)#12 GND, 3/4"C | WSHP-3 |
| | | | 51 52 | | | |
| | | | 53 54 | | | |
| WSHP-2 | (4)#8, (1)#10 GND, 3/4"C | 50 | 55 56 | 45 | (4)#8, (1)#10 GND, 3/4"C | WSHP-4 |
| | | | 57 58 | | | |
| | | | 59 60 | | | |
| WSHP-5 | (4)#8, (1)#10 GND, 3/4"C | 45 | 61 62 | 35 | (4)#8, (1)#10 GND, 3/4"C | WSHP-7 |
| | | | 63 64 | | | |
| | | | 65 66 | | | |
| WSHP-6 | (4)#8, (1)#10 GND, 3/4"C | 45 | 67 68 | 35 | (4)#8, (1)#10 GND, 3/4"C | WSHP-8 |
| | | | 69 70 | | | |
| | | | 71 72 | | | |
| OVERHEAD DOOR | (2)#12, (1)#12 GND, 3/4"C | 20 | 73 74 | 20 | (2)#12, (1)#12 GND, 3/4"C | OVERHEAD DOOR |
| | | | 75 76 | | | |
| OVERHEAD DOOR | (2)#12, (1)#12 GND, 3/4"C | 20 | 77 78 | 20 | (2)#12, (1)#12 GND, 3/4"C | OVERHEAD DOOR |
| | | | 79 80 | | | |
| SPARE | - - - | 20 | 81 82 | 20 | (2)#12, (1)#12 GND, 3/4"C | BIOSAFETY CABINET |
| | | | 83 84 | 20 | --- | SPARE |

## POWER PANEL - PP-1-1

TYPE: EATON PRL-1A
RATING: 400A, 120/208V, 3ø, 4W
MAINS: MLO
BRACING: 42 KAIC
ENCLOSURE: NEMA1, SURFACE
POLES: 84

NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.
2. ALL CIRCUITS SHALL HAVE FULL SIZE INSULATED GREEN GROUND UNLESS OTHERWISE NOTED.

| LOAD | CONDUCTORS | C.B. | | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| NORTH LIGHTS | (2)#12, (1)#12 GND, 3/4"C | 20 | 1 2 | 20 | (2)#12, (1)#12 GND, 3/4"C | EAST LIGHTS |
| SOUTH LIGHTS | | | 3 4 | | | WEST LIGHTS |
| LOBBY LIGHTS (VIA TC-1) | | | 5 6 | | | OUTDOOR LIGHTS (VIA TC-2) |
| HALLWAY LIGHTS (VIA TC-1) | | | 7 8 | 20 | (2)#12, (1)#12 GND, 3/4"C | AUTOMATIC DOOR OPENER |
| * FIRE ALARM CONTROL PANEL (FACP) | (2)#12, (1)#12 GND, 3/4"GRC | | 9 10 | 20 | | AUTOPSY EAST SIDE LTG |
| AUTOPSY WEST SIDE LTG | (2)#12, (1)#12 GND, 3/4"C | | 11 12 | | --- | SPARE |
| SPECIAL AUTOPSY LTG | | | 13 14 | -- | | SPACE |
| SPACE | --- | -- | 15 16 | | | |
| | | | 17 18 | | | |

* PROVIDE RED LOCK ON HANDLE

## POWER PANEL - LP-EM

TYPE: EATON PRL-1a
RATING: 60A, 120/208V, 3ø, 4W
MAINS: MLO
BRACING: 42 KAIC
ENCLOSURE: NEMA1, SURFACE
POLES: 18

NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.
2. ALL CIRCUITS SHALL HAVE FULL SIZE INSULATED GREEN GROUND UNLESS OTHERWISE NOTED.

| LOAD | CONDUCTORS | C.B. | | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| XRAY GENERATOR | (4)#8, (1)#10 GND, 1"C | 50 | 1 2 | -- | --- | SPACE |
| | | | 3 4 | | | |
| | | | 5 6 | | | |
| SHUNT | - - - | -- | 7 8 | | | |
| | | | 9 10 | | | |
| | | | 11 12 | | | |
| | | | 13 14 | | | |
| | | | 15 16 | | | |
| | | | 17 18 | | | |

## POWER PANEL - PP-CT

TYPE: EATON PRL-2a
RATING: 200A, 277/480V, 3ø, 4W
MAINS: MLO
BRACING: 14 KAIC
ENCLOSURE: NEMA1, RECESSED
POLES: 18

NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.
2. ALL CIRCUITS SHALL HAVE FULL SIZE INSULATED GREEN GROUND UNLESS OTHERWISE NOTED.
3. SEE TERMINAL SCHEDULE ON E-801 FOR MORE INFO.
4. PROVIDE 50 AMP 3 POLE THERMODYNAMIC CIRCUIT BREAKER WITH SHUNT TRIP DEVICE.
5. LOCATE TOP OF ENCLOSURE 6'-0" A.F.F. EC SHALL ENSURE THAT LUGS ARE LARGE ENOUGH TO FACILITATE OVERSIZED INCOMING CABLES REQUIRED BY X-RAY EQUIPMENT.

| LOAD | CONDUCTORS | C.B. | | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| CH-1 | (4)#3, (1)#8 GND, 1 1/4"C | 90 | 73 74 | 90 | (4)#3, (1)#8 GND, 1 1/4"C | CH-3 |
| | | | 75 76 | | | |
| | | | 77 78 | | | |
| CH-2 | (4)#3, (1)#8 GND, 1 1/4"C | 90 | 79 80 | 80 | (4)#4, (1)#8 GND, 1 1/4"C | CH-4 |
| | | | 81 82 | | | |
| | | | 83 84 | | | |
| AHU-1 | (4)#10, (1)#10 GND, 3/4"C | 25 | 85 86 | 25 | (4)#10, (1)#10 GND, 3/4"C | AHU-2 |
| | | | 87 88 | | | |
| | | | 89 90 | | | |
| ERF-1 | (4)#10, (1)#10 GND, 3/4"C | 25 | 91 92 | 25 | (4)#10, (1)#10 GND, 3/4"C | ERF-2 |
| | | | 93 94 | | | |
| | | | 95 96 | | | |
| BONE KETTLE | (4)#3, (1)#8 GND, 1 1/4"C | 90 | 97 98 | 20 | --- | SPARE |
| | | | 99 100 | | | |
| | | | 101 102 | 20 | (2)#12, (1)#12 GND, 3/4"C | COPIER RECEPT |
| EVIDENCE REFRIG. RECEPT | (2)#12, (1)#12 GND, 3/4"C | 20 | 103 104 | | | TISSUE REFRIG. RECEPT |
| BATHROOM RECEPT | | | 105 106 | | | BATHROOM RECEPT |
| PORTABLE X-RAY | | | 107 108 | | | SPECIAL AUTOPSY CLG RECPET |
| AUTOPSY CLG RECEPT | | | 109 110 | 15 | (2)#12, (1)#12 GND, 3/4"C | EF-1 |
| EF-2 | (2)#12, (1)#12 GND, 3/4"C | 15 | 111 112 | | | EF-3 |
| EV CHARGER | (3)#8, (1)#10 GND, 1"C | 40 | 113 114 | 40 | (3)#8, (1)#10 GND, 1"C | EV CHARGER |
| | | | 115 116 | | | |
| EV CHARGER | (3)#8, (1)#10 GND, 1"C | 40 | 117 118 | 15 | (2)#12, (1)#12 GND, 3/4"C | FORKLIFT CHARGER |
| | | | 119 120 | | | DISPOSAL |
| GEN. ACCESSORY | (3)#6, (1)#10 GND, 1"C | 60 | 121 122 | 45 | (2)#8, (1)#10 GND, 3/4"C | SCISSOR LIFT |
| | | | 123 124 | 15 | (3)#12, (1)#12 GND, 3/4"C | ERV-2 |
| ERV-1 | (3)#8, (1)#8 GND, 3/4"C | 35 | 125 126 | | | |
| | | | 127 128 | | | |
| | | | 129 130 | 20 | --- | SPARE |
| SPARE | --- | 20 | 131 132 | 20 | (3)#12, (1)#12 GND, 3/4"C | XRAY STANDBY POWER |
| ERC-1 | (3)#8, (1)#10 GND, 3/4"C | 30 | 133 134 | | | |
| | | | 135 136 | 30 | (3)#8, (1)#10 GND, 3/4"C | ERV-3 |
| ERC-2 | (3)#12, (1)#12 GND, 3/4"C | 15 | 137 138 | | | |
| | | | 139 140 | | | |
| P-5 | (4)#12, (1)#12 GND, 3/4"C | 15 | 141 142 | 15 | (4)#12, (1)#12 GND, 3/4"C | P-6 |
| | | | 143 144 | | | |
| | | | 145 146 | | | |
| P-A | (4)#1, (1)#8 GND, 1 1/4"C | 125 | 147 148 | 125 | (4)#1, (1)#8 GND, 1 1/4"C | P-B |
| | | | 149 150 | | | |
| | | | 151 152 | | | |
| ACCU-1 | (3)#12, (1)#12 GND, 3/4"C | 15 | 153 154 | 20 | --- | SPARE |
| | | | 155 156 | | | |

## POWER PANEL - PP-1-2

TYPE: EATON PRL-1A
RATING: 600A, 120,208V, 3ø, 4W
MAINS: MLO
BRACING: 42 KAIC
ENCLOSURE: NEMA1, SURFACE
POLES: 84

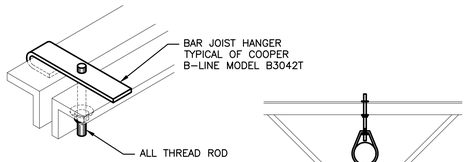
NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.
2. ALL CIRCUITS SHALL HAVE FULL SIZE INSULATED GREEN GROUND UNLESS OTHERWISE NOTED.

| LOAD | CONDUCTORS | C.B. | | C.B. | CONDUCTORS | LOAD |
|---|---|---|---|---|---|---|
| AUTOPSY HEADWALL POWER | (2)#12, (1)#12 GND, 3/4"C | 20 | 1 2 | 20 | (2)#12, (1)#12 GND, 3/4"C | AUTOPSY HEADWALL POWER |
| AUTOPSY HEADWALL POWER | | | 3 4 | | | AUTOPSY HEADWALL POWER |
| ROLLING LADDER | | | 5 6 | | | GROSSING STATION |
| EUH-1 | (2)#10, (1)#10 GND, 3/4"C | 30 | 7 8 | | | GROSSING STATION |
| CDU-1 | (3)#8, (1)#10 GND, 3/4"C | 45 | 9 10 | 45 | (3)#8, (1)#10 GND, 3/4"C | CDU-2 |
| | | | 11 12 | | | |
| | | | 13 14 | | | |
| P-1 | (4)#12, (1)#12 GND, 3/4"C | 15 | 15 16 | 15 | (4)#12, (1)#12 GND, 3/4"C | P-3 |
| | | | 17 18 | | | |
| | | | 19 20 | | | |
| P-2 | (4)#12, (1)#12 GND, 3/4"C | 15 | 21 22 | 15 | (4)#12, (1)#12 GND, 3/4"C | P-4 |
| | | | 23 24 | | | |
| | | | 25 26 | | | |
| EXERO-DR SCANNER | (3)#10, (1)#10 GND, 3/4"C | 25 | 27 28 | 20 | --- | SPARE |
| | | | 29 30 | | | |
| SPACE | --- | -- | 31 32 | | | |
| | | | 33 34 | -- | --- | SPACE |
| | | | 35 36 | | | |
| | | | 37 38 | | | |
| | | | 39 40 | | | |
| | | | 41 42 | | | |

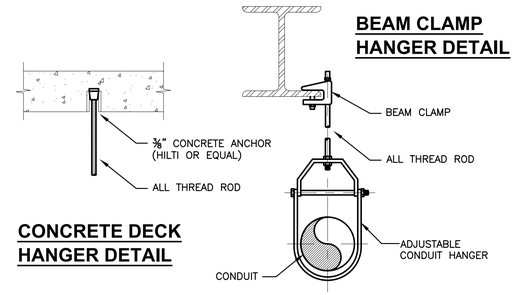
## POWER PANEL - PP-2

TYPE: EATON PRL-1a
RATING: 400A, 120/208V, 3ø, 4W
MAINS: MLO
BRANCHES: 42 KAIC
ENCLOSURE: NEMA1, SURFACE
POLES: 42

NOTES:
1. ALL WIRE SHALL BE DUAL RATED THHN/THWN COPPER CONDUCTOR UNLESS OTHERWISE NOTED.
2. ALL CIRCUITS SHALL HAVE FULL SIZE INSULATED GREEN GROUND UNLESS OTHERWISE NOTED.



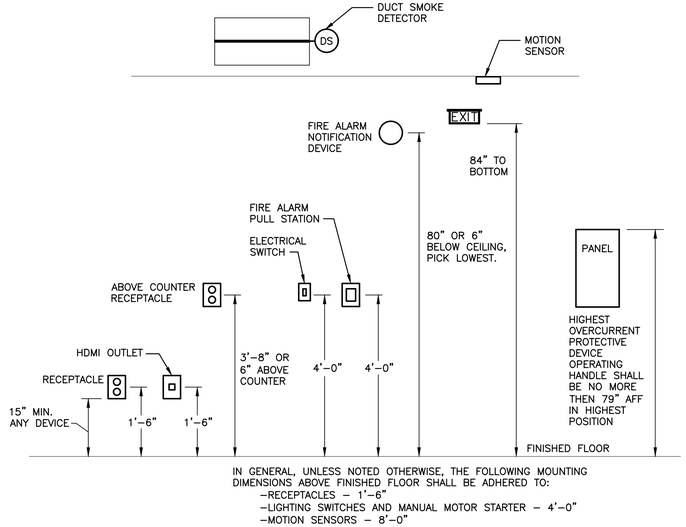

## BAR JOIST HANGER DETAIL




## BEAM CLAMP HANGER DETAIL

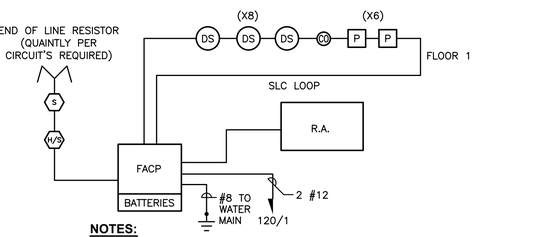
## CONCRETE DECK HANGER DETAIL

## 1 TYPICAL CONDUIT HANGER DETAIL
N.T.S.




IN GENERAL, UNLESS NOTED OTHERWISE, THE FOLLOWING MOUNTING DIMENSIONS ABOVE FINISHED FLOOR SHALL BE ADHERED TO:
- RECEPTACLES - 1'-6"
- LIGHTING SWITCHES AND MANUAL MOTOR STARTER - 4'-0"
- MOTION SENSORS - 8'-0"

## 2 MOUNTING HEIGHTS OF ELECTRICAL DEVICES
N.T.S.




**NOTES:**
1. REFER TO DRAWINGS FOR DEVICE QUANTITIES & LOCATIONS.
2. PROVIDE WIRE SIZE, TYPE AND CONFIGURATION PER MANUFACTURES REQUIREMENTS

## 3 FIRE ALARM / DETECTION SYSTEM SCHEMATIC
N.T.S.

| REVISION SCHEDULE | | |
|---|---|---|
| # | DESCRIPTION | DATE |
| | ADDENDUM D | 1/6/23 |

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M&P CONSULTANT: FELLENZER ENGINEERING
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
IT-SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
COST CONSULTANT: STUART-LYNN COMPANY


FE PROJECT #: 20-335

ORANGE COUNTY, NEW YORK

SHEET TITLE
ELECTRICAL SCHEDULES & DETAILS

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
GOSHEN, NY 10924

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SA |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
E800

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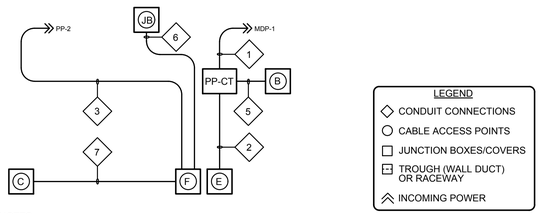



LEGEND
- CONDUIT CONNECTIONS
- CABLE ACCESS POINTS
- JUNCTION BOXES/COVERS
- TROUGH (WALL DUCT) OR RACEWAY
- INCOMING POWER

NOTES:
1. 480 VAC, 3-PHASE, POWER FOR THE X-RAY GENERATOR.
2. 208-240 VAC, SINGLE PHASE, 25 AMP, FOR THE EXERO-DR SCANNER. (CLEAN POWER).
3. 120 VAC, 20 AMP FOR THE CONTROL WORKSTATION DEVICES. (CLEAN POWER).

## 1 ELECTRIC BLOCK DIAGRAM
N.T.S.

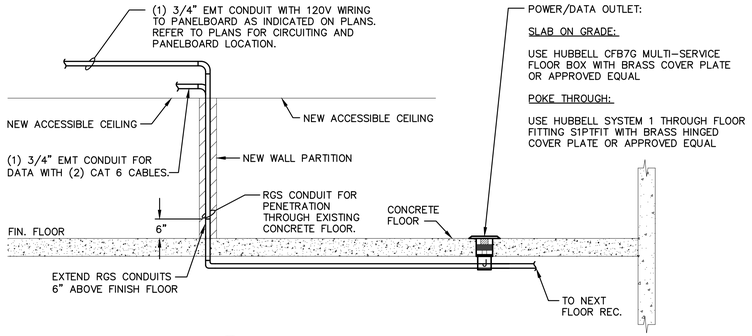
### RACEWAY & WIRING SCHEDULE
( CONTRACTOR FURNISHED - CONTRACTOR INSTALLED )

| RUN # | FROM | TO | SIZE | REMARKS |
|---|---|---|---|---|
| 1 | MDP-1 | PP-CT | 2" CONDUIT | (4) 3/0 CU, (1)#6 GND, 2"C. EC TO CONNECT AT BOTH ENDS. |
| 2 | PP-CT | E | 1" CONDUIT | (4)#8, (1)#10 GND, 1"C. EC TO CONNECT AT <A> AND TERMINATE CABLES AT <E> WITH ILSCO CLEAR SPLICE CONNECTORS. |
| 3 | PP-2 | F | 3/4" CONDUIT | 2-#10AWG PLUS 1-#10AWG NEUTRAL AND GROUND. EC SHALL CONNECT TO 25AMP, 2P, CB IN (PP-2) "EXERO-DR SCANNER" AND LEAVE 15'-0" TAILS AT (F). EC SHALL IDENTIFY WIRES AS "EXERO-DR SCANNER" POWER. |
| 6 | PP-CT | B | 3/4" CONDUIT | 2-#12 AWG PLUS GROUND. EC SHALL CONNECT TO SHUNT TRIP DEVICE IN (A) AND CONNECT "EMERGENCY OFF" SWITCH IN BOX (B). 24VAC PREFERRED. |
| 6 | JB | F | 3/4" CONDUIT | 2-#12 AWG PLUS GROUND. EC SHALL CONNECT TO "X-RAY IN USE" WARNING SIGN AT BOX (W) AND LEAVE TAILS AT (F). EC SHALL ENSURE NO LIVE WIRES IN (F). |
| 7 | F | C | 2 1/2" CONDUIT | EMPTY CONDUIT. LEAVE PULL STRINGS. FOR LODOX SUPPLIED CONTROL CABLES. |

THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ONE #8AWG GREEN EQUIPMENT GROUND WIRE BETWEEN ALL X-RAY EQUIPMENT. CONSULT WITH THE LOCAL X-RAY EQUIPMENT REPRESENTATIVE REGARDING CENTRAL GROUND POINT LOCATION.

### TERMINAL SCHEDULE
( CONTRACTOR FURNISHED - CONTRACTOR INSTALLED )

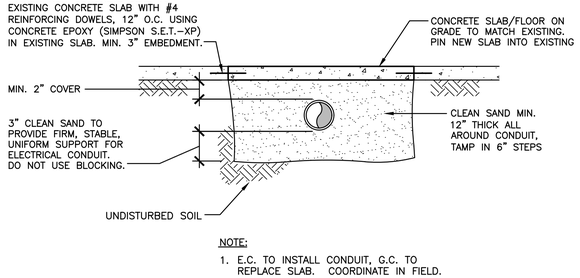
| ITEM | DESCRIPTION |
|---|---|
| B | 4" x 2" x 2" DEEP SWITCH BOX. FLUSH MOUNT IN WALL NEAR WHERE SHOWN. LOCATE BOX CENTER LINE AT 5'-6" A.F.F. SWITCH WILL BE USED FOR SHUNT TRIP OF CIRCUIT BREAKER LOCATED IN PP-CT. PROVIDE NORMALLY OPEN SWITCH AND "EMERGENCY OFF" NAME PLATE. |
| C | 8" x 8" x 4" DEEP JUNCTION BOX. FLUSH MOUNT IN WALL WHERE SHOWN. LOCATE JUNCTION BOX CENTER LINE 14" A.F.F. PROVIDE ONE 1 1/2"Ø BUSHING IN REMOVABLE OVERSIZED COVERPLATE. REFER TO COVERPLATE DETAILS. |
| E | 12" x 12" x 4" DEEP JUNCTION BOX. FLUSH MOUNT IN WALL WHERE SHOWN. LOCATE JUNCTION BOX CENTER LINE 14" A.F.F. BOX FOR 480VAC, THREE PHASE POWER TO X-RAY GENERATOR CABINET. PROVIDE ONE 1 1/2"Ø SEALTITE CONNECTION IN REMOVABLE OVERSIZED COVERPLATE. |
| F | 12" x 12" x 4" DEEP JUNCTION BOX. FLUSH MOUNT IN WALL WHERE SHOWN. LOCATE JUNCTION BOX CENTER LINE 14" A.F.F. PROVIDE TWO 3"Ø BUSHINGS IN REMOVABLE OVERSIZED COVERPLATE. REFER TO COVERPLATE DETAILS. |




## 2 FLOOR POWER/ DATA OUTLETS
N.T.S.

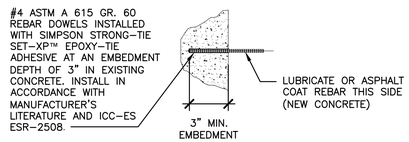
### LEGEND AND SCHEDULE OF LIGHTING EQUIPMENT

| SYMBOL | MANUFACTURER | MODEL # | DESCRIPTION |
|---|---|---|---|
| A | MERCURY LIGHTING | LRW-24G-4000- 35K-1%-UNI | 2'X4' LED TROFFER, 4000 LUMENS, 3500K CCT, 80+ CRI, 120-277V WITH 1% 0-10V DIMMING DRIVER |
| A-EM | MERCURY LIGHTING | LRW-24G-4000- 35K-1%-UNI-EM10 | SAME AS TYPE "A" ABOVE WITH INTEGRAL 10W BATTERY PACK |
| A1 | ACUITY BRANDS | EPANL 2X4 6000LM 80CRI 35K MIN10 ZT MVOLT | 2'X4' EDGE LIT FLAT PANEL 6000 LUMENS, 3500K CCT, 80+ CRI, 120-277V WITH 10% 0-10V DIMMING DRIVER |
| A1-EM | ACUITY BRANDS | EPANL 2X4 6000LM 80CRI 35K MIN10 ZT MVOLT EM10WCP | SAME AS TYPE "A1" ABOVE WITH INTEGRAL 10W BATTERY PACK |
| A2 | ACUITY BRANDS | 2SRTL G L48 24000LM OAW AFL MVOLT GZ1 35K 90CRI DWAM | 2'X4' LED CLEANROOM TROFFER, 24,000 LUMENS, 3500K CCT, 90+ CRI, 120-277V WITH 1% 0-10V DIMMING DRIVER. IP66 RATED, NSF RATED FOR SPLASH ZONE 2 |
| A2-EM | ACUITY BRANDS | 2SRTL G L48 24000LM OAW AFL MVOLT GZ1 35K 90CRI DWAM E10WLCP | SAME AS TYPE "A2" ABOVE WITH INTEGRAL 10W BATTERY PACK |
| B | MERCURY LIGHTING | LRW 22G 4000 35K 1% UNI | 2'X2' LED TROFFER, 4000 LUMENS, 3500K CCT, 80+ CRI, 120-277V WITH 1% 0-10V DIMMING DRIVER |
| C | ACUITY BRANDS | LBR6 ALO3 SWW1 AR LSS MWD MVOLT UGZ 90CRI | 6" LED DOWNLIGHT WITH 2000/2500/3000 SELECTABLE LUMENS, 3500K CCT, 90+ CRI, 120-277V WITH 0% 0-10V DIMMING DRIVER |
| D | ACUITY BRANDS | LBR6 ALO2 SWW1 AR LSS MWD MVOLT UGZ 90CRI | 6" LED DOWNLIGHT WITH 1000/1500/2000 SELECTABLE LUMENS, 3500K CCT, 90+ CRI, 120-277V WITH 0% 0-10V DIMMING DRIVER |
| D1 | ACUITY BRANDS | EVO6SH 35/30 DFF SMO MVOLT EZ1 90CRI | 6" LED DOWNLIGHT, IP66 RATED, NSF RATED FOR SPLASH ZONE 2, FLUSH LENS, 90+ CRI. 1% 0-10V DIMMING DRIVER. |
| E | MERCURY LIGHTING | LW3 4 4500 35K HTA 1% UNI | 4' SUSPENDED FIXTURE, 4500 LUMENS, 3500K CCT, 120-277V WITH 0-10V DIMMING DRIVER, SUSPENDED MOUNT |
| E1 | MERCURY LIGHTING | LW3 6 4500 35K HTA 1% UNI | SAME AS TYPE "E" ABOVE BUT 6' LENGTH |
| E2 | MERCURY LIGHTING | LW3 8 4500 35K HTA 1% UNI | SAME AS TYPE "E" ABOVE BUT 8' LENGTH |
| F | EXTANT | HTG 3R LP TD TFWP LENGTH DML MEODF 835 VU D | 3.5" APERTURE RECESSED LINEAR, EXTRUDED ALUMINUM, EDGE LIT OPTICS, DIFFUSED LENS. TOOLESS MAINTENANCE. 1% 0-10V DIMMING DRIVER. 522 LUMENS PER FOOT. CONFIRM MOUNTING |
| G | TECH LIGHTING | 700TDWIT-4-R-LED930 | WIT PENDANT SERIES, 4 GLASS, 120V, 62.2 WATTS 2672 DELIVERED LUMENS, 3000K, LED LINEAR MODULE, COORDINATE MOUNTING HEIGHT WITH ARCHITECT. |
| H | TECH LIGHTING | 700MDP3-C-R-R | MODERNRAIL PENDANT SERIES CYLINDRICAL DESIGNED FIXTURE, INTEGRATED LED MODULES, 3000K CCT, COORDINATE MOUNTING LENGTH WITH ARCHITECT. |
| OEM | LITHONIA LIGHTING | ARC2 LED-P2-30K-MVOLT-E8WC | EXTERIOR WALL PACK LED, 2000 LUMENS, 4000K CCT 120/277V WITH 8 WATT INTEGRAL EMERGENCY BATTERY PACK. |
| I | ACUITY BRANDS | J4 40LM 35K MVOLT G4 80CRI ZT HM CS | 4" DOWNLIGHT WITH HYPERBOLIC TRIM, 4000 LUMENS, 3500K CCT, 80+ CRI , 120-277V WITH 10% 0-10V DIMMING DRIVER, CLEAR SPECULAR FINISH REFLECTOR |
| J | EXTANT LIGHTING | HTG 1R LP TD TF(XX) LENGTH SLO-19(748) MEODF 835 VU D | 1.5" APERTURE RECESSED LINEAR, EXTRUDED ALUMINUM, EDGE LIT OPTICS, DIFFUSED LENS. TOOLESS MAINTENANCE. 1% 0-10V DIMMING DRIVER. 748 LUMENS PER FOOT. CONFIRM MOUNTING. |
| J1 | EXTANT LIGHTING | HTG-3P TD DT LENGTH DML MEODF VU D FINISH SDL ROD MOUNT - LENGTH BY OTHERS MH C5 RNS | 3.5" APERTURE LINEAR ROD MOUNTED (BY EC) , EXTRUDED ALUMINUM, EDGE LIT OPTICS, DIFFUSED LENS. TOOLESS MAINTENANCE. 1% 0-10V DIMMING DRIVER. 522 LUMENS PER FOOT. CONFIRM MOUNTING. |
| K | HE WILLIAMS | 75L-4-L38-8-40-DMA | 6"x48" LED STRIP LIGHT, 4000 LUMENS, 4000K CCT, SUITABLE FOR DAMP LOCATIONS. 120/277V. |
| L | H.E. WILLIAMS | S15-0-L6-80-35-FTG-BLK-120V | OUTDOOR WALL LIGHT. 6000 LUMENS, 3500 CCT, 80 CRI, 120V |
| M | LUMENWERX | VSPLWDI-PYC-HLO-SW-90-500-500-35-4-UNV-D1-1-BF-EMB | 4' LED FIXTURE PROVIDING DIRECT AND INDIRECT LIGHTING DISTRIBUTION. 4000 LUMENS, 90 CRI, 3500K CCT, SUITABLE FOR WET LOCATIONS. |
| ⊗ | H.E. WILLIAMS | EXIT-R-AC-WHT-D | WHITE EXIT FIXTURE WITH RED LETTERING. AC, 120/277V. |

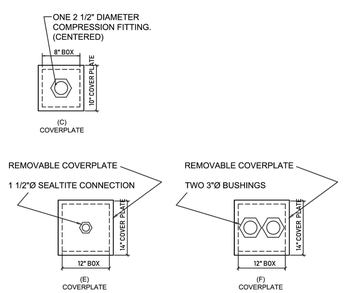



NOTE:
1. E.C. TO INSTALL CONDUIT, G.C. TO REPLACE SLAB. COORDINATE IN FIELD.

## 3 TYPICAL ELECTRICAL SAW CUTTING DETAIL
N.T.S.




## 4 DOWEL INSTALLATION DETAIL
N.T.S.




## 5 COVERPLATE DETAILS
N.T.S.

REVISION SCHEDULE

| # | DESCRIPTION | DATE |
|---|---|---|
| | ADDENDUM D | 1/6/23 |

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FF&E CONSULTANT: CLASSIC CONTRACT INTERIORS, LLC
I.T./SECURITY CONSULTANT: CONVERGENT TECHNOLOGIES
CIVIL CONSULTANT: Fusco Engineering & Land Surveying P.C.
M.E.P. CONSULTANT: FELLENZER ENGINEERING
FORENSIC CONSULTANT: crime lab design
FE PROJECT #: 20-335


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ORANGE COUNTY, NEW YORK

SHEET TITLE: ELECTRICAL SCHEDULES & DETAILS

ORANGE COUNTY MEDICAL EXAMINER'S OFFICE
22 WELLS FARM RD.
COOPER, NY 10954

| | |
|---|---|
| DATE: | 11/18/2022 |
| SCALE: | AS SHOWN |
| DRAWN BY: | SA |
| CHECKED BY: | DSS |
| APPROVED: | MDF |
| CLIENT APPROVAL | |
| HHA PROJ. NO.: | 20071 |
| CLIENT PROJ. NO.: | |

SHEET NUMBER
E801