

DESIGN & CONSTRUCTION GROUP THE GOVERNOR NELSON A. ROCKEFELLER EMPIRE STATE PLAZA ALBANY, NY 12242

ADDENDUM NO. 2 TO PROJECT NO. 45552

CONSTRUCTION, HVAC, PLUMBING AND ELECTRICAL WORK PROVIDE SUB HEADQUARTERS BUILDING 205 LIME KILN ROAD EAST FISHKILL, NEW YORK

November 16, 2021

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

BIDDING REQUIREMENTS - PLUMBING

1. SECTION 004313 – FORMS OF BID BOND – BID SECURITY: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 0004313-1 thru 004313-2) noted "REVISED 11/15/2021".

CONSTRUCTION WORK SPECIFICATIONS

- 2. SECTION 033000 CAST IN-PLACE CONCRETE: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 033000-1 thru 033000-16) noted "REVISED 11/15/2021".
- 3. SECTION 055100 ALUMINUM INCLINE STAIRS: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 055100-1 thru 055100-4) noted "REVISED 11/15/2021".
- 4. SECTION 066000 SOLID PLASTIC FABRICATION: Delete this Section in its entirety.
- 5. SECTION 104416 FIRE EXTINGUISHERS: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 104416-1 thru 104416-3) noted "REVISED 11/15/2021".
- 6. SECTION 231323 ABOVE GROUND FUEL STORAGE TANKS AND FUEL SYSTEMS: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 231323-1 thru 231323-13) noted "REVISED 11/15/2021".

7. SECTION 444249 – OIL WATER SEPARATOR: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 444249-1 thru 444249-5) noted "REVISED 11/15/2021".

ELECTRICAL WORK SPECIFICATIONS

- 8. SECTION 260573 SHORT CIRCUIT AND GROUND FAULT: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 260573-1 thru 260573-10) noted "REVISED 11/15/2021".
- 9. SECTION 260925 OCCUPANCY SENSORS FOR LIGHTING CONTROL: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 260925-1 thru 260925-3) noted "REVISED 11/15/2021".
- 10. SECTION 262212 TRANSFORMERS DRY TYPE, UNDER 600V: Add the accompanying Section (pages 262212 -1 thru 262212-2) to the Project Manual.
- 11. SECTION 263215 GASEOUS ALTERNATOR ENGINE GENERATOR: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 263215-1 thru 263215-10) noted "REVISED 11/15/2021".
- 12. SECTION 265160 LED FIXTURES: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 265160-1 thru 265160-10) noted "REVISED 11/15/2021".
- 13. SECTION 265629 STREET LIGHTING AND GROUNDS LIGHTING COBRA HEAD: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 265629-1 thru 265629-6) noted "REVISED 11/15/2021".
- 14. SECTION 283101 PROTECTED PREMISES FIRE ALARM SYSTEM: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 283101-1 thru 283101-24) noted "REVISED 11/15/2021".
- 15. SECTION 310000 EARTHWORK: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 310000-1 thru 310000-8) noted "REVISED 11/15/2021".

HVAC WORK SPECIFICATIONS

- 16. SECTION 233113 METAL DUCTWORK: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 233113-1 thru 233113-4) noted "REVISED 11/15/2021".
- 17. SECTION 233300 DUCTWORK ACCESSORIES: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 233300-1 thru 233300-8) noted "REVISED 11/15/2021".
- 18. SECTION 238316 RADIANT FLOOR SYSTEM: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 238316-1 thru 238316-9) noted "REVISED 11/15/2021".

PLUMBING WORK SPECIFICATIONS

- 19. SECTION 213000 FIRE PUMP SYSTEMS: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 213000-1 thru 213000-7) noted "REVISED 11/15/2021".
- 20. SECTION 221100 PLUMBING PIPING: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 221100-1 thru 221100-8) noted "REVISED 11/15/2021".
- 21. SECTION 310000 EARTHWORK: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 310000-1 thru 310000-7) noted "REVISED 11/15/2021".

APPENDICES – CONSTRUCTION WORK

22. SCHEDULE OF SUBMITTALS – C: Discard the Section bound in the Project Manual and substitute the accompanying Section (Pages 1 thru 14 plus instructions) noted "REVISED 11/12/2021"

APPENDICES - ELECTRICAL WORK

23. SCHEDULE OF SUBMITTALS – E: Discard the Section bound in the Project Manual in and substitute the accompanying sections (Pages 1 thru 13 plus instructions) noted "REVISED 11/11/2021"

CONSTRUCTION WORK DRAWINGS

- 24. Drawing No. A-310:
 - a. SECTION #3: Delete the following note and associated work on exterior of building in its entirety:
 - "1" WATERPROOFING AND PROTECTION BOARD OVER AIR/VAPOR RETARDER"
 - b. SECTION #4: Delete the following note and associated work on exterior of building in its entirety:
 - "1" WATERPROOFING AND PROTECTION BOARD OVER AIR/VAPOR RETARDER"
- 25. Drawing No. A-500, DETAIL # 2: Delete the following note and associated work on exterior of building in its entirety:
 - a. "1" WATERPROOFING AND PROTECTION BOARD OVER AIR/VAPOR RETARDER"
- 26. Drawing No. A-501:
 - a. Detail #6: Revise "Cold Formed Metal Roof Trusses at 16" On Center" note to read "16 GA. SLOPED RAFTERS. REFER TO STRUCTURAL".
 - b. Detail #7: Revise "Cold Formed Metal Roof Trusses at 16" On Center" note to read "16 GA. SLOPED RAFTERS. REFER TO STRUCTURAL".

27. Revised Drawings:

a. Drawing Nos. G-002, A-001, A-104, D-101, C-101, C-502, C-506 and C-510 noted "REVISED DRAWING 11/15/2021" accompany this Addendum and supersede the same numbered originally issued Drawings.

HVAC WORK DRAWINGS

28. Revised Drawings:

a. Drawing No. M-301 noted "REVISED DRAWING 11/15/2021" accompanies this Addendum and supersedes the same numbered originally issued Drawing.

PLUMBING WORK DRAWINGS

29. Revised Drawings:

a. Drawing No. P-101 noted "REVISED DRAWING 11/15/2021" accompanies this Addendum and supersedes the same numbered originally issued Drawing.

ELECTRICAL WORK DRAWINGS

30. Revised Drawings:

a. Drawing Nos. E-001, E-100, E-104, E-105, E-201, E-203, E-301 and E-404 noted "REVISED DRAWING 11/15/2021" accompany this Addendum and supersede the same numbered originally issued Drawings.

END OF ADDENDUM

Erik T. Deyoe, P.E. Director, Division of Design Design & Construction

REVISED 11/15/2021

FORM OF BID BOND - BID SECURITY STATE OF NEW YORK OFFICE OF GENERAL SERVICES - DESIGN & CONSTRUCTION

Sub. 3, Sec. 8 - Public Buildings Law

BE IT KNOWN, That				
(Name of C	Contractor)			
(Addr	ress)			
(hereinafter called the "Principal") and				
a corporation created and existing under the Laws of the State of of	having its principal office in the City duly licensed as an insurance company			
in the State of New York, (hereinafter called the "Surety"), are held and called the "State"), in the full and just sum of \$27,600 good and lawfu said sum of money, well and truly to be made, and done, the Principal executors and administrators, successors and assigns, and the Surety b these presents:	al money of the United States of America, for the payment of which binds themselves (himself, herself, itself), their (his, hers, its) heirs			
WHEREAS , the Principal has submitted to the Office of C Work, Provide Sub-Headquarters Building, East Fishkill, 205 Lime K	General Services of the State of New York a proposal for Plumbing iln Rd. (Off I-84 Exit 15), East Fishkill, NY			
and labor and material bonds required by the terms of the Principal's p NOW, THEREFORE, the condition of the foregoing oblig agreement and furnish performance and labor and material bonds rec shall be null and void, otherwise to remain in full force and virtue. NOW, THEREFORE, the condition of the foregoing obliga agreement and furnish performance and labor and material bonds requ its successors and assigns, jointly and severally, shall pay the whole su IN TESTIMONY WHEREOF, the Principal has hereunto set their (It to be signed by its Attorney-in-fact, and its corporate seal to be hereunto affixed. Signed, sealed and delivered in the presence of:	ation is such, that if the Principal shall promptly submit an executed quired by the terms of the Principal's proposal, then this obligation ation is such that if the Principal fails to promptly submit an executed uired by the terms of the Principal's proposal, then the Surety itself um of money previously set forth in this document to the State.			
(Corporate seal of Principal if a corporation)				
	(L.S.)			
	(L.S.)			
	Principal			
	Company			
(Corporate seal of Surety Co.)				
Without	Attorney-in-fact			
Witness	Name			
	Name			

REVISED 11/15/2021

(Acknowledgment by principal, unless it be a corporation) STATE OF NEW YORK		
COUNTY OF	_	
On this day of 20, before a known and known to me to be the person described in and who executhe same.	me personally came ited the foregoing instrument, and ack	toeto
	Notary Public	County
(Acknowledgment by principal, if a corporation) STATE OF NEW YORK SS.:		
COUNTY OF	_	
On this day of 20, before a known, who being by me duly sworn, did depose and say that he/she of the executed the foregoing instrument; that he knew the seal of said corp to said instrument was such corporate seal; that it was so affixed by signed his/her name thereto by like order.	resides in; the corporate poration; that the seal affixed to said of order of the Board of Directors of section	to me ; that he/she is the ion described in and which corporation; that the seal affixed aid corporation, and that he/she
	Notary Public	County
(Acknowledgment by Surety Company) STATE OF NEW YORK SS.: COUNTY OF On this day of 20, before 1 known, who being by me duly sworn, did depose and say that he/she executed the within instrument; that he/she knows the seal of said of the content of the production o	me personally came; the corporate corporation; that the seal affixed to sa	; that he/she is the ion described in and which aid instrument is such corporate
seal; that is was so affixed by order of the Board of Directors of said of	corporation; and that he/she signed his	s/her name thereto by like order.
	Notary Public	County

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Concrete Formwork: Section 031100.
- B. Steel Concrete Reinforcement: Section 032100.
- C. Fibrous Concrete Reinforcement: Section 032101.

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of American Concrete Institute (ACI) and American Society for Testing and Materials (ASTM) documents.
 - 1. ACI 117-10: Specifications for Tolerances in Concrete Construction and Materials
 - 2. ACI 212.3R-10: Report on Chemical Admixtures for Concrete; Chapter 15 Permeability Reducing Admixtures
 - 3. ACI 301-16: Specification for Structural Concrete for Buildings.
 - 4. ACI 302.1R-15: Guide for Concrete Floor and Slab Construction.
 - 5. ACI 302.2R-06: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
 - 6. ACI 304.2R-96: Placing Concrete by Pumping Methods.
 - 7. ACI 305R-10: Guide for Hot Weather Concreting.
 - 8. ACI 306R-10: Guide to Cold Weather Concreting.
 - 9. ACI 308.1-11: Standard Specification for Curing Concrete.
 - 10. ACI 318 -14 Building Code Requirements for Structural Concrete.
 - 11. ACI 360R-10: Guide to Design of Slabs on Grade
 - 12. ASTM C 94/C 94M 11b: Standard Specification for Ready-Mixed Concrete.
 - 13. ASTM C 494/C 494M 11: Standard Specification for Chemical Admixtures for Concrete.
 - 14. ASTM F 710-11: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.03 **DEFINITIONS**

- A. ACI 301, Section 1.2 Definitions:
 - 1. Add the following definitions:
 - a. Cementitious Material: Cementitious materials include cement, ground blast furnace slag and fly ash.
 - b. Pumped Concrete: Concrete that is conveyed by pumping pressure through rigid pipe or flexible hose.

c. Water-to-Cementitious Ratio (w/c): A ratio representing quantity in pounds of free moisture available for cement hydration divided by quantity of cementitious materials in pounds per cubic yard concrete.

1.04 SUBMITTALS

A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.

B. Product Data:

- 1. Mix Design: Submit proposed concrete design mix(es) together with name and location of batching plant at least 28 days prior to the start of concrete work.
 - a. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.
 - b. Pumped Concrete: Include test results of proposed design mix(es) tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.
- 2. Portland Cement: Brand and manufacturer's name.
- 3. Fly Ash: Name and location of source, and DOT test numbers.
- 4. Air-entraining Admixture: Brand and manufacturer's name.
- 5. Water-reducing Admixture: Brand and manufacturer's name.
- 6. High Range Water-reducing Admixture (Superplasticizer): Brand and manufacturer's name.
- 7. Accelerating Admixture: Brand and manufacturer's name.
- 8. Aggregates: Name and location of source, and DOT test numbers.
- 9. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
- 10. Penetrating Anti-Spalling Sealer: Brand and manufacturer's name, and application instructions.
- 11. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
- 12. Expansion Joint Fillers: Brand and manufacturer's name.

C. Quality Control Submittals:

- 1. Batching Plant Records: At the end of each day of placing concrete, furnish the Director's Representative with a legible copy of all batch records for the concrete placed.
- 2. Concrete Pumping Equipment Data: Include manufacturer's name and model of principal components, type of pump, and type and diameter of pipe/hose.
- 3. Minutes of the previous pre-installation conference.

1.05 QUALITY ASSURANCE

- A. Qualifications of Crew Pumping Concrete: Workers pumping concrete shall have had at least one year of experience pumping concrete.
- B. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.
- C. Truck mixers for concrete shall be currently approved by the New York State Department of Transportation.
- D. Pumping equipment for pumped concrete shall be subject to the approval of the Director.
- E. Fly ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".
- F. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
 - 1. Batching and mixing facilities and equipment.
 - 2. Sources of materials.
- G. ACI 301, Section 1.4 Reference standards and cited publications:
 - 1. Add the following to the list of ASTM Standards:
 - a. C 311-11a Standard Methods of Sampling and Testing Fly Ash or Natural Pozzolans For Use As A Mineral Admixture in Portland Cement Concrete.
- H. Pre-Construction Conference: A minimum of 14 days prior to the initial submission of shop drawings, a conference will be held by the Director's Representative at the Site for the purpose of reviewing the Contract Documents, and discussing the requirements and procedures for submittals and for the Work. The conference shall be attended by the Contractor, the concrete supplier representative, and the reinforcement fabricator's project coordinator.
 - 1. If resilient flooring is to be placed on slab-on-grade, the meeting will also include discussion of curing procedures and moisture mitigation measures.

1.06 DELIVERY

- A. ASTM C 94/C 94M, Article 14 Batch Ticket Information: In addition to the information required by Paragraph 14.1, also include the following:
 - 1. Type and brand, and amount of cement.
 - 2. Weights of fine and coarse aggregates.
 - 3. Class and brand, and amount of fly ash (if any).

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C 150, Type I or II Portland cement.
- B. Water: Potable.
- C. Air-entraining Admixture: ASTM C 260, and on the New York State Department of Transportation's current "Approved List".
- D. Water-reducing Admixture: ASTM C 494/C 494M, Type A, and on the New York State Department of Transportation's current "Approved List".
- E. High Range Water-reducing Admixture (Superplasticizer): ASTM C 494/C 494M, Type F, and on the New York State Department of Transportation's current "Approved List".
- F. Retarding Admixture: ASTM C 494, Type D, Water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".
- G. Accelerating Admixture: Non-corrosive admixture, containing no chloride, complying with ASTM C 494, Type C or E, and on the New York State Department of Transportation's current "Approved List".
- H. Fly Ash: ASTM C 618, including Table 1 (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.
- I. ACI 301, Section 4.2.1.2 Aggregates:
 - 1. Add the following paragraph:
 - a. Fine aggregate for pumped concrete shall meet the requirements of ASTM C 33, except 15 to 30 percent shall pass the No. 50 sieve and 5 to 10 percent shall pass the No. 100 sieve. The fineness modulus of the fine aggregate for pumped concrete shall not vary more than 0.20 from the average value used in proportioning.
- J. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap complying with ASTM C 171.
 - 1. For slabs exposed to view, provide one of the following or accepted equivalent:
 - a. "HydraCure S16" by PNA Construction Technologies.
 - b. "UltraCure NCF/SUN" by McTech Group.
- K. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed. Not permitted for slabs.
 - 1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.

- 2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.
- 3. MasterKure CC 180 WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- 4. Cure & Seal 25 UV (J-22 UV) by Dayton Superior Corp., 1125 Byers Rd., Miamisburg, OH 45342, (800) 745-3700.
- 5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- L. Penetrating Exterior Anti-Spalling Sealer: "Euco-Guard 100" by Euclid Chemical Co. (mixed to 17.5 percent concentration); "MasterProtect H400" by Master Builders; "Aquapel Plus" by L&M Construction Chemicals; or accepted equivalent.
- M. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate.
 - 1. MasterKure HD 300WB by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
 - 2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
 - 3. Liqui-Hard by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
 - 4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
 - 5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 - 6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - N. Evaporation Retarder: Monomolecular, film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss. "Aquafilm J74RTU" by Dayton Superior; "Eucobar" by Euclid Chemical Co.; "MasterKure ER 50" by Master Builders, Inc.; or accepted equivalent.
 - O. Crack Repair Material: For cracks smaller than 1/8 inch, use "Sika Pronto 19" methacrylate by Sika; "Rapid Refloor" polyurea by Metzger McGuire; or accepted equivalent. For cracks greater than 1/8 inch, use specified joint filler material
 - P. Type 1 Expansion Joint Filler: Preformed, resilient, nonextruding cork units complying with ASTM D 1752, Type II.
 - Q. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
 - 1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.

- 3. MasterEmaco ADH 327 RS by by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- R. Vapor Retarder: Provide vapor retarder cover over prepared subbase where indicated below slabs on grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154 as follows:
 - 1. Polyolefin not less than 15 mils thick, in compliance with ASTM E 1745 Class A and with a perm rating less than 0.02 perms. "Stegowrap 15 mil Class A" by Stego Industries LLC; "Moistop Ultra 15" by Fortifiber Building Products; "Griffolyn 15 Mil Green" by Reef Industries, Inc.; or "Vapor Block 15" by Raven Industries.
 - a. Provide manufacturer's-recommended, pressure-sensitive/water resistant seam tape and mastic for vapor retarder selected.
- S. Corrosion-Inhibiting Admixture: ASTM C 494/C 494M, for use in resisting corrosion of steel reinforcement. Product below or approved equal:
 - 1. For Hot Weather Concrete Pours
 - a. DCI Corrosion Inhibitor by GCP Applied Technologies
 - b. MasterLife CNI by Master Builders/ BASF Building Systems.
 - 2. For Cold Weather Concrete Pours
 - a. DCI S Corrosion Inhibitor by GCP Applied Technologies.

2.02 PROPORTIONING OF MIXES

- A. Cast-in-place concrete shall be air-entrained normal weight concrete, except as noted below.
- B. Concrete Quality:

Location	Exposure Category†	Maximum Aggregate Size	Required 28- day Compressive Strength psi	Maximum Water/Cement Ratio	Percent Entrained Air
Interior stair pans, misc. concrete.	F0, S0, W0, C1	1 ½"	3,000	0.55	N/A
Interior office slabs	F0, S0, W0, C0	1"	3,500	0.50	0
Interior garage slabs	F3,S0,W1, C2	1"	5,000	0.40	0
Footings, foundation walls, piers.	F2, S0, W1, C2	1 ½"	4,500	0.45	5.5*
Exterior slabs	F3, S0, W1, C2	1"	5,000	0.40	6*

^{*} Plus or minus 1.5 percent.

[†] ACI 318 Section 19.3.1

- 1. Slump: Maximum 4 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site.
- 2. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.
 - a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.
 - b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.
- 3. For normal-weight concrete, quantity of coarse aggregate in pounds must be in range of 1.25 to 1.5 times quantity of fine aggregate in pounds. Provide minimum of 1,800 pounds of coarse aggregate for each cubic yard of concrete.
- C. Slump for Pumped Concrete: When a water-reducing admixture is not used, maximum slump shall be 4 inches. When a water-reducing admixture is used, maximum slump shall be 6 inches and when a high-range water-reducing admixture (superplasticizers) is used, maximum slump shall be 8 inches.
- D. Where required, use air-entraining admixtures, not air-entrained cement.
- E. ACI 301, Section 4.2.2.3: Change article to read as follows:
 - 1. 4.2.2.3 Size of Coarse Aggregates:
 - 4.2.2.3.a Normal Weight Concrete: Coarse aggregates shall conform to graduation requirements for various sizes as tabulated in Table No. 2 of ASTM C
 33. The sizes of coarse aggregates for various classes of Work shall be as follows with all percentages being determined by weight.
 - 3. 4.2.2.3.b For concrete floors, concrete encasing underground electric conduits, and concrete in which the space between restricting objects is 2 inches or less, the course aggregate shall be Size No. 67.
 - 4. 4.2.2.3.c For other concrete Work having a minimum cross-sectional dimension of not more than 6 inches, the coarse aggregate shall be a well graded mixture of No. 67 and No. 57, provided that not more than 50 percent nor less than 30 percent shall be Size No. 67 and not more than 70 percent nor less than 50 percent shall be Size No. 57.
 - 5. 4.2.2.3.d For other concrete Work having a minimum cross-sectional dimension greater than 6 inches and not more than 12 inches, the coarse aggregate shall consist of a mixture of No. 67, No. 57 and No. 467, providing that not more than 25 percent nor less than 10 percent shall be Size No. 67 and not more than 40 percent shall be Size No. 467.
 - 6. 4.2.2.3.e For other concrete Work having a minimum cross-sectional dimension of more than 12 inches, the coarse aggregate shall consist of a mixture of No. 67, No. 57 and No. 357, providing not more than 25 percent nor less than 10 percent shall be Size No. 67 and not more than 40 percent shall be Size No. 357.

- F. ACI 301, Section 4.1.2.1 Mixture Proportions:
 - 1. Add the following to paragraph 4.1.2.1:
 - a. Proposed design mix(es) for pumped concrete and the pumping equipment shall have been tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.
- G. Corrosion-Inhibiting Admixture: Provide corrosion-inhibiting admixture in all exposed concrete: including garage slabs on grade, exterior slabs on grade, and foundation walls.

2.03 JOINTS

- A. ACI 301, Section 5.3.2.6 Construction joints and other bonded joints:
 - 1. Delete the following subparagraphs:
 - a. Use an acceptable surface retarder in accordance with manufacturer's recommendations;
 - b. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface; or
 - 2. Add the following in place of the above subparagraph:
 - a. The use of cement grout.
- B. ACI 301, Section 10.2.5 Isolation-joint filler materials:
 - 1. Add the following paragraphs:
 - a. Except as otherwise shown on the Drawings, expansion joints shall be as follows:
 - b. In joints required to receive a sealant, the joint filler shall be 1/2 inch thick and recessed as required to form a caulking slot.
 - c. In joints not required to receive a sealant, the joint filler shall be 1/2 inch thick and extend through the full cross-section of the concrete.
 - d. Tool edges of concrete with 1/8 inch radius edging tool.

2.04 PRODUCTION OF CONCRETE

- A. Provide ready-mixed concrete, either central-mixed or truck-mixed, unless otherwise approved in writing by the Director.
- B. ACI 301, Section 5.3.2.1 Weather considerations
 - 1. Delete paragraph under 5.3.2.1.c Hot Weather, and add the following:
 - a. 5.3.2.1.c Provide adequate controls to ensure that the temperature of the concrete when placed does not exceed 90 degrees F., and make every effort to place it at a lower temperature. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set or cold joints. Ingredients may be cooled before mixing by shading the aggregates, fog spraying the coarse aggregate, chilling the mixing water or other approved means. Mixing water may be chilled with flake ice or well-crushed ice of a size that will melt

completely during mixing, providing the water equivalent of the ice is calculated into the total amount of mixing water.

- C. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.
 - 1. In cold weather, comply with ACI 306R.
 - when air temperature is below 40 degrees F (4 degrees C) heat the mixing water and, if necessary, the aggregates to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement. If the mixing water is heated, do not exceed a temperature of 140 degrees F at the time it is added to the cement and aggregates.
 - 2. In hot weather, comply with ACI 305R.
 - a. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Check items of aluminum required to be embedded in the concrete and insure that they are coated, painted or otherwise isolated in an approved manner.
- C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- D. Do not deposit concrete in water. Keep excavations free of water by pumping or by other approved methods.
- E. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.
- F. Prior to placement of a concrete slab-on-grade, ensure roof is watertight and install polyethylene or other preventative measures to mitigate exposure to external moisture sources such as rainwater; runoff from adjacent slopes; landscaping water; water from curing; or wet grinding, sawing, and cleaning.

3.02 ADMIXTURE ADDITIONS AT THE SITE

- A. Site additions shall be limited to high-range water-reducers, non-chloride accelerators, and corrosion inhibitors. Comply with manufacturers' printed instructions for discharge of admixtures shall be furnished.
- B. High-Range Water-Reducers:
 - 1. Concrete shall arrive at a slump of 2 to 4 inches (50 to 100 mm). Water additions at the Site shall be limited to comply with water-to-cementitious ratio requirements.
 - 2. Following addition of high-range water-reduced concrete, a minimum of 70 revolutions or 5 minutes of mixing shall be completed to assure a consistent mixture.
- C. All concrete with other admixture additions shall mix a minimum of 70 revolutions or 5 minutes to assure a consistent mixture.

3.03 VAPOR RETARDER INSTALLATION

- A. Following placement and compaction of subbase, place vapor retarder sheeting with longest dimension parallel with the direction of slab placement.
- B. Install vapor retarder in accordance with ASTM E 1643, manufacturer's instructions, and as follows:
 - 1. Lap joints 6 inches, and seal vapor retarder joints with manufacturer-recommended seam tape.
 - 2. Extend vapor retarder up walls and penetrations 4 inches minimum.
 - 3. Seal vapor retarder to walls and penetrations with manufacturer-recommended mastic to form continuous barrier.
 - 4. Repair damaged areas by cutting patches of vapor retarder material and placing to overlap damaged areas by 6 inches each side. Seal each side of patch with seam tape.
- C. Remove debris and standing water from vapor retarder prior to slab placement.

3.04 PLACING

- A. ACI 301, Section 5.3.2.3 Conveying equipment:
 - 1. Add the following paragraphs:
 - a. 5.3.2.3.d When pumping concrete, the lubricating mortar for the delivery line shall not be discharged into an area of concrete placement.
 - b. 5.3.2.3.e The inside diameter of the delivery lines for pumped concrete shall be the greater of either a minimum of 5 inches or 3 times the maximum size of coarse aggregate.
- B. ACI 301, Section 5.3.2.2 Conveying:
 - 1. Add the following paragraph:
 - a. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.

- C. ACI 301, Section 5.3.2.4 Depositing:
 - 1. Add the following paragraph:
 - a. Do not allow concrete to free fall more than 4 feet.
- D. Construction Joints:
 - 1. Construct joints true to line with faces perpendicular to surface plane of concrete. Locate and install construction joints so strength and appearance of concrete are not impaired, at locations indicated or acceptable to Director.
 - 2. Provide keyways at least 1-1/2 inches deep in construction joints in walls. Roughen joints between reinforced concrete walls and footings to a minimum 1/4-inch amplitude and remove dirt and concrete laitance prior to casting concrete walls.
 - 3. Space vertical joints in walls at a maximum of 60 feet and locate beside piers integral with walls, near corners, and in concealed locations where possible.
 - 4. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.05 REPAIRING SURFACE DEFECTS

- A. ACI 301, Section 5.3.7 Repair of surface defects:
 - 1. Add the following paragraph:
 - a. 5.3.7.1.a Finish patched areas to match the texture of the surrounding surface.
- B. ACI 301, Section 5.3.7.2 Repair of tie holes:
 - 1. In 5.3.7.2 and replace with the following:
 - a. The patch mixture shall consist of a mixture of dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for placing and handling. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Contractor shall be responsible for cost of repairing slab defects.
- D. Test surfaces for flatness and level tolerances. Test uniform surfaces sloped to drain for trueness of slope.
- E. Correct flatness and levelness defects by grinding or removing and replacing slab. Patching low spots not permitted. Repair areas shall be remeasured and accepted by Owner.

- F. Repair cracks only when slab is more than 90 days old. Use crack repair material. For cracks over 1/8 inch, fill crack with oven-dried sand prior to application of crack repair material as recommended by manufacturer. Contractor has option to remove and rebuild areas of cracking. Mask cracks to limit crack repair material to crack only.
- G. Repair curling only when slab is more than 90 days old.
- H. Curling at slab edges exceeding 1/8 inch when measured with a 10-foot straightedge shall be made level by grinding or planing. Locate straightedge with its end at the slab edge, and measure space between straightedge and slab.
- I. If curling exceeds 1/4 inch, level slab by grinding or planing as stated above. In addition, core-drill slab 10 inches from joint at 2 foot intervals, alternating on each side of joint, and inject nonshrink grout to fill void beneath slab.
- J. Repair edge spalls occurring from shrinkage cracking or from Contractor's operations with methods acceptable to Engineer

3.06 FINISHING FORMED SURFACES

- A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Rough Form Finish for concrete surfaces not exposed to view.
 - 2. Smooth Form Finish for concrete surfaces exposed to view.
- B. ACI 301, Section 5.3.3.3 As-cast Finishes:
 - 1. Add the following to paragraph 5.3.3.3:
 - a. Fins shall be completely removed on surfaces to receive waterproofing.

3.07 SURFACE FINISHES

A. Acceptability of finish surface with respect to surface void ratio, color uniformity, surface irregularities, and construction and facing joint shall be in accordance with ACI 347.3R-13. The following categories are applicable:

Formed Concrete	Description †
Surface Category	
CSC 1	Concrete surfaces in areas with low visibility or of limited importance with regard to formed concrete surface requirements, used or covered with subsequent finish materials.

†ACI 347.3R-13 Table 3.1a

3.08 SLABS

- A. Slabs On Grade: Provide DOWELED joints for Garage slabs. Install dowel bars parallel to slab surface and perpendicular to joints. Support dowel bars by the use of parallel construction supports.
- B. Use Diamond Dowel plates and sleeves for Garage joints.
- C. Use round greased dowels for construction joints in Office slabs.
- D. Tool exposed joints.
- E. ACI 301, Section 5.3.4 Finishing unformed surfaces:
 - 1. Add the following paragraph to section 5.3.4.1 Placement:
 - a. Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots.
 Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.
- F. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Troweled Finish for:
 - a. Interior slabs that are to be exposed to view.
 - b. Slabs and fill over which resilient tile or sheet flooring, carpet, or thinfilm coating system is required.
 - c. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
 - d. Treads and platforms of interior steps and stairs.
 - 2. Broom or Belt Finish for:
 - a. Exterior slabs. Texture as approved by the Director's Representative.
 - 3. Scratched Finish for:
 - a. Surfaces to be covered with ceramic tile set in a bonded thick mortar bed, except screed to a Class B tolerance.
 - b. Surfaces to be covered with floor topping.
- G. ACI 302.1R Chapter 10.2 Tools for jointing; Saw-cutting.
 - 1. Add the following paragraph:
 - a. Early-entry dry-cut saws are preferred in place of conventional wet-cut saws.
- H. ACI 302.1R Chapter 10.3
 - 1. Add the following to Conventional wet-cut saw cutting:
 - a. Begin saw-cutting as soon as the saw will not dislodge the aggregate or ravel the edge of the saw-cut, but in no case longer than 12 hours after the slab is placed. Saw-cut leaving a clean, sharp edge in the pattern shown on the Contract Documents.

Provide sufficient personnel and equipment to complete saw-cutting operations within 18 hours after the slab is placed.

- I. Exposed surfaces with fibrous reinforcement: After curing of the concrete, remove any protruding fibers in a manner which will not harm the parent concrete.
- J. Floor flatness and levelness tolerances: For flatness and levelness tolerances of floor slabs refer to ACI 302 Chapter 10.1. Floor surface tolerances shall be 1/8 inch over a horizontal distance of 10 feet in any direction, unless otherwise specified by floor profile quality classifications in ACI 302.
 - 1. When flatness or levelness tolerances are not met then the floor shall be ground or scarified and repoured to meet specifications.

3.09 CURING AND PROTECTION

- A. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.
- B. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.
- C. Protect freshly placed slabs from premature drying and excessive cold or hot temperature. Maintain without drying at a relatively constant temperature for time period necessary for cement hydration and proper hardening.
- D. Cure exterior slabs completely by moist-curing using burlap absorptive cover, soaker hoses, and ponding; or sheet-curing, for at least 7 days. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers. Avoid rapid drying at end of curing period. Allow absorptive cover to remain an additional 3 days.
- E. Cure interior (Garage and Office) slabs by sheet-curing by covering slabs with Moisture-Retaining Covers for 7 days minimum. Avoiding rapid drying at end of curing period. Place curing cover in widest practicable width with sides and ends lapped at least 3 inches and sealed with waterproof tape or adhesive. Immediately repair holes or tears in cover during curing period. Do not use curing compounds.
- F. Do not allow foot or other traffic over slabs during 7-day curing period.
- G. Provide protection for concrete slabs from direct exposure to sun, wind, precipitation, and excessive cold or hot temperatures lasting from concrete placement until the building is enclosed and conditioned. Acceptable curing and drying conditions include a minimum ambient temperature of 70 degrees F and a maximum relative humidity of 50%. Air movement at 15 mph.

- 1. Protect the slab surface and slab openings from exposure to water; this includes water from construction activities and precipitation.
- 2. Contractor shall be responsible for cost of repairing slab defects and moisture issues resulting from deficient protection methods.
- 3. One method of protection is installing exterior walls, roof membrane and roof drains prior to installing vapor retarder, slab subbase, and slab on grade.

H. Curing Vertical-Formed Surfaces:

- 1. Keep forms in place for minimum of 7 days, 14 days in cold weather or until concrete has achieved 70 percent of its design strength.
- 2. If forms are removed before minimum time period, alternate methods of curing, wet-curing, moisture-retaining-cover curing, or liquid-membrane curing, are required.
 - a. Contractor shall submit procedures to Architect for review.
 - b. Forms shall remain in place for a minimum of 24 hours when alternating methods of curing are used. For placement during cold weather, the minimum time to form removal shall be extended based on expected weather conditions and Contractor's submitted procedures.

3.10 CHEMICAL HARDENERS AND SEALERS

- A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed within the Office areas.
- B. Apply Penetrating Exterior Anti-Spalling Sealer to all Garage and exterior slabs.
- C. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer's instructions.
- D. Prepare surfaces and apply chemical hardener in accordance with manufacturer's printed instructions and recommendations.

3.11 FIELD QUALITY CONTROL

- A. ACI 301, Section 1.6.4.2 Testing Services:
 - 1. Add the following paragraph:
 - a. Strength Tests for Pumped Concrete: Prepare strength test specimens and make strength tests from concrete samples obtained at the truck discharge chute and at the end of the pump delivery line in accordance with paragraph 16.3.4.4.
- B. ACI 301, Section 1.6.3.3 Tests required of Contractor's testing agency:
 - 1. Add the following paragraph:
 - a. Make available to the Director's Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

- C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the State and as accepted by the Director. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Director's Representative before using in the work.
- D. Test results will be reported in writing to the Director's Representative, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- E. Nondestructive Testing: Impact hammer, Windsor probe, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- F. Additional Tests: The State shall make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Director's Representative. The testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Pay for such tests when unacceptable concrete is verified, including all inspection and Engineering fees when non-conforming work is verified.
- G. Moisture Testing: Test all slabs-on-grade for moisture content that will receive resilient flooring. For a preferred moisture testing method and limits; consult the written instructions of the floor covering manufacturer, the adhesive manufacturer, the patching/underlayment manufacturer, or combination thereof. Test repeatedly until the desired moisture content is obtained.
- H. pH Testing: Test concrete floors for pH level prior to the installation of resilient flooring. Do not exceed the recommended pH level of the resilient flooring manufacturer or the adhesive manufacturer, or both.

END OF SECTION

SECTION 055100

ALUMINUM INCLINED LADDERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Fixed, inclined, aluminum, folding mezzanine access ship ladder.

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall meet the requirements of the following:
 - Design, Fabrication, and Erection: "Specification for Structural Steel Buildings, Allowable Stress Design and Plastic Design" adopted by the American Institute of Steel Construction, June 1, 1989 (AISC Specification).
 - a. Design and Fabrication of Cold-Formed Shapes: "Specification for the Design of Cold-Formed Steel Structural Members", by the American Iron and Steel Institute (AISI Specification).
 - 2. Welding: "Structural Welding Code Steel, AWS D1.1", or "Structural Welding Code Sheet Steel, AWS D1.3", by the American Welding Society (AWS Codes).
 - 3. High Strength Bolting: "Specification for Structural Joints Using ASTM A325 or A490 Bolts, August 14, 1980", by the Engineering Foundation's Research Council on Riveted and Bolted Structural Joints (Specification for Structural Joints).

B. Organizations:

- 1. AISC: American Institute of Steel Construction, One East Wacker Dr., Suite 700, Chicago, IL 60601-1802, 866-275-2472, www.aisc.org.
- 2. AISI: American Iron and Steel Institute, 1140 Connecticut Ave., NW, Suite 705, Washington, D.C. 20036, (202) 452-7100, www.steel.org.
- 3. AWS: American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126, (800) 443-9353, www.aws.org.
- 4. ANSI: American National Standards Institute, 1819 L Street, NW, 6th Floor, Washington, DC 20036, (202) 293-8020, www.ansi.org. a. ANSI A14.3 Ladders, Fixed, Safety Requirements.
- 5. ASME: ASME International, 3 Park Ave., New York, NY 10016-5990, (800) 843-2763, www.asme.org.
- ASTM: ASTM International, 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA, 19428-2959, (610) 832-9500, www.astm.org.
 a. ASTM B209 Aluminum and Aluminum-Alloy Sheet and Plate.
 b. ASTM B221 Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- 7. MPI: The Master Painters Institute Inc., 2808 Ingleton Ave., Burnaby, BC, V5C 6G7, (888) 674-8937, www.specifypaint.com.
- 8. SSPC: The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh PA 15222-4656, (877) 281-7772, www.sspc.org.

1.03 SUBMITTALS

- A. Shop Drawings: Show application to project. Machine duplicated copies of Contract Drawings will not be accepted. Shop drawings shall be standard 24 inch by 36 inch size sheets. The fabricator's name and address shall be indicated in the title block on each drawing.
 - 1. Include anchor bolt location plan (if any), erection drawings, and detail drawings of all connection components.
 - 2. Indicate shop and field welds by standard AWS welding symbols in accordance with AWS A2.4.
 - 3. When shop drawings are marked "Approved as Noted", promptly resubmit copies of corrected shop drawings for formal approval and record.

B. Product Data:

- 1. Product data for inclined ship ladders, grating treads, and platforms.
- 2. Shop drawings showing elevations, dimensions, connections, size and type of fasteners, and fabrication and installation details.
- 3. Certificate showing compliance with Paragraph 1.04.
- 4. Installation and maintenance instructions.

C. Quality Control Submittals:

- 1. Certificates: Copy of certificates required under Quality Assurance Article.
- 2. Fabricator's Qualifications Data:
 - a. Firm's name, business address and telephone number.
 - b. Years of experience fabricating metal stairs.

1.04 QUALITY ASSURANCE

A. Certificates:

- 1. Affidavit by the structural steel manufacturer certifying that structural steel items meet the contract requirements.
 - a. Submit evidence of steel material compliance with this Specification. Evidence shall consist of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.
 - 1) Documentation to confirm compliance with General Conditions Article 25.4 Domestic Steel.
- B. Fabricator's Qualifications: The fabricator shall be experienced in metal stair work and shall be subject to the approval of the Director.
- C. Inspection: Shop and field quality assurance inspection may be made by the State. If quality assurance inspection is made by the State, it shall not relieve the fabricator and erector of responsibility for their own quality control programs.
- D. Galvanizing: Stamp galvanized items with galvanizer's name, weight of coating, and applicable ASTM number.

E. Access ladders shall be designed and installed to comply with ANSI A14.3.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. UPNO VR, Inc., 3 Crane Way, Hooksett, New Hampshire 03106; 603-625-8639.

2.02 MATERIALS

- A. Extruded aluminum: ASTM B221, Alloy 6063 Temper T-6, non-spark.
- B. Sheet aluminum: ASTM B209 6063 Temper T-6.
- C. Finish: Mill finished aluminum.

2.03 GENERAL FABRICATION

- A. Field verify ladder dimensions prior to fabrication.
- B. Components shall be welded and bolted. Ladder shall not require field assembly.

2.04 INCLINED SHIP LADDER

- A. Basis of Design: Fixed, inclined, aluminum, folding mezzanine access ship ladder; Model No. U-505 as manufactured by UPNOVR, Inc.
- B. Accommodation height: 10'-10" +/-.
- C. Angle of inclination: 70 degrees.
- D. Treads: Form with two 1-1/4 inches square tubes by 24 inches long with corrugated surfaces.
 - 1. Equally space treads as indicated on Drawings and reviewed shop drawings.
 - 2. Attach treads to stringers by welding.
- E. Operation: Folding ladder shall store against wall with stringers in vertical position. Top of ladder shall pivot with sliding hinge assembly with stainless steel pin to inclined use position.
- F. Stringers: 3 by 1 inch aluminum channel. Equip bottom of stringer with non-skid rubber foot. Top of stringer shall be supported by wall bracket fabricated from 3 inches by 1/4 inch thick aluminum plate.

- G. Handrail: Fabricate from 1-1/4 inches diameter aluminum pipe
 - 1. Form returns with 6 inches radius.
 - 2. Attach rail to stringer such that rail projects approximately 6 inches above stringer.
 - 3. Extend rail above ladder to form guardrail extending 42 inches above top tread.
 - 4. Locate bottom of handrail 36 inches above floor.

2.05 ACCESSORIES

A. Support brackets: Support ship ladder with top wall brackets and bottom floor brackets fabricated from 2 by 1/4 inch minimum flat bar aluminum.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prior to fabrication, field verify required dimensions.
- B. Coordinate ladder installation with construction of CMU walls specified in Section 042000 Concrete Unit Masonry to ensure block walls are adequately reinforced and cells grouted for attachment of brackets and support of ladder.
- C. Insulate dissimilar metals to prevent electrolysis with bituminous paint or non-absorptive isolation pad to prevent contact.
- D. Do not make corrections or alterations to fabricated steel without prior written approval by the Director's Representative.

3.02 INSTALLATION

- A. Install inclined ladder in accordance with manufacturer's instructions and reviewed shop drawings.
- B. Securely anchor support brackets with fasteners of type and size recommended by manufacturer. Place wall brackets at top and floor brackets at bottom of ladder. Place intermediate wall brackets at 48 inches maximum.
- C. Ensure ladder is plumb and rigid.
- D. After installation inspect ladder to verify proper, secure, and safe installation.
- E. Clean ladder using clean water and mild detergent. Do not use abrasive agent, steel wool, or harsh chemicals. Rinse with clean water.

END OF SECTION

SECTION 104416

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
 - a. Schedules and coordination requirements.

1.04 SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Warranty: Sample of special warranty.
- C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.05 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.02 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Larsens Manufacturing Company.
 - 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 - 3. Valves: Manufacturer's standard.
 - 4. Handles and Levers: Manufacturer's standard.
 - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Aluminum Container 10-A:120-B:C, 20-lb (9.1-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-aluminum container.

2.03 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Larsens Manufacturing Company.
 - 2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

2.04 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.05 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: Top of fire extinguisher to be at 42 inches (1067 mm) above finished floor.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Unless otherwise indicated, install Work of this Section in strict accordance with the manufacturer's instructions.
 - 1. Install all attachments, anchorage devices, and fasteners as required to securely mount accessory units to types of wall or partition construction indicated.

END OF SECTION

SECTION 231323

ABOVE GROUND FUEL STORAGE TANKS AND FUEL SYSTEMS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-In-Place Concrete: Section 033001.
- B. Electric Heating Cable System: Section 230533.
- C. Piping Insulation: Section 230700.
- D. Liquid Fuel Piping: Section 231100.

1.02 REFERENCES

- A. NFPA 30 Flammable and Combustible Liquids Code.
- B. NFPA 30A Automotive and Marine Service Station Code.
- C. NFPA 31 Oil Burning Equipment.
- D. NFPA 70 National Electric Code.
- E. NFPA 110 Standards for Emergency and Standby Power Systems.
- F. API 1615 Installation of Underground Liquid Storage Systems.
- G. Underwriter's Laboratories (UL).
- H. ETL Testing Laboratories (ETL).
- I. Steel Tank Institute (STI).
- J. Factory Mutual Engineering and Research (FM).
- K. NYS Department of Environmental Conservation Regulations.
- L. US Environmental Protection Agency Regulations.

1.03 **DEFINITIONS**

A. Motor Fuel Dispensing System: Fuel storage tank including leak containment and detection for tank and underground piping, overfill prevention, high level alarm, gage system, remote pump, dispenser, and automated fuel management system.

1.04 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300 does not apply to this Section.
- B. Submittals Package: Submit the Product Data, and Quality Control Submittals specified below at the same time as a package.
- C. Product Data: Catalog sheets, specifications, illustrations, wiring diagrams, CARB Stamp (where applicable), and installation instructions for each item specified for each type of system.
- D. Quality Control Submittals:
 - 1. Tank Installation Contractor's Qualifications Data:
 - a. Name of Contractor, business address and telephone number.
 - b. Names and addresses of 3 similar projects that the Contractor has worked on during the past 5 years.
 - 2. Pipe Installer's Qualifications Data:
 - a. Name of each person who will be performing the Work and their employer's name, business address and telephone number.
 - b. Names and addresses of 3 similar projects that each person has worked on during the past 5 years.
 - c. Copy of certification from pipe manufacturer(s).
 - 3. Factory Test Certificate: For each tank.
 - 4. Company Field Advisor Data:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company, listed specifically for this project.

1.05 WORK ORDER CLOSEOUT SUBMITTALS

- A. Work Order Closeout Submittals: Submit the following to the Director's Representative at substantial completion of each work order:
 - 1. Operation and Maintenance Data.
 - 2. Warranty: Copy of specified warranty.
 - 3. Tank Manufacturer Installation Check List.
 - 4. Spare parts and special tools.
 - 5. As-built drawings.

1.06 **QUALITY ASSURANCE**

- A. Qualifications:
 - 1. Tank Installation Contractor: The firm performing the Work of this Section shall have been regularly engaged in the installation and maintenance of above ground fuel storage tanks for a minimum of 5 years, and shall have completed 3 similar projects.

- 2. Pipe Installer: Individual with minimum 5 years experience in installing fuel piping, have worked 3 similar projects, and shall be certified by pipe manufacturer of the type of pipe being installed.
- B. Listings: Components of the system(s) for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark.
- C. Regulatory Requirements:
 - 1. Systems for storing diesel fuel or unleaded gasoline for motor fuel dispensing systems shall comply with the applicable requirements of UL 58, NFPA 30 and NFPA 30A.
 - 2. New York State Department of Environmental Conservation Bulk Storage Regulations 6 NYCRR Part 613.
 - 3. New York State Department of Environmental Conservation Petroleum and Volatile Organic Liquid Storage and Transfer 6 NYCRR Part 229.
 - 4. New York State Department of Environmental Conservation Dispensing Site and Transport Vehicles 6 NYCRR Part 230.

D. Company Field Advisor:

- 1. Secure the services of a Company Field Advisor of the manufacturer of the leak and overfill monitoring system for a minimum of 6 hours for the following:
 - a. Inspect installation and witness initial startup of system.
 - b. Train facility personnel in the operation and maintenance of the system (minimum of two 2 hour training sessions. Schedule training sessions with the Director's Representative.
- 2. Secure the services of a Company Field Advisor of the manufacturer of the fuel management system for a minimum of 6 hours for the following:
 - a. Inspect installation and witness initial startup of system.
 - b. Train facility personnel in the operation and maintenance of the system (minimum of two 2 hour training sessions. Schedule training sessions with the Director's Representative.

1.07 WARRANTY

A. Warranty: Thirty year manufacturer's warranty for each tank.

1.08 MAINTENANCE

- A. Spare Parts:
 - 1. Two keys for each padlock.
- B. Special Tools:
 - 1. One stick gage and two calibration charts for each fuel tank.
 - 2. Two tools for each type and size vandal resistant fastener.

PART 2 PRODUCTS

2.01 DOUBLE WALL STEEL PROTECTED FUEL STORAGE TANKS (TYPE DWS-1)

- Tanks shall be listed as secondary containment in accordance with UL
 2085, and shall be marked for fire resistance, and protected from vehicle impact and projectile hazards.
- B. Type: Double wall steel interior tank with minimum 3 inch interstitial space filled with lightweight, porous, monolithic insulation material.
 - 1. Exterior Protective Coating: Conforming to Steel Tank Institute Standards.
 - a. Surface Preparation: SSPC-SP6 grit blast.
 - b. Primer: Corrosion resistant epoxy or urethane in accordance with UL 2085 requirements.
 - c. Top Coat: Epoxy or urethane in accordance with UL 2085 requirements.

C. Acceptable Tanks:

- 1. Fireguard Thermally Protected Tank by Highland Tanks, Manheim, PA, (717) 664-0600.
- 2. Fireguard Thermally Protected Tank by Modern Welding Company, Newark, OH, (740) 344-9425.
- 3. Hoover Vault Tank by Containment Solutions, Conroe, TX 77301, (800) 537-4730.
- 4. Fireguard Thermally Protected Tank by Lancaster Tanks, Buffalo, NY (716) 332-5928.

2.02 TANK ACCESSORY PACKAGE

- A. Stair/Platform Assembly:
 - 1. Stairs and railings shall meet OSHA Standard 29 CFR Ch. XVII, Paragraph 2910.24.
 - 2. Platform Mounting Height: 30 to 36 inches from the top of tank.
 - 3. Platform provides access to the fill port, and stick gage port.
 - 4. Assemblies shall either be painted per Section 099103, or galvanized in accordance ASTM Standard A53-96.
 - 5. Provide right and left hand stairs/platform assemblies with railings on exposed sides only.

B. Gaging Equipment:

- 1. Stick Gage Port (Furnished with all tanks): Accessible from ground level or stair/platform assembly.
- 2. Mechanical Gaging: Field adjustable float type gage with minimum 4-1/2 inch dia. display face, vapor tight construction, and stainless steel float; 818 Clock Gage by Morrison Bros., Dubuque, IA. Order clock gauge by tank size geometry (unit display in gallons)

C. Venting:

- 1. Vent primary tank with normal and emergency venting (NFPA 30 and UL 2085 test configuration. Vent interstitial space with emergency venting only.
- 2. Pipe: Standard weight black steel pipe (2 inch size) with 150 lb malleable iron fittings with fuel resistant thread sealant.
 - a. Finish: Paint pipe and fittings in accordance with Section 099103.
 - b. Terminate pipe minimum 12 feet above grade.
- 3. Vent Caps:
 - a. Fuel Oil, or Diesel Fuel: Open type with 30 or 40 mesh screen; OPW 23, EMCO Wheaton AH10, EBW 800, Morrison Bros. 354, or EBW 800 series.
- 4. Emergency Vent: Aluminum body with cast iron lid, zinc plated steel shaft, and Buna-N O-ring; OPW 301 or EBW803, Morrison Bros. 2440M.
 - a. Conforming to NFPA 30, and UL 2085 test configuration.

D. Tank Identification:

- 1. Type: Two layer etched plastic or metal permanently attached to the tank.
 - a. Decals or stenciling is not acceptable.
- 2. Signs shall include the following information:
 - a. Manufacturer's statement that tank conforms to Bulk Storage Regulation 6 NYCRR Part 614.
 - b. Standards of Design by which tank was manufactured.
 - c. List of products and additives which may be permanently stored in tank.
 - d. Year in which tank was manufactured.
 - e. Unique identification number.
 - f. Dimensions, working capacity, and tank model number.
 - g. Name of tank manufacturer and installer.
 - h. Date of tank installation.

E. Fill Limiting Valve:

- 1. Morrison Bros. 9095AA (includes adapter), EBW 709 Warden, or OPW 61FSTOP.
 - a. Drop tube as required.
 - b. Adapter: OPW 633AST, Morrison Bros. 800A; 3 inch size.
 - c. Cap: OPW 634B, EBW 774, or Morrison Bros. 800DC

F. Spill Containment at Fill Port:

1. For 1,000-8,000 gallon DWS-1 Tanks: Welded steel, 24 inch dia x 13-1/2 inch high x 1/4 inch thick, with lockable watertight lid, drain valve, and Master Lock 911-DKA.

G. Stickport:

- 1. Provide a port for manually gaging the tank including a lockable vapor tight twist off cap; Morrison Bros. 178X, EBW770, or OPW 83-0066.
- 2. All tanks shall be provided with a stick gage.

2.03 TYPE A TANK GAGING, LEAK AND OVERFILL MONITOR SYSTEM

- A. Acceptable Companies:
 - 1. Veeder Root Inc., Simsbury, CT, (800) 873-3313.
 - 2. OMNTEC/Electro Levels Mfg. Co., Ronkonkoma, NY, (516) 467-5787.
- B. Type: Continuous operation 7" graphic touchscreen tank gauging, leak detection and overfill monitor system for double wall storage tanks, double wall product piping, and containment sumps.
 - 1. Systems shall have system test capability, and shall be UL listed and/or FM approved.
- C. Alarm Monitor Panels: Locate panel inside nearest appropriate building as directed by Director's Representative.
 - 1. The alarm panel shall visually indicate the following:
 - a. Status of each tank's interstitial space.
 - b. Status of each containment system.
 - c. Status of high level sensor set at 95 percent of tank operating capacity (on or off). When sensor is tripped, audio alarm shall be activated and be audible at fill port location.
 - 2. An additional wireless alarm panel shall be installed in the office as determined by the Director's Representative.
- D. Non Discriminating Leak Sensors:
 - 1. Detects leaks in the following:
 - a. Interstitial space between tank walls.
 - b. Piping system which drains into containment sump.
 - 2. Sensors: Non discriminating type not sensitive to condensation forming on the sensor surface, or dripping across the sensor surface.
- E. Magnetostrictive Gage Probe:
 - 1. Includes temperature sensors, and both product and water floats capable of sensing product level to nearest 0.001 inch.
 - 2. Upon demand, the system shall indicate water level, product level, and average product temperature.
 - 3. System shall sense and alarm leakage rates greater than 0.2 gal/hr.
- F. Instrumentation Control Cable: Connect probe and sensor to alarm monitor panel, as recommended by manufacturer of leak and overfill monitor system.
- G. Audible Overfill Alarm Device: Weatherproof, surface mounted basic grille type, 120 V ac or as manufactured by tank gauging, leak detection and overfill monitor system manufacturer.
- H. Overfill Alarm Device Sign: Constructed of 1/8 inch thick two color laminated plastic engravers stock, with the words "OVERFILL ALARM DEVICE" engraved in white on red background. Size sign and lettering for easy reading from ground level.
- I. Printer: As recommended by system manufacturer. If printer is thermal type provide 6 rolls of thermal paper at each location.

2.04 TYPE D-1 DIESEL FUEL INSTALLATION PACKAGE

- A. Manual Shutoff Valve: Brass, full port ball valve, 1 1/2 inch size, Jomar T-100NE, or Morrison Bros. 691B.
- B. Explosion Proof Solenoid Valve: Brass, 1-1/2 inch SIZE; ASCO 8210, or Morrison Bros. 710.
- C. Pressure/Expansion Relief Valve: Use one of the following types:
 - 1. Steel Body: 1/4 inch size; Morrison Bros. 77.
 - 2. Ductile Iron Body: 1/2 inch size, Morrison Bros. 078DI.
- D. Flexible Hose: UL listed, braided steel, by Titeflex, Springfield MA, or Flex-ing, Sherman, TX.
- E. External Emergency Valve: Spring loaded fusible link type; OPW 178S-6130 or Morrison Bros. 346DI.

2.05 SUCTION PUMP DISPENSERS

- A. Full Size Suction Pump Dispensers: Pad mounted.
 - 1. Type:
 - a. Single Hose, Single Product Type: Dresser Wayne G6202P/27AGJK/AJS with hose with swivel fittings on each end, breakaway fitting, illuminated product panel and register area, pulser, and high hose retractor; 115/230 V ac.
 - 2. Aboveground Dispenser Sump/Stand:
 - a. Acceptable Companies:
 - DP Series by Fairfield Industries, 827 North 6th Street, Newark, NJ 07107, (973-483-0100), www.fairfield-industries.com.
 - 2) Model 434S 17000 series by Morrison Bros.
 - b. Designed for use with single hose or dual hose, single product or dual product, Dresser/Wayne suction pump dispensers.
 - c. Heavy gage stainless steel construction.
 - d. Anchor feet for pad mounting.
 - e. Provides leak containment during dispenser use and filter change outs.
 - f. Penetrations for vapor recovery fittings, conduit, and double wall piping.
 - g. Adjustable stabilizer bar.
 - 3. Hose Retractor: Prevents hose from touching the concrete when the nozzle is hung in its housing
 - 4. Cabinet and Frame:
 - a. All stainless steel construction.
 - 5. Pumping Unit: Positive displacement, self priming, gear type with integral centrifugal air separator, adjustable bypass valve, suction strainers at inlet connection, and 1 hp continuous duty motor with thermal overload protection.

- 6. Dispenser Accessories:
 - a. Totalizer.
 - b. Double swivel fitting.
 - c. Whip hose.
 - d. Pulser.
 - e. Fuel Filters: As manufactured by Cim-Tek for required fuel type and environmental conditions.
 - f. Balance Adapter: OPW 38CS-0380.
 - g. Hose Mast Assembly: Wayne 889918-001.
- B. Hose and Nozzle Assemblies:
 - 1. Diesel Fuel Hose and Nozzle Assemblies:
 - a. Nozzle: OPW 7H.
 - b. Breakaway Coupling: Dry reusable type; Husky 2776, EBW 697, or OPW 66RB.
 - c. Hose: One inch dia, minimum 14 feet required (one 9 foot hose and one 5 foot hose).
- C. Warning Sign: Dispenser area mounted, as required per local fire code; with the following text:
 - "1. NO SMOKING.
 - 2. SHUT OFF MOTOR.
 - 3. DISCHARGE YOUR STATIC ELECTRICITY BEFORE FUELING BY TOUCHING A METAL SURFACE AWAY FROM THE NOZZLE.
 - 4. TO PREVENT STATIC CHARGE, DO NOT REENTER YOUR VEHICLE WHILE DIESEL IS PUMPING.
 - 5. IF A FIRE STARTS, DO NOT REMOVE NOZZLE BACK AWAY IMMEDIATELY.
 - 6. IT IS UNLAWFUL AND DANGEROUS TO DISPENSE DIESEL INTO UNAPPROVED CONTAINERS.
 - 7. NO FILLING OF PORTABLE CONTAINERS IN OR ON A MOTOR VEHICLE. PLACE CONTAINER ON GROUND BEFORE FILLING.
 - 8. TURN OFF HANDHELD ELECTRICAL DEVICES BEFORE DISPENSING FUEL.
 - 9. REMAIN WITH THE VEHICLE WHILE FUELING."
- D. Emergency Procedures Sign: Dispenser area mounted, as required per local fire code; with the following text:

"INCASE OF FIRE, SPILL OR RELEASE

- 1. USE EMERGENCY PUMP SHUTOFF.
- 2. REPORT THE ACCIDENT!
 FIRE DEPARTMENT TELEPHONE NO. (local number entered here).
 NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL
 CONSERVATION SPILL HOTLINE NO. (Current NYS DEC number entered here).

FACILITY ADDRESS (Street address and name entered here)."

2.06 FUEL MANAGEMENT SYSTEM

- A. Type A (Small Fleet System): Stand alone, magnetic strip card, programmable key or keyless activated, self contained, island mounted type capable of 24 hour monitoring, and simultaneous control of maximum of 4 hoses.
 - 1. Acceptable Systems:
 - a. FuelMaster 2500 System by Syn-Tech Systems, Inc., 100 Four Points Way, Tallahassee, FL 32305, (800) 888-9136, www.marketing@syntech-fuelmaster.com.
 - b. K800 Fuel Control System by OPW, 6900 Santa Fe Drive, Hodgkins, IL 60525, (708) 485-4200, www.opwglobal.com.
 - c. FCT-RT Fuel Control Terminal by E.J. Ward, 8801 Tradeway, San Antonio, TX 78217, (210) 824-7383, www.ejward.com.
 - d. FuelFocus Island Controller by AssetWORKS, 998 Old Eagle School Road, Suite 1215, Wayne, PA 19087, (610) 687-9202, www.assetworks.com

2. Features:

- a. Microprocessor:
 - 1) Capable of reprogramming without changing hardware, and communicates with communication controller by internal network or by dial-up phone lines.
 - 2) Memory: 2 MEG.
- b. Keypad: Heavy duty, alpha-numeric membrane type with separate key for each letter (no shift or function keys required).
- c. Display: Backlit LCD with contrast adjustment that is highly visible and easy to read in total darkness or direct sunlight.
- d. Dispenser selection controlled thru system logic by vehicle and/or operator card data.
- e. Programmable to limit delivery by card or vehicle identification.
- f. Audible "Card Left in Reader" alarm.
- g. Capable of recording and storing transaction data including operator vehicle, quantities, day and time, odometer reading; and printing this information on demand.
- h. Interfaces with fuel dispensers, tank monitoring equipment, and capable of data transfer via modem to facility computers.
- i. Storage capacity with battery backup for minimum 500 transactions.
- j. Transient protection on AC power input and modem communication.
- k. Manual system override switches.
- l. Weatherproof Cabinet and Stand: Powder coated steel construction.
- m. Capable of reconciliation reporting.
- n. Maximum Operating Temperature: -40 degrees F to 122 degrees F.

2.07 FUEL SYSTEM POWER PANEL

- A. Acceptable Manufactures:
 - 1. OMNTEC Mfg., Inc., Ronkonkoma, NY, (877) 814-2001.
 - 2. Power Integrity Systems, Madison, WI, (608) 838-8786.
- B. Features:
 - 1. Compatible with NEC 514.11, 514.13 and NFPA 30A.
 - 2. Emergency stop controls.
 - 3. Pump isolation controls.
 - 4. Tank monitoring interface.
 - 5. Dispenser & pump power connections.
 - 6. Individual circuits disconnects for maintenance.
 - 7. 208V, 1ph, 60Hz power connection.
 - 8. UL Listed.
 - 9. Enclosure Type 1 indoor rated. (3R for outdoor).
- C. Provide emergency push-button shutoff greater than 20 feet and within 100 feet of dispenser. Provide sign at location of emergency push-button shutoff.
 - 1. Emergency shut off shall disconnect power to all dispensing devices, to all remote pumps serving the dispensing devices, to all associated power, control, and signal circuits, and to all other electrical equipment in the locations surrounding the fuel dispensing devices. Resetting from an emergency shut off shall require manual intervention.

2.08 LIGHTING STANDARDS

- A. 16 Foot Height: Aluminum, 5 inch round tapered shaft, Lithonia's Round Tapered Aluminum Standards, having:
 - 1. Finish to match luminaire.
 - 2. 0.125 inch wall thickness.
 - 3. Number and size of anchor bolts as recommended by lighting standard manufacturer. Threaded end hot dipped galvanized for a minimum of 10 inches. Galvanized nut, lockwasher and flatwasher with each bolt.
 - 4. Template for setting anchor bolts.
 - 5. One 1/8 inch and two 1/16 inch aluminum shims for each standard.
 - 6. Provisions for LuminaireMounting:
 - a. Holes predrilled to accommodate direct arm mounted luminaires.
 - b. Pole top tenon to accommodate tenon mounted luminaires.
 - 7. Base cover attached to base with vandal resistant fasteners.
 - 8. Ground lug at base.

2.09 LUMINAIRES

- A. Type PLL-3: Lithonia Lighting D-Series Size 1 LED Area Luminaires, having:
 - 1. Thirty LEDs. 1050 drive current. 102W. Ballast shall be multiple tap for use on 120, 208, 240 and 277 volt circuits, capable of starting lamp at -40 degrees C.
 - 2. Luminaire connected for operation on 120 volt circuit, unless otherwise indicated on drawing.
 - 3. Mounting:
 - a. Direct arm mounted.
 - 4. LEDs, wattage as indicated on drawings:
 - a. P3 package.

- 5. LEDs, wattage as indicated on drawings:
 - a. T4M, type 4 medium distribution.
- 6. Bronze finish.

2.10 CONCRETE BASES

- A. As detailed on the drawings. Bases may be precast or poured in place.
- B. Location shown on drawings. Mount type FP luminaire per manufacturers recommendations.

2.11 FASTENERS

A. Vandal Resistant Fasteners: Stainless steel, allen or torx head, both with center post.

2.12 FUEL FOR TESTING

- A. Coordinate with the Facility thru the Director's Representative for the delivery of a full tank of each appropriate fuel type for testing to verify that fuel transfer equipment and instrumentation is operating properly.
 - 1. The Facility shall pay for delivery of fuel.

2.13 DIESEL EXHAUST FLUID STORAGE TANK

- A. Self contained storage and dispensing unit with heated enclosure.
 - 1. Acceptable Systems:
 - a. Benecor DEF tote and Enclosures by Benecor, Inc. 12809 Silver Lake Road, Brighton, MI 48116 (248) 437-4437, www.Benecor.com
 - Spatco DEF tote and Enclosures by Spatco Energy Solutions 4800 N. Graham Street, Charlotte, NC 28269 (886) 977-2826, www.Spatco.com
 - c. KleerBlue Single Ultra Tote Enclosure by KleerBlue DEF Storage & Dispensing Systems 1601 Buchanan Road, Evansville, IN 4772 (800)320-2122, www.KleerBlueSolutions.com
 - d. Tote Eco Bulk MX by Schutz Packaging Systems 200 Aspen Hill Road US-North Branch, New Jersey 08876 (908) 526-6161
- B. System Components: System shall be provided as a complete self contained unit with all required equipment and hardware including but not limited to the following:
 - 1. 500 gallon DEF tote
 - 2. Fiberglass enclosure
 - 3. Lockable front and rear access doors
 - 4. Automatic stainless steel nozzle with breakaway swivel
 - 5. 25' hose reel, 25' hose and all necessary hardware
 - 6. UL enclosed electrical panel
 - 7. Cold weather package including
 - a. Insulated enclosure
 - b. Insulated roll lock nozzle door and hardware

- c. Thermostatically controlled heater
- d. Strobe light warning for low temperature inside tote enclosure
- 8. Face mounted display meter and in-line pulse meter. Pulse meter shall tie into fuel management system.

PART 3 EXECUTION

3.01 PREPARATION

- A. Testing Prior to Installation:
 - 1. Before placing the tank in place, plug all openings and pressure test tank in accordance with manufacturer's printed test instructions, unless otherwise specified.
 - 2. Tanks should not be pressurized beyond manufacturer's specified limits.
 - 3. The tank must hold the test pressure for 30 minutes.
 - 4. Check fitting connections, and seams in tank by applying a soap suds solution.
 - 5. Reject any leaking tanks.

3.02 INSTALLATION

A. Install the Work of this section in accordance with the item manufacturer's printed installation instructions, unless otherwise shown or specified.

3.03 TANK ACCESSORIES

- A. Fuel Identification: Attach laminated plastic nameplate to each tank fill pipe to identify the fuel in the tank.
- B. Tank Identification: Affix tank identification label, or plate permanently to tanks and fill ports.
- C. Install padlocks on all lockable caps on fill piping.
- D. Terminate vent lines with vent caps.
- E. Overfill Alarm Device Sign: Mount sign adjacent to alarm horn in a location easily readable from ground level.

3.04 FIELD QUALITY CONTROL

- A. Testing: After installation of tank and piping, test the system in the presence of the Director's Representative, as follows:
 - 1. Piping:
 - a. Steel Piping: Before painting, plug ends and test with air at 1-1/2 times operating pressure, and hold for 3 hours without leaking.
 - 2. Tanks: Pressure test tank in accordance with manufacturer's printed test instructions, unless otherwise specified.

- a. Tanks should not be pressurized beyond manufacturer's specified limits.
- b. The tank must hold the test pressure for 30 minutes.
- c. Check fitting connections, and seams in outermost tank by applying a soap suds solution.
- 3. Product Level and Overfill Protection:
 - a. The Facility through the Director's Representative will arrange for delivery of product as needed to test high level alarm, and fill limiting valve.
 - b. During the filling process the Director's Representative will monitor and record the low level alarm, quantity of product as compared to reading on the Control Panel, the overfill alarm, and will test the overfill valve.
 - c. Make required repairs and final adjustments.
- 4. Motor Fuel Dispensing System:
 - a. After reconnecting all piping, dispensers, and tanks, and when directed, perform a system acceptance test in the presence of the Director's Representative to demonstrate that the fuel dispensing system is operating properly.
 - b. Make required repairs and final adjustments.
 - c. Minimum flow rate for diesel systems is 11.0 gpm.

END OF SECTION

SECTION 444249

OIL-WATER SEPARATOR

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork: Section 310000.
- B. Cast-In-Place Concrete: Section 033000.

1.02 REFERENCES

- A. Concrete Tank:
 - 1. ASTM Standard C913 for Precast Water and Wastewater Structures.
 - 2. ACI-318-89 Building Code Requirements For Reinforced Structural Concrete.
 - 3. ACI-350R-89 Environmental Engineering Concrete Structures.
 - 4. ASTM Standard C890 Minimum Structural Design Loading of Precast Concrete Water and Wastewater Structures.
 - 5. AASHTO Vehicle Loads at Grade.
- B. Fiberglass Tank:
 - 1. API Manual on Disposal of Refinery Wastes.
 - 2. API Bulletin No. 1630 (1st Edition).
 - 3. API Bulletin No. 421.
 - 4. Tank manufactured per ASTM D-4021.
 - 5. Tank manufactured per U.L. 1316.
 - 6. NFPA 30 Flammable and Combustible Liquids Code.
- C. Steel Tank:
 - 1. Tank manufactured per U.L. 58.
 - 2. Corrosion control system in strict conformance with Sti-P3 Specifications with a 30 year warranty. Tank manufacturer shall be a licensee of the Steel Tank Institute.
 - 3. NFPA 30.
- D. Standards: The oil water separator shall be designed in accordance with Stokes Law and the American Petroleum Institute Manual on Disposal of Refinery Wastes, Volume on Liquid Wastes as stated in Chapter 5, Oil Water Separator Process Design and API Bulletin No. 1630 First Edition, Waste Water Handling and Treatment Manual for Petroleum Marketing Facilities.

1.03 SYSTEM DESCRIPTION

A. The separator system shall be designed to perform as specified for variable, intermittent and continuous flows up to and including 200 gpm and containing 1000 ppm oil and grease with a specific gravity range of 0.68 and 0.9.

B. The unit shall incorporate a parallel plate coalescer enabling the removal of fine and widely dispersed oil and grease droplets by means of buoyant displacement to the underside of the plates where they undergo subsequent detachment in the form of globules rising to an upper self-contained holding and storage zone.

1.04 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300, does not apply to this Section.
- B. Product Data: Catalog cuts with dimensions, specifications, installation instructions. Include one copy of operation and maintenance instructions for informational purposes.
- C. Performance data: Defined by influent and effluent characteristics.
- D. Factory Test: Test certification for the tank.
- E. Accessory Sensors and Alarms: Schematic wiring diagrams and bill of materials for each component of each sensor/alarm system.
- F. Contract Closeout Submittals: Provide two additional copies of operation and maintenance instructions to the Director's Representative.

1.05 WARRANTY

A. Manufacturer's Warranty: The tank manufacturer shall warrant the oil/water separator tank for a period of 30 years against leakage due to internal corrosion, external corrosion, and structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Concrete Tank: Oldcastle/Spancrete North, Inc., 123 County Route 101, P.O. Box 534, South Bethlehem, NY 12161, (518) 767-9390.
- B. Fiberglass Tank: Containment Solutions, Inc., Route 20, Box 1380, Conroe, TX 77301-4124, (409) 756-7731.
- C. Steel Tank:
 - 1. Highland Tank and Manufacturing Co., One Highland Road, Stoystown, PA 15563, (814) 893-5701.
 - 2. McTighe Industries, Inc., 2100 North Kimball Street, P.O. Box 928, Mitchell, SD 57301, (605) 996-1162.

2.02 TANK MATERIAL OPTION

A. The oil/water separator tank may be fabricated from concrete, fiberglass, or steel at the Contractor's option.

2.03 SEPARATOR TANK

- A. Type: Heavy duty underground single wall tank with product level monitoring system.
 - 1. Flanged inlet and outlet connections, including isolation spools for metal tanks.
 - 2. Internal inlet velocity head diffusion baffle or tee.
 - 3. Sediment chamber.
 - 4. Sludge baffle.
 - 5. Oil water separation chamber containing a parallel corrugated plate coalescer and a removable "Petroscreen" polypropylene coalescer designed to intercept oil droplets > 20 microns in size and to produce an effluent quality of 10 ppm or less of free oil and grease.
 - 6. Fittings for vents.
 - 7. Four inch diameter oil pump out and sampling pipe.
 - 8. Two inch diameter sensor pipe.
 - 9. Two 24 inch diameter manways, with extensions (if required), covers, gaskets, and bolts.
 - 10. Lifting lugs for installation.
 - 11. Electronic intrinsically safe oil level monitors and sensors to actuate visual and audible alarm.
 - 12. Metal tanks coated inside and out per manufacturer's recommendations. Concrete tanks coated inside with heavy coat of "Resist-All" sealant produced by Sealing Systems, Inc., 23230 W. Thomess Blvd., Lorretto, MN 55357, (612) 478-2057.
- B. Capacity: 2000 gallons.
- C. Loading Conditions:
 - 1. Internal Load: Five pounds per square inch (PSIG) above ground air test. Contractor shall test prior to installation with a soap solution applied to weld seams in search of leaks.
 - 2. Surface Loads: Withstand surface H-20 axle loads when properly installed.
 - 3. Tank shall support accessory equipment when installed according to tank manufacturer's recommendations and limitations.

2.04 MISCELLANEOUS MATERIALS

- A. Galvanized Pipe (For Vents). 2-4 inch Schedule 40.
- B. Steel Retaining Riser (For Manways): Size and length to be determined by tank manufacturer and site conditions.

- C. Concrete Pad With Tank Hold-Down Device: Comply with manufacturer's recommendations.
 - 1. Straps with neoprene liners and turnbuckles.
 - 2. Anchors.
 - 3. Separating Pads: Made of inert dielectric material.

2.05 ACCESSORIES

- A. Interface and Level Sensor: Intrinsically safe oil level controls to activate high level alarm at a predetermined oil level.
- B. Alarm panel to monitor oil level sensors and activate a visual and audible alarm:
 - 1. Audible alarm and alarm light.
 - a. Audible alarm shall be equipped with a silence switch.
 - b. Annunciator light shall remain lit until off-normal condition has been corrected.
 - c. Alarm shall have nameplate identification.
 - 2. Separate alarm light for high oil level (red) and caution oil level (yellow).
 - 3. Self-test button.
 - 4. Phenolic plastic nameplate identification for each light, switch, etc.
 - 5. Phenolic plastic nameplate identification for the alarm panel as follows, "Oil/Water Separator Oil Level".

2.06 ACCESS HATCH COVERS

- A. Provide aluminum hatch covers suitable for H-20 wheel loading for access to tank manways.
 - 1. Size recommended by the oil/water separator manufacturer.
 - 2. Cover shall lay flat without any protrusions rising above the frame.
 - 3. Acceptable Door: Type JD-2, double leaf, aluminum access door with automatic hold-open arm, torsion bar counter balances and removable key wrench, all as manufactured by Bilco Company, New Haven, CT 06505, (203) 934-6363.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform tests in accordance with manufacturer's printed recommendations.
 - 1. Air test steel separator tanks above ground at 5 psig while a soap solution is applied to the weld seams to detect leaks.
- B. Repair damaged coating with manufacturer's touch-up kit.
- C. Excavate and install tank in accordance with manufacturer's recommendations.
- D. Extend tank vents into building and terminate above roof. Tank vents may be combined into one 4" vent. Follow manufacturer's written instructions.

- E. Backfill in accordance with manufacturer's printed recommendations.
- F. Fill separator tank with clean water ballast. After ballasting is complete, check elevations for proper tolerances.
- G. Field locate the control panel with alarm where indicated and as directed.
- H. Provide electric service to the control panel(s) and make necessary electrical interconnection of panel(s), pumps, oil and water level sensors, and alarm.
 - 1. Electric work shall conform to the National Electrical Code (NEC).

3.02 CLEANING INFLUENT/EFFLUENT LINES

A. Flush existing lines connected to the oil/water separator and dispose of the effluent in accordance with NYS Department of Conservation Regulations.

END OF SECTION

SECTION 260573

SHORT CIRCUIT AND GROUND FAULT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions and Supplementary General Conditions of the work, where applicable to Mechanical and Electrical Work.
- B. The requirements of this Section shall apply to all Sections within this BID Package.
- C. Examine all Drawings and all Sections of the Specifications for requirements and provisions affecting the Work of this Section.

1.02 **DEFINITIONS**

A. STUDIES refers to Short Circuit and Ground Fault Analysis and Report, Protective Device Time- Current Coordination Analysis and Report, and Arc Flash Hazard Analysis and Report.

1.03 DESCRIPTION OF WORK

- A. Work includes proving the STUDIES. The final STUDIES shall be performed by the equipment manufacturer supplying electrical distribution system equipment for this project.
- B. STUDIES shall include all portions and devices of the electric distribution system from the normal power source (NYSEG service) and emergency generator source (emergency generator) down to and including the smallest fuse and circuit breaker in the electric distribution system.
- C. The firm performing the STUDIES shall be currently involved in medium and low-voltage power system evaluation. The STUDIES shall be performed, stamped and signed by a registered professional engineer licensed in New York State. Credentials of the individual(s) performing the STUDIES and background of the firm shall be submitted to the Engineer for approval prior to start of the work. A minimum of five (5) years' experience in power system analysis is required for the individual in charge of the project.
- D. The firm performing the STUDIES shall have the capability and experience to provide assistance during start up as required.

E. The preliminary and final approved STUDIES shall be completed and submitted with the submittals. Rejection of either the Study Report or the electrical equipment involved in the STUDIES will require full resubmission of both.

1.04 QUALITY ASSURANCE

- A. Studies shall be performed with a digital computer program and shall comply with reference standards listed below.
- B. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - 1. IEEE 141 Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
 - 2. IEEE 242 Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
 - 3. IEEE 399 Recommended Practice for Industrial and Commercial Power System Analysis
 - 4. IEEE 241 Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems
 - 5. IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations
- C. American National Standards Institute (ANSI):
 - 1. ANSI C57.12.00 Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
 - 2. ANSI C37.13 Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
 - 3. ANSI C37.010 Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
 - 4. ANSI C37.41 Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single- Pole Air Switches, Fuse Disconnecting Switches and Accessories.
- D. The National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code, latest edition
 - 2. NFPA 70E Standard for Electrical Safety in the Workplace

1.05 SUBMITTALS

- A. Submittals Package: Studies shall be submitted with the related equipment submittals. Both the studies and equipment submittals must be approved for both to be accepted.
- B. Provide six (6) copies of the preliminary STUDIES for distribution to the SUCF consultant, SUCF, and the campus for review and comment.
- C. The preliminary STUDIES shall be submitted along with the electric equipment shop drawings for review and approval. Equipment submittals will not be approved without an approved final Studies Report.

- D. The Contractor shall provide the required data (based on actual installation) for preparation of the STUDIES to the firm performing the STUDIES. The firm performing the STUDIES shall furnish the Contractor with a listing of the required data immediately after award of the contract.
- E. Expedite collection of the data to assure completion and submission of both the preliminary and final approved STUDIES prior to the acceptance of equipment submittals.
- F. Submit qualifications of individual(s) who will perform the STUDIES for approval prior to commencement of the STUDIES. Provide STUDIES in conjunction with equipment submittals to verify equipment ratings required. Submit the STUDIES to Engineer, and the Campus for review. Make all additions or changes as required by the Engineer, or the Campus.
- G. The results of the STUDIES shall be summarized in a final report. Six (6) bound copies of the final report shall be submitted.
- H. A copy of the Studies Report perform by the engineer during the design will be provided to the contractor for reference.

I. Product Data:

- 1. Listing of all required data.
- 2. Short circuit and ground fault analysis and protective device time current coordination study.
- 3. Arc flash hazard analysis.
- 4. Time current curves on log-log forms for each fuse and circuit breaker. Time current curves shall be complete.
- 5. Time current curves for 15kV fuses, 600V fuses, circuit breakers with all settings and transformer characteristics.
- 6. Transformer impedances, magnetizing currents and ANSI transformer withstand parameters shall be submitted for transformers.
- 7. Time current curves for ground fault pickups and delays on clear log-log forms.
- 8. A composite overlay of all time current curves with all settings and transformer characteristics illustrating the system coordination of fuses and circuit breakers and protection of transformers. The composite overlay shall be based on a 480V system.
- J. The report shall include the following sections:
 - 1. Executive Summary including Introduction, Scope of Work, and Results/Recommendations
 - 2. Short-Circuit Methodology, Analysis, Calculations, Results and Recommendations
 - 3. Short-Circuit Device Evaluation Table with ratings of electric equipment, protective devices, etc. vs. calculated short circuit duties, etc.
 - 4. Protective Device Coordination Methodology Analysis Results and Recommendations

- 5. Protective Device Settings Table (circuit breaker settings, relay settings, fuse selection, etc.)
- 6. Time-Current Coordination Graphs and Recommendations
- 7. Arc Flash Hazard Methodology, Analysis, Calculations, Results and Recommendations including the details of the incident energy and flash boundary calculations, along with Arc Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.
- 8. Arc Flash Labeling section showing types of labels to be provided with descriptive information as well as typical label images. Arc Flash labels shall be placed on equipment prior to energization.
- 9. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the analysis, and other information pertinent to the analysis.
- 10. Ground fault analysis, calculations, results, settings, and recommendations.

K. Contract Close-Out Submittals

- 1. Certificate signed by Contractor and electric equipment manufacturer that all fuse ratings and types, settings of all circuit breakers and ground fault system are in accordance with the STUDIES.
- 2. Final STUDIES that include all revisions, changes, etc. and match the as-built drawings.

PART 2 PRODUCTS

2.01 SHORT-CIRCUIT AND GROUND FAULT ANALYSIS AND REPORT

- A. Provide the following:
 - 1. Calculation methods and assumptions.
 - 2. Selected base per unit quantities if applicable.
 - 3. Base calculations on assumed three phase bolted faults and phase to ground faults at each electric equipment and overcurrent devices.
 - 4. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.
 - 5. Input circuit data including electric utility system characteristics, emergency generator plant characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, raceway types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit and ground fault calculations.

- 6. Tabulations of calculated quantities including symmetrical and asymmetrical fault currents, short circuit kVA, short-circuit currents, fault impedance, X/R ratios, asymmetry factors, equipment short-circuit interrupting, withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.
- 7. Results, conclusions, and recommendations with a comprehensive discussion section evaluating the adequacy or inadequacy of the equipment recommendations as appropriate for improvements to the system.
- 8. Evaluation of equipment and protective devices and comparison of short circuit ratings to available fault currents.
- 9. Adequacy of electric equipment (switchboards, panelboards, automatic transfer switches, etc.) to withstand short-circuit stresses.
- 10. Ground fault analysis, calculations, results, settings (for ground fault protection and ground fault indication alarm) and recommendations.

2.02 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS AND REPORT

- A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs. Include on each TCC graph, a complete title with descriptive device names.
- B. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
- C. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
- D. Plot the following characteristics on the TCC graphs, where applicable:
 - 1. Electric service overcurrent protective devices.
 - 2. Emergency generator overcurrent protective devices.
 - 3. Time-current curves for medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands including short-circuit benchmarks representing maximum fault currents to which the devices represented must respond.
 - 4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands.
 - 5. Transformer full-load current, magnetizing inrush current, and ANSI withstand curves.
 - 6. Low voltage and medium voltage conductor damage curves.
 - 7. Ground fault protective devices, as applicable.
 - 8. Pertinent motor starting characteristics and motor damage points, where applicable.
 - 9. Pertinent generator short-circuit decrement curve and generator damage point.
 - 10. Circuit breakers and buses in each switchboard, panelboard, etc.

E. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

F. Provide the following:

- 1. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the analysis, cable and bus connection between equipment, device numbers used in the analysis and the maximum available short-circuit current at each bus location and other information pertinent to the analysis.
- 2. A sufficient number of log-log plots to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
- 3. Computer printouts to accompany the log-log plots and contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
- 4. A separate, tabular printout containing the recommended settings (device tap, time dial, pickup, instantaneous, time delay settings, etc.) of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram.
- 5. Discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination.
- 6. Recommendations for improvements.
- G. Select each primary protective device required for a delta-wye connected transformer so that its characteristic or operating band is within the transformer characteristics, including a point equal to 58 percent of the ANSI withstand curve to provide secondary line-to-ground fault protection. Separate transformer primary protective device characteristic curves from associated secondary device characteristics by a 16 percent current margin to provide proper coordination and protection in the event of secondary line-to-line faults.

2.03 ARC FLASH HAZARD ANALYSIS AND REPORT

- A. Arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2015, Annex D and in conjunction with the short-circuit analysis and the protective device time-current coordination analysis.
- B. The flash protection boundary and the incident energy shall be calculated at all locations in the electrical distribution system (switchboards, panelboards, etc.) where work could be performed on energized parts.

- C. Circuits 240V or less where available bolted short circuit current is less than 10 kA may be omitted from the computer model and will be assumed to have a hazard risk category 0 per NFPA 70E (2015) Table 130.7(C)(15)(a), including foot note 3.
- D. Circuits 240V or less fed by transformers 112.5 kV A or less may be omitted from the computer model and will be assumed to have a hazard risk category 0 per IEEE 1584.
- E. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.
- F. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations.
- G. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the operation of the electric utility, as well as the emergency generator plant. The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.
- H. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:
 - 1. Fault contribution from induction motors should not be considered beyond 5 cycles.
- I. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.

- J. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.
- K. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.
- L. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds will be used based on IEEE 1584-2002 section B.I.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

M. Provide the following:

- 1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
- 2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
- 3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. The Contractor and electric equipment manufacturer shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved STUDIES.
- B. The Contractor and electrical equipment manufacturer shall perform field adjustment of the protective devices at the emergency generator as required to place the equipment in final operating condition.
- C. The settings shall be in accordance with approved STUDIES. No equipment shall be energized until all settings have been adjusted.
- D. The Contractor and manufacturer shall confirm all settings and shall submit a written certified report indicating all settings, date of settings, names of technicians, and confirm settings are in accordance with STUDIES.

- E. Make all modifications to equipment as required to accomplish conformance with STUDIES.
- F. Arrange and schedule all testing work to be witnessed by Campus representative as well as a Campus designated independent commissioning agent.

3.02 ARC FLASH LABELS

- A. Provide a 4.0 in. x 4.0 in. Brady thermal transfer type label of high adhesion polyester for each work location analyzed.
- B. The labels shall be designed according to the following standards:
 - 1. UL969 -Standard for Marking and Labeling Systems
 - 2. ANSI Z535.4 -Product Safety Signs and Labels
 - 3. NFPA 70 (National Electric Code) -Article 110.16
- C. The label shall include the following information:
 - 1. System Voltage
 - 2. Flash protection boundary
 - 3. Equipment Designation
 - 4. Personal Protective Equipment category
 - 5. Arc Flash Incident energy value (cal/cm2)
 - 6. Limited, restricted, and prohibited Approach Boundaries
 - 7. Study report number and issue date
- D. Labels shall be printed by a thermal transfer type printer, with no field markings.
- E. Arc flash labels shall be provided for equipment as identified in the STUDIES and the respective equipment access areas per the following:
 - 1. Floor Standing Equipment -Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment line-ups containing sections with multiple incident energy and flash protection boundaries shall be labeled as identified in the Arc Flash Analysis table.
 - 2. Wall Mounted Equipment -Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.
 - 3. General Use Safety labels shall be installed on equipment in coordination with the Arc Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc flash, and explosions, and instruct workers to turn off power prior to work.

F. Labels shall be field installed by a qualified technician. The technician providing the installation shall have completed an 8-Hour instructor led Electrical Safety Training Course with includes NFPA 70E material including the selection of personal protective equipment. No equipment shall be energized until all labels have been installed.

END OF SECTION

SECTION 260925

OCCUPANCY SENSORS FOR LIGHTING CONTROL

PART 1 GENERAL

1.01 SUBMITTALS

- A. Waiver of submittals: The "Waiver of Certain Submittals Requirements" in Section 013300 does not apply to this Section.
- B. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.
- C. Shop Drawings (For Sensor Systems):
 - 1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed (standard diagrams will not be accepted).
 - 2. Scale drawing for each area showing exact location of each sensor, switching module, and on-off-auto switch.
- D. Product Data: Catalog sheets, specifications and installation instructions.
 - 1. Include data for each sensor which:
 - a. Indicates where sensor is proposed to be installed.
 - b. Proves that the sensor is suitable for the proposed application.

1.02 MAINTENANCE

- A. Spare Parts:
 - 1. 1 of each switch module.

PART 2 PRODUCTS

2.01 OCCUPANCY SENSORS

- A. Ceiling Mounted Sensors:
 - 1. Advanced signal processing circuitry helps to eliminate false ONs.
 - 2. Utilizes advanced, omni-directional (360 degrees), Doppler technology for reliable occupancy detection.
 - 3. Angled transmitter and receiver pairs help optimize sensitivity while eliminating unwanted detection from ceiling air movement.
 - 4. Digital DIP switch time delay (15 seconds to 30 minutes).
 - 5. LED indicates occupancy detection.
 - 6. Reliable solid-state construction.
 - 7. Temperature and humidity resistant 32 kHz receivers.
 - 8. Mounts to ceiling tiles or box.
 - 9. Units per power pack: up to 4.
 - 10. UL listed.
 - 11. 5-year warranty.

- 12. Design Make: Pass & Seymour;
 - a) CSU600 (rooms less 500 square feet).
 - b) CSU1100 (rooms 500-1000 square feet).
 - c) CSU2200 (rooms 1000-2000sqare feet).

B. Vacancy Sensor:

- 1. Manual-ON operation. Auto adjustable time delays: automatic, fixed (5, 10, 15, 20, 25 or 30 minutes), walk-through, test-mode.
- 2. Selectable time delay automatically adjusts. Selectable walk-through mode turns lights off three minutes after the room is initially occupied if no motion is detected after the first 30 seconds. Selectable test mode allows quick and easy adjustments.
- 3. Selectable audible alert for impending shutoff.
- 4. LED indicating occupancy detection.
- 5. Built-in light level sensing with simple, one-step setup.
- 6. Override mode allows sensor to operate as a service switch in the event of a failure. NEMA WD 7 guideline utilized for coverage testing. Sensitivity adjustment: PIR (high/low).
- 7. Coverage: 180 degrees, up to 1050 sq. ft.; major motion 35' x 30'; minor motion 20' x 15'.
- 8. 5-year warranty.
- 9. Loads: Incandescent, fluorescent, compact fluorescent (CFL), magnetic low-voltage (MLV) and electronic low-voltage (ELV), 1/6 hp.
- 10. Design Make: Pass & Seymour OS300SW.

C. Dimmable Wall Switch Occupancy/Vacancy Sensor

- 1. For use with 0-10V, 4 wire, 120V and 277V dimming ballasts and drivers
- 2. Pressing and holding the UP button will ramp the lights up to the maximum value as determined by the high trim setting. Pressing and holding the DOWN button will dim the lights down to the minimum value as determined by the low trim setting. By default, the values are set at 100% (10v) for high trim and OFF (0v) for low trim.
- 3. Automatic-ON (Occupancy) or Manual-ON (Vacancy) operation. Refer to plans for Occupancy and Vacancy Sensor requirements and adjust dip switches accordingly to either Automatic-ON (Occupancy) or Manual-ON (Vacancy).
- 4. Adjustable time delay from 3, 5, 15 and 30 minutes.
- 5. Multi-way wiring available up to 4 sensors. All switches can sense each other's dimming events and respond accordingly.
- 6. 180 degree field of view for use in spaces no larger than 12' x 15'.
- 7. Design Make: Pass & Seymour PW-311.

D. Power Packs:

- 1. Provide power packs for low voltage control devices.
- 2. Universal Voltage Pack with 24 VDC operating voltage to low-voltage occupancy sensors and similar controls.
- 3. High-efficiency power supply and a high-current relay. Transformer with a primary high voltage input, and a secondary low-voltage output (24 VDC, 114 mA, with relay connected)

- 4. Secondary output will turn the connected load on and off automatically based on device input.
- 5. When the lighting system detects motion or inadequate ambient light, sensor shall electrically close an internal circuit which sends 24 VDC back to the Power Pack.
- 6. Design Make Pass & Seymour PWP series.

E. Dimming Photo Sensor:

- 1. The photosensor shall be a self-contained, ceiling-mounted daylighting control device that detects changes in light levels and raises or lowers electrical lighting in response.
- 2. The photosensor shall be a low voltage device, powered by 24 VDC voltage supplied by a power pack.
- 3. Design Make Pass & Seymour LS-301 series.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated.
- B. Adjust sensitivity so that controlled area is lighted when area is occupied.
- C. Adjust time delay so that controlled area remains lighted for 15 minutes after occupant leaves area.
- D. For sensors that are equipped with light level sensors, adjust light level setting so that lights are off when there is sufficient natural light.

3.02 FUNTIONAL TESTING

- A. Where Dimmers, Occupancy Sensors, time switches, programmable schedule controls, photo sensors are installed, the following procedures shall be performed:
 - 1. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance.
 - 2. Confirm that the time switches and programmable schedule controls are programmable to turn the lights off.
 - 3. Confirm that the placement and sensitivity adjustments for the photo sensor controls reduce electric light based on the amount of usable daylight in the space as specified.
- B. Contractor shall submit a written report to Director's Representative on results of each functional test on equipment installed. Report shall contain Director's Representative's signature.

END OF SECTION

SECTION 262212

TRANSFORMERS - DRY TYPE, UNDER 600V

PART 1 GENERAL

1.01 REFERENCES

A. NEMA, ANSI, IEEE, and UL.

1.02 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300 does not apply to this Section.
- B. Submittals Package:
 - 1. For Transformers Rated 75KVA and Below: Submit the product data, and quality control submittals specified below all at the same time as a package.
 - 2. For Transformers Rated over 75KVA: Submit the product data, and quality control submittals preliminary data specified below all at the same time as a package.
- C. Product Data: Catalog sheets, specifications and installation instructions.
- D. Quality Control Submittals:
 - 1. Transformers Rated 75KVA and Below: Submit certified report of the Company's routine commercial NEMA tests for each type transformer.
 - 2. Transformers Rated over 75KVA:
 - a. Preliminary Data: Submit certified report of the Company's standard tests for each type transformer.
 - b. Final Approval: After approval of preliminary data and after construction of transformers, make routine commercial NEMA tests at the factory on the actual transformers and submit certified test reports.
- E. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director's Representative.
 - 2. Energy Efficiency Rebate Documentation:
 - a. Deliver 2 copies of documentation to the Director's Representative showing the costs associated with purchase of any Energy Star labeled transformers.
 - 1) Submittal of confidential or proprietary documentation may be accommodated thru the rebate organization's legal declarations.
 - b. The documentation will be forwarded to Facility supervisory personnel for their use in pursuing energy efficiency rebate incentive funds that may be, or may become, available during the course of this Contract thru organizations such as:

1) New York State Energy Research and Development Authority (NYSERDA): New York Energy Smart program (518) 862-1090, www.nyserda.org.

1.03 DELIVERY, STORAGE AND HANDLING

A. Storage of Transformers: Provide supplemental heating devices, such as incandescent lamps or low wattage heaters within the enclosure or under a protective covering to control dampness. Maintain this protection from the time equipment is delivered to the site until it is energized.

PART 2 PRODUCTS

2.01 DRY TYPE TRANSFORMERS

- A. By Acme Electric Corp. Power Products Div., Cutler-Hammer Inc., General Electric Co., Jefferson Electric Inc., Niagara Transformer Corp., Sola/Hevi-Duty Unit of General Signal, or Square D Co.:
 - 1. Two winding insulating type construction.
 - 2. Labeled for EPA Energy Star Program (based on NEMA TP1 Guide for Determining Energy Efficiency for Distribution Transformers), except where a specific type of dry type transformer is indicated on the drawings.
 - 3. 80 Degree C. Rise Transformers (where indicated on the drawings).
 - a. Reduced average winding temperature rise of 80 degrees C. over 40 degrees C maximum ambient temperature with transformer utilizing a Class 220 insulation system.
 - 4. K Factor Rating (where indicated on the drawings):
 - a. Suitable for non-sinusoidal current load with K factor not to exceed standard K factor rating of 4 as indicated for each specific transformer.
 - 5. Enclosures For Transformers Installed In Dry Protected Locations (unless otherwise indicated):
 - a. Ventilated enclosure for transformers rated over 10KVA.
 - b. Enclosures for transformers rated 10KVA and under may be ventilated or non-ventilated.
 - 6. Mounting accessories.
 - 7. Lightning arresters connected to primary terminals of transformers where indicated on the drawings (arresters may be mounted in transformer enclosure or in a separate grounded sheet metal enclosure).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install dry type transformers where indicated on the drawings.

END OF SECTION

SECTION 263215

GASEOUS-ALTERNATOR ENGINE GENERATORS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Automatic Transfer Switch: Section 263623

1.02 SUMMARY

- A. Section includes packaged engine generators for emergency use with the following features:
 - 1. Natural gas engine
 - 2. Gaseous fuel system
 - 3. Control and monitoring
 - 4. Generator overcurrent and fault protection
 - 5. Generator, exciter, and voltage-regulator
 - 6. Outdoor generator-set enclosure
 - 7. Vibration isolation devices

B. Description of System:

- 1. The gaseous-alternator power system powers the entire facility in the event of failure of normal power source
- 2. In normal operation condition, the mechanism of the transfer switch s in the normal position and the gaseous-alternator unit shut down. Sequence of the transfer operation occurs as follows:
 - a. Upon signal from the automatic transfer switch, the gaseous-alternator unit automatically starts.
 - b. Complete transition from onset of normal service failure to gaseous-alternator power system transfer shall not exceed 10 seconds
 - c. The gaseous-alternator unit continues to run until the related automatic transfer stich signals for the unit shutdown.

C. Compliant with the following:

- 1. Listed by UL and designed to the standards of UL2200
- 2. Designed to NFPA 37, 70, 110

D. Definitions:

- 1. 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
- 2. LP: Liquefied petroleum
- 3. kW: Kilowatt
- 4. kVA: Kilo Volt-Ampere
- 5. pf: Power Factor

1.03 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300 does not apply to this Section.
- B. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below all at the same time as a package for preliminary approval. After preliminary approval, perform factory test and submit the factory test report for final approval.

C. Shop Drawings:

- 1. Show the construction (outline) of the gaseous-alternator unit and accessories
- 2. Installation details
- 3. Housing details including layout of equipment, raceways, piping, etc.

D. Product Data:

- 1. Catalog sheets, specifications and installation instructions.
- 2. Bill of materials
- 3. Detailed sequence of operations (format similar to 1.02 B. Description of System).
- 4. Company's data indicating fuel consumption with the unit operating at 1/2, 3/4 and full load (include fuel specifications).
- 5. Name, address and telephone number of nearest fully equipped service organization.

E. Quality Control Submittals

- 1. Design Data:
 - a. Company's data indicating HP, kW and kVA ratings with proof that the unit will meet the full load test without exceeding NEMA temperature rise specified at 100 percent full load.
 - b. Certified data from Company proving that the unit will meet the requirements of 1.02A Design Criteria
 - c. Torsional stress compatibility analysis for the proposed gas/alternator combination proving that the torsional stress will not exceed the specified limit.
 - d. Ampere requirements of the starting system (at the batteries specified minimum ambient temperature) during cranking.
 - 1) Include engine manufacturer's recommended battery ampere-hour capacity at the minimum ambient temperature condition for the specified duration and number of crank cycles.
 - 2) Include battery manufacturer's data proving that the batteries will meet the ampere-hour requirements at the batteries minimum ambient temperature.
 - 3) Include details of battery charger and battery rack recommended by battery manufacturer
- 2. Factory Test Report
- 3. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.

- b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
- c. Services and each product for which authorization is given by the Company, listed specifically for this project.

F. Contract Closeout Submittals:

- 1. Operation and Maintenance: Deliver 2 copies, covering the installed products, to the Director's Representative. Include name, address, and telephone number of nearest fully equipped service organization.
- 2. Test Report: System acceptance test report
- 3. Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.
- 4. Photographs
 - a. After completion of the work, take color photographs of the completed Work of this Section, as follows:
 - 1) 3 of gaseous-alternator unit from different positions
 - 2) 1 overall view of the gaseous-alternator unit
 - 3) Nameplate(s)
 - 4) Generator Main Circuit Breaker Life Safety
 - 5) Generator Main Circuit Breaker Optional Standby
 - 6) Generator Main Circuit Breaker Fire Pump
 - 7) Generator phase conductors
 - 8) Generator Bonding Jumper, Grounding Electrode Conductor, and Grounding Electrode.
 - b. Use a digital camera. Use wide angle lens for overall view. Use electronic flash capable of supplying sufficient light to evenly illuminate the overall subject.
 - c. Minimum digital requirements:
 - 1) Format shall be .jpg or .tif
 - 2) The resolution shall be minimum 12 Megapixels or greater.
 - d. Submit photographs to electronic submittal website for approval and record.

1.04 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - At the time of submission provide written notice to the Director of the intent to propose an "or equal" for products other than those specified.
 Make the "or equal" submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

- a. Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
- b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
- 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
- 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.
- B. Source Quality Control: The Company producing the gaseous-alternator unit shall have test facilities available which can demonstrate that the proposed system meets contract requirements.
- C. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 16 working hours for the following:
 - 1. Render advice regarding installation and final adjustment of the system.
 - 2. Witness final system test and then certify with an affidavit that the system is installed in accordance with the contract documents and manufacturer requirements, and is operating properly.
 - 3. Train facility personnel on the operation and maintenance of the system (minimum of two 2-hour sessions)
 - 4. Explain available service programs to facility supervisory personnel for their consideration.
- D. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

1.05 PROJECT CONDITIONS

A. The gaseous-alternator unit shall meet all requirements at the following elevation and ambient temperatures (actual site conditions)

- 1. Elevation above sea level: maximum 890 feet.
- 2. Maximum ambient temperature: 105 degrees F.
- 3. Minimum ambient temperature: -40 degrees F.

1.06 MAINTENANCE

A. Spare Parts:

- 1. Two sets of gaskets for routine maintenance.
- 2. Two spare heating elements for water jacket heater. Furnish spare water jacket heater if elements are not replaceable.
- 3. Set of belts.
- 4. Set of oil filter elements.
- 5. Set of fuel filter elements.
- 6. Set of air cleaner elements.
- 7. Hydrometer for testing anti-freeze solution.
- 8. Test kit for checking chemical condition of coolant.
- 9. One year supply of coolant conditioner.
- 10. Special tools if required for the regular maintenance and minor repairs of the unit.

PART 2 PRODUCTS

2.01 GASEOUS-ALTERNATOR UNIT

- A. Manufacturers: Acceptable Companies: Caterpillar Tractor Co., Cummins Engine Co. Inc., Kohler Co., Generac Power Systems Inc., MTU-Rolls Royce Power Systems Inc.
 - 1. Basis of Design: Generac SG230
 - 2. Source Limitations: Obtain packaged engine generators and auxiliary components through one source from a single manufacturer.
- B. Performance Requirements:
 - 1. UL Compliance: Comply with UL 2200.
 - 2. Compliance with NFPA 110 Level 1.
 - 3. Engine Exhaust Emissions: Comply with EPA requirements and applicable state and local government requirements.
 - 4. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage, or degradation of performance capability:
 - a. Elevation above sea level: maximum 890 feet.
 - b. Maximum ambient temperature: 105 degrees F.
 - c. Minimum ambient temperature: -40 degrees F.

C. Engine Generator Assembly Description

1. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

- 2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to the authorities having jurisdiction, and marked for intended location and use.
- 3. Power Rating: 230kW/288kVA
- 4. Frequency: 60 Hz5. Voltage: 277/480V
- 6. Phase: Three
 - Governor: Adjustable isochronous, with speed sensing
- 7. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.
- 8. Engine Generator Performance:
 - a. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
 - b. 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.
 - c. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
 - d. 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.
 - e. 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.
 - f. 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.
 - g. Start Time: <10 Seconds
 - h. Alternator K0250124Y21
 - 1) 480V @ 0.3pf 15% skVA
- D. Gaseous-Alternator Engine:
 - 1. Fuel: Natural Gas
 - 2. Rated Engine Speed: 1800 RPM
 - 3. Lubrication System: Engine or Skid-Mounted
 - a. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 - b. 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.
 - c. 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.

- 4. Cooling system: Closed loop, liquid-cooled, with radiator factory mounted on engine generator mounting frame and integral engine-driven coolant pump.
- 5. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anti-corrosion additives as recommended by engine manufacturer.
- 6. Temperature control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- 7. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system not to exceed engine manufacturer's engine back pressure requirements.
- 8. Starting System:
 - a. Components: Sized so they are not damaged during a full enginecranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
 - b. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least three times without recharging.
 - c. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
 - d. Battery Compartment: Factory-fabricated of metal with acidresistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F (10 deg C) regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.
 - e. Battery Stand: Factory-fabricated, two-tier metal with acidresistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
 - f. Battery Charger: Current-limiting, automatic-equalizing, and float charging type designed for lead-acid batteries. Unit shall comply with UL 1236.
- 9. Alternator Heater: Thermostatically controlled and sized to prevent condensation.
- 10. Engine Block Heater: Thermostatically controlled and sized by engine manufacture to maintain optimal engine temperature.
- 11. Oil Heater: Thermostatically controlled to maintain optimal oil temperature.

E. Gaseous Fuel System:

- 1. Natural Gas Piping: Comply with requirements in related sections.
 - a. Natural gas valves and piping.
- 2. Gas Train: Comply with NFPA 37.
- 3. Natural gas fuel valves, piping and fuel pressure regulator by PC.
- 4. Provide metal plaque ser in concrete pad near housing stating "Gas Fuel".

F. Control and Monitoring:

- 1. Remote Alarm Annunciator: An NFPA 110 compliant LED indicator light 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.
 - a. Overcrank alarm
 - b. High/low Battery Voltage
 - c. High engine temperature pre-alarm
 - d. High engine temperature alarm
 - e. Low lube oil pressure alarm
 - f. Overspeed alarm
 - g. Low fuel pre-alarm
 - h. Battery charger failure alarm
 - i. Generator Run indication
 - j. Contacts for local and remote common alarm
 - k. Audible-alarm silencing switch
 - 1. Not in automatic-position alarm
 - m. Low water level alarm
 - n. High/Low water temperature pre-alarm
 - o. High Water temperature alarm
 - p. System Ready
 - q. RPM sensor loss
 - r. Emergency stop
 - s. Utility/Generator Power (though ATS connection)
- 2. Remote Emergency-Stop Switch: Surface; wall-mounted (unless otherwise indicated); and labeled. Push button shall be protected from accidental operation.
- 3. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring require to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

G. Generator Overcurrent and Fault Protection:

- 1. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100% rated; complying with UL 489.
 - a. Tripping Characteristics: Designed specifically for generator protection.
 - b. Trip Rating: Matched to generator output rating.
 - c. Mounting: Adjacent to or integrated with control and monitoring panel
 - d. Lockable in the open position.

H. Generator, Exciter, and Voltage Regulator:

- 1. Comply with NEMA MG 1.
- 2. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be Permanent Magnet Excitation and rotated integrally with generator rotor.

- 3. Electrical insulation: Class H.
- 4. 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.
- 5. Enclosure: Drip-proof.
- 6. Instrument Transformers: Mounted within generator enclosure.
- 7. Voltage Regulator: Solid-state type, separate from exciter.
 - a. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
- 8. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

I. Outdoor Generator-Set Enclosure:

- 1. Description: Vandal-resistant, sound-attenuating, weatherproof steel housing, wind resistant up to 110mph. 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.
 - a. Sound Attenuation Level: 1.
 - 1) dBA target of 23 feet (7 meters)
- 2. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine generator components.
- 3. Muffler Location: Within enclosure.
- 4. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates with ambient temperature at top of range specified in system service conditions.
- 5. Interior Lights with Switch: Factory-wired, vapor-proof fixtures within housing; arranged to illuminate controls and accessible interior.
 - a. AC lighting system.
- 6. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.
- 7. Integral loadcenter/panelboard: 125A rated, 120/208V, 3-phase, 12 poles. 60A/3P breaker shall be provided in panel LS-L for loadcenter/panel feeder. All internal AC accessories factory wired to the panelboard.

J. Finishes

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

PART 3 EXECUTION

3.01 INSTALLATION

A. Connections: Make all connections to unit with flexible connections designed for the specific purpose.

B. Gaseous Fuel:

- 1. Gaseous fuel shall have characteristics as recommended by the generator manufacturer.
- C. Phase Relationship: Correctly phase normal and generator feeders so that motor rotation will not reverse upon transfer from normal to generator feeder.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed system (with the contract automatic transfer switch connected). Coordinate with automatic transfer switch company field advisor preliminary switch/system test requirements. Operate it long enough to assure that it is performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training Facility personnel.

B. System Acceptance Test:

- 1. Preparation: Coordinate test with automatic transfer switch manufacturer and notify the Director's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
- 2. Make the following tests:
 - a. Test each system function step by step as summarized under SYSTEM DESCRIPTION.
 - b. Test starting system and battery capacity. Crank engine for the required time and number of consecutive starting attempts.
 - c. Load Test: Using the facility system as load to the extent possible plus supplemental load banks, run the following test at rated voltage:
 - Four hours at full load. Provide supplemental load banks to bring load to full rating of gaseous-alternator unit (load not to exceed rating of unit). Connect the supplementary load banks to the secondary side of selected pad mounted transformers.
 - 2) During the test period take voltage, current, frequency and all engine instrument readings. Record results at the beginning and end of test and at fifteen minute intervals during test.
- 3. Supply equipment necessary for system adjustment and testing.
- 4. Submit written report of test results signed by Company Field Advisor and the Director's Representative. Mount a copy of the final report in a plexiglass enclosed frame assembly adjacent to the engine instrument panel.

END OF SECTION

SECTION 265160

LED FIXTURES

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. General Commissioning Requirements: Section 019113.
- B. Commissioning Process: Section AGCP in Appendix.

1.02 **DEFINITIONS**

- A. Retain terms that remain after this Section has been edited for a project.
- B. CCT: Correlated color temperature.
- C. CRI: Color Rendering Index.
- D. Fixture: See "Luminaire."
- E. IP: International Protection or Ingress Protection Rating.
- F. LED: Light-emitting diode.
- G. Lumen: Measured output of lamp and luminaire, or both.
- H. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.03 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 01330 does not apply to this Section.
- B. Product Data: Catalog sheets, specifications and installation instructions, including:
 - 1. For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes.
 - 2. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, driver, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

- 3. Physical description of lighting fixture including dimensions.
- 4. Emergency lighting units including battery and charger.
- 5. LED Driver, including certification data. Include data which proves proposed LED and driver combinations do not exceed specified total harmonic distortion.
- 6. Energy-efficiency data.
- 7. Life, output (lumens, CCT, and CRI), and energy-efficiency data for LED.

C. Quality Control and Assurance Submittals:

- 1. List of Installations for LED fixtures: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 1 year.
- Luminaire Photometric Data Testing Laboratory Qualifications:
 Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- 3. 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.
- 4. Comply with NFPA 70.

D. Informational Submittals:

- 1. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Lighting fixtures.
 - b. Suspended ceiling components.
 - c. Partitions and millwork that penetrate the ceiling or extends to within 12 inches (305 mm) of the plane of the luminaires.
 - d. Structural members to which suspension systems for lighting fixtures will be attached.
 - e. Other items in finished ceiling including the following:
 - 1) Air outlets and inlets.
 - 2) Speakers.
 - 3) Sprinklers.
 - 4) Smoke and fire detectors.
 - 5) Occupancy sensors.
 - 6) Access panels.
- 2. Qualification Data: For qualified agencies providing photometric data for lighting fixtures.
- 3. Product Certificates: For each type of driver for LED fixtures, from manufacturer.
- 4. Field quality-control reports.

E. Commissioning Documents:

- 1. Prefunctional checklists.
- 2. Functional test procedures.

F. Closeout submittals

- 1. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
- 2. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

G. Maintenance material submittals

- 1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- 2. Lamps: 5 for every 50 of each type and rating installed. Furnish at least one of each type.
- 3. Diffusers and Lenses: 5 for every 50 of each type and rating installed. Furnish at least one of each type.
- 4. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.04 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.05 **QUALITY ASSURANCE**

- A. Luminaire Photometric Data Testing Laboratory Qualifications:
 - 1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Retain first paragraph or second paragraph below, or both, for luminaires with integral lamps.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.07 WARRANTY

- A. Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for

first year, and prorated warranty for the remaining nine years.

B. LED Lighting fixtures: The manufacturer shall provide a warranty against loss of performance and defects in materials and workmanship for the Luminaires for a period of 10 years after acceptance of the Luminaires. Warranty shall cover all components comprising the luminaire including LED drivers. All warranty documentation shall be provided to customer prior to the first shipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.
 - 1. Provide products of the firms regularly engaged in the manufacture of recessed lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years. The manufacturer of the lighting fixtures shall comply with the provisions of the appropriate code and standards. All fixtures shall be pretested before shipping.
- B. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.
- C. Codes: Materials and installation shall be in accordance with the latest revision of the National Electrical Code and any applicable Federal, State, and local codes and regulations.
- UL or CSA US Listing: All fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the "Standards for Safety" to UL 1598 for luminaires, UL 924 for exit signs and emergency luminaires as they may be applicable. A listing shall be provided for each fixture type, and the appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.
- E. Luminaire shall be DLC Certified (Design Lights Consortium).
- F. Specifications and scale drawings are intended to convey the salient features, function and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary for the work.
- G. Base Bid Manufacturers: Are listed on fixture schedule. Manufacturers listed without accompanying catalog numbers are responsible for meeting the quality standards and photometric distribution set by the specified product.
- H. Alternate Manufacturers: Identification by means of manufacturers names and catalog numbers is to establish basic features, quality and performance standards. Any substitutions must meet or exceed these standards.

2.02 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.
- B. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit opening without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally when opened and when secured in operating position.

F. Electrical:

- 1. Power Consumption: Maximum power consumption, +/- 5% when operating at 120V
- 2. Operation Voltage The luminaire shall operate from a 60 HZ ± 3 HZ AC line over a voltage 120 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
- 3. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
- 4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage.
- 5. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference.
- 6. RF Interference: The luminaire and associated on-board circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
- 7. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.
- 8. All electrical components shall be RoHS compliant.

G. Thermal Management:

- 1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the warranty of the fixture.
- 2. The LED manufacturer's maximum junction temperature shall not be exceeded at the average operating ambient (25 degree celsius).

- 3. Any luminaire intended for recessed installation shall have an IC rating in accordance with UL 1598.
- 4. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

H. Diffusers:

- 1. Polycarbonate Lighting Diffusers: High resistance to impact, yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
 - b. UV stabilized.
- I. Factory-Applied Labels: Comply with UL 1598 (Luminaires) and UL 924 (Safety standard for Emergency lighting). Test according to IES LM-79 and LM-80. Include recommended LED and drivers. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp and ballast characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. LED and driver configuration, base type, and nominal wattage.
 - c. Control type and wiring diagram (such as 0-10).
 - d. CCT and CRI for all luminaires.

2.03 POWER SUPPY AND DRIVER FOR LED LAMPS

- A. General Requirements for Electronic driver:
 - 1. 120 volt operation voltage, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum. Driver shall not be "overdriven".
 - 2. Driver shall be suitable for full-range dimming. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100% to 5% of rated lumen output with a smooth shut off function. Dimming shall be controlled by a 0-10V signal.
 - 3. Driver shall be UL listed.
 - 4. Maximum stand-by power shall be 1 Watt.
 - 5. Driver disconnect shall be provided.
 - 6. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements
 - 7. The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A. Comply with UL 935 and with ANSI C82.11.

2.04 LED LAMPS

- A. Lumen Output minimum initial lumen output of the luminaire shall be for the lumens exiting the luminaire in the 0-90 degree zone as measured by IESNA Standard LM-79- 08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
- B. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours.
- C. Individual LEDs shall be connected such that a catastrophic loss of the failure of one LED will not result in the loss of the entire luminaire.
- D. LED Boards shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED boards shall be upgradable.
- E. Light Color/Quality
 - 1. CCT for project shall be 3500K in offices and 5000K in work areas unless otherwise noted on drawings and shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2-D CIE chromaticity chart.
 - 2. The CRI shall be 80 or greater
 - 3. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.

2.05 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 260529 "FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- C. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- E. Additional components:
 - 1. Plaster frames as required for installation of recessed and semi-recessed fixtures.
 - 2. Safety clips for fixtures installed in grid ceilings.
 - 3. End caps for individually mounted fixtures and end of continuous row fixtures.

- 4. Finishing collar or combination finishing collar/outlet box for surface mounted fixture used with exposed raceway:
 - a. Finishing Collar: Same finish and peripheral dimensions as the fixture base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.
 - b. Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the fixture base, gage or thickness of metal as required by National Electrical Code, including provisions for mounting and knockouts or threaded bosses for entrance of raceway.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 TEMPORARY LIGHTING

A. If approved by the Director's Representative, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.03 INSTALLATION

- A. Comply with NECA 1.
- B. Install fixtures at locations indicted on the drawings. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:

- 1. Secured to outlet box.
- 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
- 3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:

- 1. Attached to a minimum 20 gauge backing plate attached to wall structural members.
- 2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:

- 1. Ceiling Mount:
 - a. Minimum two, 5/32-inch diameter aircraft cable supports adjustable to 10 feet in length.
 - b. Pendant mount with 5/32-inch diameter aircraft cable supports adjustable to 10 feet in length.
 - c. Hook mount.
- 2. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
- 3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
- 4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
- 5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

- 1. Secure to any required outlet box.
- 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
- 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Fixture Used With Exposed Raceway):
 - 1. Provide finishing collar where surface mounted fixture is installed on an exposed raceway outlet box and the fixture base is larger than the outlet box.
 - 2. Provide combination finishing collar/outlet box where surface mounted fixture is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into fixture body due to fixture design.

3.04 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals.
- B. Install labels with panel and circuit numbers on concealed junction and outlet boxes.

3.05 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.06 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make one visit to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Director's Representative.

END OF SECTION

SECTION 265629

STREET LIGHTING AND GROUNDS LIGHTING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork: Section 310000.
- B. Cast-In-Place Concrete: Section 033001.
- C. General Commissioning Requirements: Section 019113.
- D. Commissioning Process: Section AGCP in Appendix.

1.02 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittals Requirements" in Section 013300 does not apply to the following products specified in this Section:
 - 1. Lighting standards.
 - 2. Luminaires.
 - 3. Bases.
- B. Product Data: Catalog sheets, specifications and installation instructions. Include candlepower distribution curves for each type fixture if different from Company or catalog number specified.
- C. Commissioning Documents:
 - 1. Prefunctional checklists.
 - 2. Functional test procedures.

1.03 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - At the time of submission provide written notice to the Director of the intent to propose an "or equal" for products other than those specified.
 Make the "or equal" submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

- a. Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
- b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
- 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
- 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

PART 2 PRODUCTS

2.01 LIGHTING STANDARDS

- A. 20 Foot Height: Aluminum, 5 inch round tapered shaft, Lithonia's Round Tapered Aluminum Standards, having:
 - 1. Finish to match luminaire.
 - 2. 0.125 inch wall thickness.
 - 3. Number and size of anchor bolts as recommended by lighting standard manufacturer. Threaded end hot dipped galvanized for a minimum of 10 inches. Galvanized nut, lockwasher and flatwasher with each bolt.
 - 4. Template for setting anchor bolts.
 - 5. One 1/8 inch and two 1/16 inch aluminum shims for each standard.
 - 6. Provisions for Luminaire Mounting:
 - a. Holes predrilled to accommodate direct arm mounted luminaires.
 - b. Pole top tenon to accommodate tenon mounted luminaires.
 - 7. Base cover attached to base with vandal resistant fasteners.
 - 8. Ground lug at base.

2.02 LUMINAIRES

- A. Type PLL-1: Lithonia Lighting D-Series Size 1 LED Area Luminaires, having:
 - 1. Thirty LEDs. 1050 drive current. 102W. Ballast shall be multiple tap for use on 120, 208, 240 and 277 volt circuits, capable of starting lamp at -40 degrees C.
 - 2. Luminaire connected for operation on 120 volt circuit, unless otherwise indicated on drawing.
 - 3. Mounting:
 - a. Direct arm mounted.
 - 4. LEDs, wattage as indicated on drawings:
 - a. P3 package.
 - 5. LEDs, wattage as indicated on drawings:
 - a. T4M, type 4 medium distribution.
 - 6. Bronze finish.
- B. Type PLL-2: Lithonia Lighting D-Series Size 1 LED Area Luminaires, having:
 - 1. Two (2) Thirty LEDs. 1050 drive current. 204W. Ballast shall be multiple tap for use on 120, 208, 240 and 277 volt circuits, capable of starting lamp at -40 degrees C.
 - 2. Luminaire connected for operation on 120 volt circuit, unless otherwise indicated on drawing.
 - 3. Mounting:
 - a. Direct arm mounted.
 - 4. LEDs, wattage as indicated on drawings:
 - a. P3 package.
 - 5. LEDs, wattage as indicated on drawings:
 - a. T4M, type 4 medium distribution.
 - 6. Bronze finish.

2.03 CONCRETE BASES

- A. As detailed on the drawings. Bases may be precast or poured in place.
- B. Location shown on drawings. Mount type FP luminaire per manufacturers recommendations.

2.04 RIGID FERROUS METAL CONDUIT AND FITTINGS

A. Steel, galvanized on the outside and inside (conduit enameled on the inside will not be accepted), UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit-Steel or Rigid Steel Conduit), as manufactured by Allied Tube & Conduit Corp., Midwest Electric, Occidental Coating Co., Robroy Industries Inc., Steelduct Conduit Products, Triangle PWC Inc., or Wheatland Tube Co.

2.05 RIGID NONMETALLIC CONDUIT

A. PVC Plastic Conduit and Fittings: Carlon Electrical Sciences Inc.'s Plus 40, Certain Teed Corp.'s Schedule 40, National Pipe Co.'s Schedule 40, or Queen City Plastic Inc.'s Schedule 40.

2.06 FUSE HOLDERS AND FUSES

A. Enclosed waterproof in-line fuse holders rated 600 volts, Bussmann Mfg. Div. McGraw-Edison Co.'s TRON waterproof fuseholder Symbol HEB with fuses rated 600 volts, Buss Symbol KTK.

2.07 TAGS

A. One-inch letters, embossed aluminum tags as manufactured by Emed Company Inc., Seton Name Plate Corp., or Tech Products, Inc.

2.08 **GROUT**

A. L&M Const. Chemicals Inc.'s Crystex, Protex Industries Inc.'s Propak, Sonneborn's Sonogrout, or U.S. Grout Corp.'s 5 Star Grout.

2.09 THRU WALL SEALING BUSHINGS

- A. For Walls Which Have or Will Have Membrane Waterproofing:
 - 1. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK thruwall seal and Type FSKA membrane clamp adapter.
 - 2. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM and Type CSMC with membrane clamp adapter.
- B. For Walls Which Will not Have Membrane Waterproofing:
 - 1. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK.
 - 2. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM or Thunderline Corp.'s Link-Seal.

2.10 SPLICE CONNECTORS FOR EQUIPMENT GROUNDING CONDUCTOR

- A. Exothermic Type Weld: Cadweld Process (Erico Products Inc. Cadweld Div.).
- B. Compression Connectors: Thomas & Betts Co.'s Grid and Ground Rod System.
- C. Indent Type: Burndy Corp.'s Hydent, or Thomas and Betts Corp.'s Compression Connectors.

2.11 INSULATED GROUNDING BUSHINGS

A. Appleton Electric Co.'s GIB-50 Series, Gould Inc.'s Efcor 56-50-8 Series, Midwest Electric Mfg. Corp.'s GLL Series, OZ-Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, or Thomas & Betts Corp.'s 3870 Series.

PART 3 EXECUTION

3.01 PREPARATION

A. Before installing any Work, lay out the proposed course for the conduits, location of lighting standards, etc. and have same approved.

3.02 INSTALLATION

- A. Lighting Standards:
 - 1. Install each lighting standard on concrete base.
 - Prepare a level surface on compacted earth, undisturbed earth or concrete footing. Set bases on the prepared surface. Have all bases checked and approved by the Director's Representative for level and elevation prior to making any conduit connections.
 - 3. Install lighting standards vertical.
 - a. Use 2 nuts on each anchor bolt. Run first nut down on the thread to the top of the foundation.
 - b. Install pole, run second nut down.
 - c. Adjust pole if necessary, then tighten nuts in accordance with pole manufacturer's recommendations.
 - d. Grout voids between metal base of lighting standard and concrete base. Create a drain through the grout by slipping a short length of conduit under the base in the wet grout, projecting it into the large drain hole in the base of the lighting standard. Rotate the conduit to finish the drain, then remove conduit.

B. Conduit System:

- 1. Use rigid ferrous metal conduit in all locations unless otherwise specified or indicated.
- 2. Rigid nonmetallic conduit may be used except:
 - a. Where conduits enter lighting standard bases, manholes or buildings (Use 10 foot length of rigid ferrous metal conduit at these locations).
 - b. Where conduits are jacked.
- 3. Depth: Unless otherwise indicated or directed, install conduits so that the top of the conduits are at least at the following depths:

	BELOW FINISHED GRADE (INCHES)	BELOW TOP SURFACES OF ROADS & PARKING LOTS (INCHES)
Rigid Ferrous Metal Conduit	24	24
Rigid Nonmetallic Conduit	24	30

- 4. Conduits Entering Buildings: Conduit entrances into building shall be watertight.
- 5. Cleaning Conduits: Take precautions to prevent foreign matter from entering conduits during installation. After installation, clean conduits with tools designed for the purpose.
- 6. Jacking Conduits: Rigid ferrous metal conduit may be jacked under roads, parking lots, etc. Submit jacking details for approval.
- 7. Concrete encasement is not required for street lighting and grounds lighting conduit system.

C. Grounding:

- 1. Provide a bare copper equipment grounding conductor (same size as phase conductors) installed within the conduit. Terminate and bond equipment grounding conductor with suitable fitting in panel.
- 2. Bond lighting standards, conduit and equipment grounding conductors in lighting standard base with indent type splice connectors, insulated grounding bushings and ground lug on standard.
- 3. Bond rigid ferrous metal conduit in manholes to the equipment grounding conductor.
- 4. Make grounding splice connections in manholes with exothermic type weld or compression connectors.
- D. Fuse Holder and Fuses: Install in base of each lighting standard an inline fuse holder and 5 ampere fuse for each ungrounded conductor. Install fuse holders so that fuse is not energized when fuse holder is uncoupled.
- E. Wiring Inside Lighting Standards: Install No. 8 AWG Type THW, XHHW, THWN or Type USE insulated conductors from fuse holder to luminaire.
- F. Tags: Install aluminum tags with lighting standard numbers thereon. Fasten tags to standards with tamperproof screws, 4 feet above finished grade, facing roadway.

END OF SECTION

SECTION 283101

PROTECTED PREMISES FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 REFERENCES

- A. Underwriters Laboratories Inc.
- B. National Fire Protection Association Standard 13 and 72.

1.02 **DEFINITIONS**

- A. Initiating Device Circuit: A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated. Example:
 - 1. Circuits from FACP to non-addressable signal initiating devices.
- B. Notification Appliance Circuit: A circuit or path directly connected to a notification appliance. Example:
 - 1. Circuits from FACP to notification appliances.
- C. Signaling Line Circuit: A circuit or path between any combination of circuit interfaces, control units, or transmitters over which multiple system input signals or output signals, or both are carried. Examples:
 - 1. Circuits from FACP to addressable devices.
- D. Operating Mode:
 - 1. Public Mode: Audible and visible signaling to occupants or inhabitants of the area protected by the fire alarm system.

1.03 SYSTEM DESCRIPTION

- A. The system operates as a multiplexed protected premises fire alarm monitoring and control system.
 - 1. In Building With One Fire Alarm Control Panel: Changes in the status of monitored points are indicated at the microprocessor based main fire alarm control panel (FACP).
 - a. The FACP continually monitors the communications and data processing cycles of the micro-processor. Upon FACP failure, an audible and visible alarm activates at the FACP.
 - 2. Smoke sensors act as intelligent and addressable devices. The smoke sensor converts the condition of its smoke sensing chamber to an analog value. This analog value is digitized and transmitted to the FACP.
 - a. Actual smoke density and temperature measurements are referenced from average sample measurements and are compared to programmable values of threshold sensitivity.

- b. Sensor "dirty" and "excessively dirty" trouble conditions are reported automatically through a maintenance advisory and alert program procedure.
- c. The system continuously performs an automatic self-test routine on each sensor that checks sensor electronics to ensure the accuracy of the values being transmitted to the FACP. Sensors that fail are identified and indicate a trouble condition.
- d. System automatically performs NFPA 72 sensor sensitivity testing by:
 - 1) Frequent routine individual sensor alarm simulation testing.
 - 2) Trouble signal when sensor is outside its acceptable sensitivity range.
- 3. System individually identifies each addressable initiating device and other addressable monitor functions using multiplexing techniques.
- 4. System is capable of individually operating each alarm notification appliance, and other control functions, using multiplexing techniques.
- 5. Alarms are processed by the system at 3 levels of priority:
 - a. Fire alarms, supervisory, and trouble signals take precedence in that respective order of priority, over all other signals.
 - b. Other alarms that require interaction by the attendant have the second level of priority.
 - c. Monitored points that do not require interaction by the attendant are the third level of priority.
- 6. Alarms, supervisory signals, and trouble signals are distinctively and descriptively annunciated.
 - a. Fire alarm signals are distinctive in sound from other signals, and this sound is not used for any other purpose.
 - b. Supervisory signals are distinctive in sound from other signals.
 - 1) System differentiates between supervisory device activation and trouble (wiring faults) on independent supervisory service initiating circuits.
 - c. Trouble signals are indicated by distinctive audible signals.

 Exception: The same sound may be used for both supervisory signal and trouble signal if distinction is made between signals by visible annunciation.
- 7. Switches for silencing audible trouble and supervisory signals transfers the audible signal to an identified lamp or other visible indicator adjacent to the switches. The visible indication persists until the condition has been corrected. The audible signal sounds when the switch is in its silence position and no trouble or supervisory condition exists.
 - a. Trouble silencing switch does not prevent sounding of supervisory signal. Subsequent supervisory signals from other zones causes the supervisory signal to resound. A switch left in the silence position where there is no supervisory off-normal signal operates a visible signal silence indicator and causes the trouble signal to sound until the switch is returned to normal.

- A silenced audible trouble signal resounds at programmable time intervals (every 24 hours or less) as a reminder that the trouble condition has not been corrected. Re-sounded signal is retransmitted to all locations required of the original trouble signal.
- 8. System visible and audible trouble signals and supervisory signals and visible indication of their restoration is indicated at the FACP.
 - a. Monitoring of ground fault conditions indicate a ground fault trouble condition at the FACP.
- 9. Access to the system functions are controlled thru at least 3 levels of access security to prevent program modifications or use by unauthorized personnel:
 - a. At the lowest level of access the system automatically receives, displays and prints alarms, and performs control-by-event life safety functions. The attendant has minimum access to the system functions:
 - 1) Alarm acknowledge.
 - 2) Print alarm summary.
 - 3) Silence alarms.
 - 4) Perform other basic system functions that require interaction by the attendant (cannot change program parameters).
 - b. At mid-level of access, the attendant may change user programmable parameters and print all summaries.
 - c. At the highest level of access, programs may be modified by the system manager (life safety control-by-event programs may be field or factory modified).
 - d. System access functions (log on, log off, access level authority) are displayed and printed with date, time, and person's name.
- 10. Summary reports are displayed and printed at the FACP upon appropriate function command. Active control points are identified by an assigned message. Spare control points are identified by a point number. The summary reports can be interrupted and terminated and the system returned to normal operation by a manual reset control or automatically if the system senses a change of status signal. The summary reports include:
 - a. Current Alarm, Trouble, and Supervisory Conditions: Lists all points not in normal state (print and display).
 - b. Alarm historical log report.
 - c. Trouble and supervisory historical log report.
 - d. All Points: Lists every point in the system and current status of the point (print only, display not required).
 - e. Control by Event Programs: Lists data for event-initiated programs (print only, display not required).
 - f. Control by Time Programs: Lists data for time-initiated programs (print only, display not required).
 - g. Diagnostics:
 - 1) Alarm verification cycles initiated by a smoke detector zone or individual smoke sensors.

- 2) Smoke sensor service report: Device number, device type, custom label, presently selected alarm set point information, present average value, present value, peak observed values, service status.
- 3) Smoke sensor status report: Device number, device type, custom label, present sensitivity in % for smoke sensors and in degrees for temperature sensors, present status, and sensor range (normal, almost dirty, dirty).
- 4) Devices that fail automatic tests.
- 5) Walk test reports.
- 11. Life safety control-by-event functions are retained in a non-volatile programmable memory and are not alterable through normal operation of the system.
 - a. The life safety control-by-event control points may be manually operated at any time by authorized personnel thru appropriate system commands.
- 12. User programmable control-by-event functions may be programmed thru appropriate system commands to automatically activate any user programmable control point upon a status change from any programmable monitor point.
 - a. The user programmable control-by-event control points may be manually operated at any time by the authorized personnel thru appropriate system commands.
- 13. User programmable parameters for automatic time-initiated functions (start/stop, on/off, secure/access, etc.) may be added, omitted and altered thru appropriate system commands.
 - a. The time-initiated user programmable control points may be manually operated at any time by authorized personnel thru appropriate system commands.
- 14. One person may test the system (walk test).
 - a. When in testing mode:
 - 1) Alarm activation of an initiating device circuit is silently logged as an alarm condition in the historical data file. The system automatically resets after logging each alarm.
 - 2) The momentary disconnection of an initiating device or notification appliance circuit is silently logged as a trouble condition in the historical data file. The system automatically resets after logging each trouble condition.
 - 3) The person testing the system may also choose to have the system activate the alarm notification appliances for a maximum of two seconds upon initiating device testing and a maximum of four seconds upon trouble condition testing.
 - 4) If in the test mode for an inappropriate (programmable) amount of time, the system automatically reverts to normal mode.
 - 5) The municipal or remote station connection is bypassed.
 - 6) The system shows a trouble condition.
 - 7) Control relay functions are bypassed.

- b. Testing groups allow portions of the system to be placed in test mode while the non-test groups remain in normal mode.
- B. The FACP activates immediately and performs its alarm functions upon receipt of system alarm condition thru actuation of automatic or manual initiating devices:
 - 1. The FACP sounds its audible alarm and illuminates its system alarm lamp or flashing display.
 - a. The audible alarm pulses until the system acknowledge button is depressed.
 - b. The system alarm lamp remains illuminated until the alarm condition has been corrected and the system reset.
 - 2. The FACP displays the point and type of alarm condition. Addressable devices are individually identified. Groups of non-addressable devices are identified by zones.
 - 3. The FACP prints the assigned message with date and time on the printer for the point in alarm. Assigned messages, date and time are also printed for the control-by-event functions activated by the point in alarm.
 - 4. The fire department is automatically called.
 - a. For system test, a switch in the FACP enables an authorized person to prevent a signal transmission to the fire department. When disconnected, a system trouble condition is indicated, also, a separate lamp illuminates indicating the disconnected mode.
 - 5. An authorized person at the FACP presses the acknowledge button which silences its audible alarm and causes a print-out and display of the assigned message for the point in alarm with date, time and an acknowledge prefix.
- C. Life Safety Control-By-Event Functions: The FACP immediately performs life safety control-by-event functions upon system alarm condition:
 - 1. Public mode audible alarm signals have a sound level of not less than 75 dBA at 10 feet nor more than 120 dBA at the minimum hearing distance from the audible appliance. Also, the audible signal has a sound level at least 15 dBA above the average ambient sound level or 5 dBA above the maximum sound level having a duration of at least 60 seconds (whichever is greater) measured 5 feet above the floor in each occupiable area.
 - 2. The system allows an authorized person to:
 - a. Silence any alarm signal in progress through a silence command, but subsequent actuation of initiating devices on other initiating device circuits or subsequent actuation of addressable initiating devices on signaling line circuits causes the system to resound the alarm.
 - 1) Silencing of an audible alarm does not cancel any visible zone alarm indicators.
 - 2) A silencing means that it is left in the "off" position when there is no alarm operates an audible trouble signal until the means is restored to normal.
 - b. Activate the alarm notification appliances on the floor.
 - 1) Visible indicators in the RAP at the FACP indicate on/off status of the alarm notification appliances.

- 3. Public mode visible alarm notification appliances illuminate and flash a fire warning signal.
 - a. Public mode flash rate does not exceed 2 flashes per second, nor less than one flash every second throughout the listed voltage range of the appliance.
 - 1) The maximum pulse duration is 0.2 seconds with a maximum duty cycle of 40 percent. The pulse duration is defined as the time interval between initial and final points of 10 percent of maximum signal.
- 4. Selected HVAC equipment (ventilating fans, air handling units, return fans, etc.) shut down.
 - a. Fire alarm zones are coordinated with the smoke control zones that they actuate.
 - 1) Fire alarm zone(s) activated by fire alarm system automatic or manual initiating devices (including sprinkler waterflow switch) causes HVAC equipment to shut down (or perform other required program operation) within the alarmed fire alarm zone(s) thru connection (network or other digital communication technique) to the direct digital building control system.
 - b. Actuation of air duct smoke detecting devices used solely for HVAC system shutdown sounds the alarm signal and activates all other FACP alarm functions.
 - c. Each air distribution system supply, return, and exhaust fan can be manually stopped by the attendant at the FACP during an emergency.
- 5. Smoke detectors listed for use in air distribution systems and located as indicated below, automatically stop their respective fan(s) on detecting the presence of smoke:
 - a. Downstream of the air filters and ahead of any branch connections in air supply systems having a capacity greater than 2000 ft.³/min.
- D. An authorized person manually resets the system at the FACP at conclusion of alarm condition. When an alarm condition is corrected, a print-out and display occurs at the FACP stating the assigned reset message for the point in alarm with the date, time and reset suffix.
 - 1. Manually resetting the system requires only one operation.
 - 2. Resetting the system does not disturb system control points or functions.
- E. Primary and Secondary Power Supplies:
 - 1. Failure of primary power supplies automatically transfers the affected portions of the system to the secondary power supplies:
 - a. Initiating, notification, print recording/printer, visible indication and supervisory functions of the system are transferred without loss to the secondary power supplies.
 - 1) Ground fault indication, and battery trouble conditions, are not required to transfer to the secondary power supplies.

- b. Audible and visible indication of alarm condition when operating system on secondary power supply is:
 - 1) Sounding of the FACP's audible alarm.
 - 2) Illumination of the FACP's system alarm lamp or flashing display.
 - 3) Display and printing of assigned message on printer at the FACP.
- 2. Utilizing the secondary battery power supplies, the system operates under maximum normal load conditions for 4 hours and then is capable of operating all alarm notification appliances used for evacuation for 5 minutes.
 - a. The secondary supply, in addition to the battery standby power supplies, also includes connection to an automatic starting gasalternator system that will operate the system for 24 hours.
- 3. Upon restoration of primary power supply, the system reverts to normal operation without loss, attendant intervention, or manual re-start procedures.
- F. Monitoring Integrity of Installation Conductors and Other Signaling Channels:
 - 1. Performance of Signaling Line Circuits:
 - a. Circuits from FACP: NFPA 72, Class A, Style 7. A print-out and display occurs to identify trouble conditions.
 - b. Circuits from FACP to Addressable Devices: NFPA 72, Class B, Style 4. A print-out and display occurs to identify trouble conditions.
 - Modem Unit Signaling Line Circuits from FACP: NFPA 72, Class B, Style 1. A print-out and display occurs to identify trouble conditions.
 - 2. Performance of Initiating Device Circuits:
 - a. Circuits from FACP to Initiating Devices (Fire Alarm, Sprinkler): NFPA 72, Class B, Style C. A print-out and display occurs to identify trouble conditions.
 - 3. Performance of Notification Appliance Circuits:
 - a. Circuits from FACP to Notification Appliances: NFPA 72, Class B, Style Y. A print-out and display occurs to identify trouble conditions.
 - 4. Monitoring Integrity of Power Supplies:
 - a. Primary and secondary power supplies are monitored for presence of voltage at the point of connection to the system. Failure of either supply results in a system trouble condition.
 - b. An audible and visible alarm, display and print-out indicates failure of the primary (main) power supplies, within the system, at the FACP.
 - c. The system also monitors the secondary (battery) power supplies for battery trouble conditions (low voltage/no batteries, high current and charging current).
- G. Interconnection of Fire Safety Control Functions:
 - 1. A listed relay or other listed appliance connected to the fire alarm system is used to initiate control of protected premises fire safety functions and is located within 3 feet of the controlled circuit or appliance.

- a. The installation wiring between the fire alarm control unit and the relay or other appliance is monitored for integrity.
- b. Relays and appliances that operate on loss of power are considered self-monitoring for integrity.
- 2. The method(s) of interconnection between the fire alarm system and controlled electrical and mechanical systems is monitored for integrity and is achieved by one of the following recognized means:
 - a. Electrical contacts listed for the connected load.
 - b. Listed digital data interfaces such as serial communication ports and gateways.
 - c. Other listed methods.
- 3. Fire safety functions do not interfere with other operations of the fire alarm system.
 - a. Fire safety function control devices and gateways are listed as compatible with the fire alarm control unit so as to prevent interference with control unit operation caused by controlled devices and to ensure transmission of data to operate the controlled devices.
- 4. Controls provided specifically for the purpose of manually overriding automatic fire safety functions provide visible indication of the status of the associated control circuits.
 - a. Status indicators for emergency equipment and fire safety functions are arranged to reflect the actual status of the associated equipment or function.
- H. Sprinkler System Alarm and Supervision:
 - 1. Flow of water through a waterflow fire alarm switch causes a system alarm.
 - 2. Supervision of sprinkler system signal attachments (sprinkler valve supervisory switches, pressure switches, etc.) are arranged to indicate circuit trouble and supervisory signal conditions at the FACP for each circuit.
 - a. Removal of covers from water flow alarm switches indicates trouble conditions at the FACP.
 - 3. Control valves in the sprinkler system are supervised to initiate 2 separate and distinct signals at the FACP, indicating movement of the valve from its normal position.
 - a. The off-normal signal is initiated during the first 2 revolutions of a hand wheel or during 1/5 of the travel distance of the valve control apparatus from its normal position.
 - b. The second signal indicates restoration of the valve to its normal position. (The off-normal signal remains until the valve is restored to its normal position).
- I. Supervision of All Fire Suppression Systems for Tampering:
 - 1. In addition to the specific supervision functions of each fire suppression system, each system also indicates trouble condition at the FACP whenever components of the system are tampered with, opened or removed, including:
 - a. Removal of covers from junction boxes on the outside of buildings.

- b. Valves installed in the connection between a signal attachment and the fire suppression system to which it is attached.
- c. Operation of disconnect switches that are used to allow system testing without activating the fire suppression system.

1.04 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300 does not apply to this Section.
- B. Submittals Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.
 - 1. Company Field Advisor Letter: With the submittals package include a letter from the Company Field Advisor stating that he/she has reviewed the Submittals Package for accuracy and completeness, and approves all materials and installation methods included in the Submittals Package.

C. Shop Drawings:

- 1. Composite wiring and/or schematic diagrams of the complete system as proposed to be installed (standard diagrams will not be acceptable).
 - a. Indicate circuits which are power-limited if power-limited wiring is proposed for use.
 - b. For 2-hour fire rated cable assemblies show proposed routes and installation details (include UL classification data, listing and system number).
 - c. Include transient surge and lightning protection grounding details for signaling line circuits, initiating device circuits, and ac power conductors entering and leaving each fire alarm control panel.

D. Product Data:

- 1. Catalog sheets, specifications and installation instructions.
- 2. Bill of materials.
- 3. Detailed description of system operation. Format similar to SYSTEM DESCRIPTION.
- 4. Sample procedure, programming and print-out for alarm, acknowledgment, and system reset.
- 5. Total electrical load of the complete system in supervisory and alarm conditions.
 - a. Include for each system component that utilizes batteries the battery ampere-hour capacity recommended for each component by the Company producing the system, for the specified duration.
- 6. Statement from the Company producing the system, for each size and type of single conductor and multiconductor cable proposed for use, indicating that the electrical characteristics meet the requirements of the Company.
- 7. Data from the Company furnishing the products, proving that detection devices that receive their power from the initiating device circuit or a signaling line circuit of a fire alarm control unit are UL listed for use with the control unit.

- a. Submit copy of the control unit "Installation Manual Wiring Diagrams" that were a part of the UL "UOJZ" approval process showing that the proposed products, circuits, and wiring diagrams are UL listed "Control Units System (UOJZ)" for use with the control panel.
- b. Submit data proving that the software and firmware is listed for use with the control panel.
- c. Submit data proving that the initiating devices are listed for the intended application. Also for specific applications, such as:
 - 1) Air duct smoke detecting devices, show listing indicating complete range of air velocity, temperature and humidity expected at the device when the air handling system is operated.
 - 2) Smoke detecting devices installed in supply air duct downstream of the fan and filters, show detector listed for the air velocity present.
 - 3) For smoke detecting devices installed in return air system, show listing for the air velocity present where the air leaves each smoke compartment, or in the duct system before the air enters the return air system common to more than one smoke compartment.
- d. Submit data proving that relays and appliances connected to the fire alarm system, which are used to initiate control of fire safety functions, are listed for the purpose.
- e. Submit data proving that the method(s) of monitoring the connection between the fire alarm system and controlled electrical and mechanical systems for integrity are listed for the purpose.
- 8. Detailed description of procedure proposed to test individual initiating devices.
 - a. Include product information pertaining to the test equipment that will be used to perform the tests.
 - b. Include certified statement that the proposed test method meets the test requirements of NFPA 72 and UL 268 (cite reference to the applicable NFPA and UL paragraphs).
- 9. Name, address and telephone number of nearest fully equipped service organization.
 - a. Include list of service technicians who are NICET Level II or higher Fire Alarm Systems certified.
- 10. State grade and number of leased telephone lines required for use with modem units.
 - a. Two (2) phone lines are required.

E. Quality Control Submittals:

- Copy of license required by New York State General Business Law Article
 6-D for installing Fire Alarm Systems.
 - a. Also include copy of identification card issued by the Licensee for each person who will be performing the Work.
- 2. Company Field Advisor Data: Include:
 - Advisor secured for the required services.

- b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
- c. Copy of NICET Letter of Approval indicating Level III or higher Fire Alarm Systems certification.
- d. Services and each product for which authorization is given by the Company, listed specifically for this project.

F. Contract Closeout Submittals:

- 1. System acceptance test report.
- 2. Certificates:
 - a. Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.
 - b. NFPA Record of Completion (NFPA 72 Figure 1-6.2.1).
- 3. Operation and Maintenance Data:
 - a. Deliver 2 copies, covering the installed products, to the Director's Representative. Include:
 - 1) Operation and maintenance data for each product.
 - 2) Complete point to point wiring diagrams of entire system as installed. Identify all conductors and show all terminations and splices. (Identification shall correspond to markers installed on each conductor.)
 - Name, address, and telephone number of nearest fully equipped service organization.

1.05 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - At the time of submission provide written notice to the Director of the intent to
 propose an "or equal" for products other than those specified. Make the "or
 equal" submission in a timely manner to allow the Director sufficient time to
 review the proposed product, perform inspections and witness test
 demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

- 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
- 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - Make arrangements with the test facility for the Director's
 Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
- 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.
- B. UL Listing: The system shall be listed in the UL Fire Protection Equipment Directory under product category "Control Units System (UOJZ)".
- C. Test Facility: The Company producing the system shall have test facilities available that can demonstrate that the proposed system meets contract requirements.
- D. Company Field Advisor: Company Field Advisor shall be National Institute for Certification in Engineering Technologies (NICET) certified as Level III or higher Fire Alarm Protection/Fire Alarm Systems Engineering Technician.
 - 1. Secure the services of a Company Field Advisor for a minimum of 16 working hours at the contract site for the following:
 - a. Render advice regarding installation and final adjustment of the system.
 - b. Assist in initial programming of the system.
 - c. Render advice on the suitability of each signal initiating device for its particular application.
 - d. Witness final system test and then certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.
 - e. Train facility personnel on the operation, programming and maintenance of the system (minimum of two 3-hour sessions).
 - f. Explain available service programs to facility supervisory personnel for their consideration.

1.06 MAINTENANCE

- A. Service Availability: A fully equipped service organization capable of guaranteeing response time within 4 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.
 - Service organization personnel shall include service technicians who are National Institute for Certification in Engineering Technologies (NICET) certified as Level II or higher Fire Alarm Protection/Fire Alarm System Engineering Technician.

- B. Spare Parts:
 - 1. 50 percent spare of each type fuse.
 - 2. 30 percent spare of each type lamp (except LED type).
 - 3. 10 percent spare of each type initiating device.
 - 4. 10 percent spare of each type notification appliance.
 - 5. 10 percent spare of each type protective device.
 - 6. Twelve rolls of paper for strip printer, Keltron 10S212.
 - 7. Four snap-in ribbon cassettes for strip printer, Keltron 10S220.

PART 2 PRODUCTS

2.01 MAIN FIRE ALARM CONROL PANEL

- A. Fire Alarm Control Panels: Edwards Kiddie FX-64, FX-1000, RZI16-2RS, Notifier's NFS-320, NFS2-640, NFS2-3030, Simplex's 4006, 4007ES, 4010ES, 4100ES:
 - 1. Base selection of each fire alarm control panel upon its capacity and capabilities to the specific requirements of the system at the panels' location.
 - 2. Permanently record the installed software and firmware version number within each fire alarm control panel.
 - 3. 14 gage metal cabinet. Size as recommended by the Company producing the system.
 - a. Control switches, inaccessible behind hinged and locked door.
 - b. Alarm display and lamps visible when door is closed.
 - 4. Annunciator (or display) that individually identifies addressable devices and identifies groups of non-addressable devices by zones.
 - 5. Do not load visible alarm appliance circuit outputs to more than 70 percent of the FACP's power limited rating.
 - 6. Input circuits suitable for operation on 120Vac primary (main) power supply and 24 Vdc secondary (battery) power supply.
 - 7. 24 Vdc Secondary (Battery) Power Supplies: Sealed, lead-acid gelled electrolyte or maintenance free lead-calcium batteries:
 - a. Ampere-hour capacity to operate under load conditions specified in SYSTEM DESCRIPTION.
 - b. Battery charger with charging characteristics as recommended by battery manufacturer.
 - c. Meters for battery voltage and charging current.
 - d. Batteries and charger integrally mounted or separate cabinet mounted as recommended by the company producing the system.
 - 8. Transient surge and lightning protection for signaling line circuits, initiating device circuits, and ac power conductors entering and leaving each fire alarm control panel:
 - a. City Connection Circuit Wiring (reverse polarity type): UL listed to Standard 497A; Edwards' ______, Notifier's _____, or Simplex's 2081-9045.
 - b. Signaling Line Circuits and Initiating Device Circuits: UL listed to Standard 497B; Edwards' LTP, Notifier's T11325-2M, or Simplex's 2081-9027, 2081-9028, 2081-9034, 2081-9043.

- c. AC Power Conductors: Edwards' TSP, Notifier's ______, or Simplex's 2081-9033, 2081-9042.
- 9. Strip printer mounted in FACP; Keltron 90 Series Alarm Printer (Kelton Corp., 101A First Avenue, Waltham, MA 02154 (716) 894-8710).
- B. Remote Auxiliary Power Supplies: Edwards' BPS, Notifier's FCPS-24, Simplex's 2080 Series:
 - 1. 14 gage surface mounted metal cabinet. Size as recommended by the Company producing the system.
 - 2. Control switches inaccessible behind hinged and locked door.
 - 3. Input circuit suitable for operation on 120Vac primary (main) power supply.
 - 4. Regulated and filtered 24 Vdc output.
 - 5. 24 Vdc Secondary (Standby) Power Supply: Sealed, lead-acid gelled electrolyte or maintenance free lead-calcium batteries:
 - a. Ampere-hour capacity to operate under load conditions specified in SYSTEM DESCRIPTION.
 - b. Battery charger with charging characteristics as recommended by battery manufacturer.
 - c. Meters for battery voltage and charging current.
 - d. Batteries and charger integrally mounted or separate cabinet mounted as recommended by the Company producing the system.
 - 6. Activated by host FACP via signaling line circuit loop thru addressable modules:
 - a. Addressable control monitor activates the power supply outputs.
 - b. Addressable monitor module senses power supply trouble conditions.
 - 7. Supervised power supply, battery, and notification appliance circuits.
- C. Remote Annunciator Panel (RAP's): Edwards' 2-3 ANN/D, 2-6 ANN/D, 3-ANN, Notifier's INA/ACS, or Simplex's Network Node Unit, with:
 - 1. Flush mounted enclosure.
 - 2. LCD that is capable of displaying all system points.
 - 3. Master enable/disable key switch for all control switches behind hinged and locked door having windows for visibility of system functions.
 - 4. Annunciator modules for visible indication of specific life safety control-byevent functions:
 - a. Status of alarm notification appliances.
 - 5. Annunciator modules for visible indication of specific user programmable control-by-event functions specified in SYSTEM DESCRIPTION. Identify each visible indicator with appropriate message.
 - 6. Switch modules for manual operation of specific life safety control-by-event control points:
 - a. Alarm notification appliances.
 - 7. Switch modules for manual operation of each user programmable controlby-event control point that is utilized for this project.
 - 8. Switch modules for manual operation of each user programmable automatic time-initiated control point that is utilized for this project.

2.02 INITIATING DEVICES

A. General:

- 1. Fire detection devices that receive their power from the initiating device circuit or a signaling line circuit of a fire alarm control unit shall be listed for use with the control unit.
- 2. Where individually identifiable (addressable) devices are required, but not available from the Company producing the system, either:
 - a. Use non-addressable devices and individually wire each device to the FACP's as separate monitor points, making each non-addressable device individually identifiable, or:
 - b. Employ remote addressable network modules to make each non-addressable device individually addressable.

B. Ceiling Mounted Sensors (Intelligent, Addressable, Analog):

- 1. General:
 - a. Ionization smoke sensors, and photoelectric smoke sensors shall have common mounting base that accommodates interchanging of the different type sensors.
- 2. Smoke Sensors:
 - a. Ionization Type: Edwards' SIGA-IS, Notifier's FSI-751, or Simplex's 4098-9716/9798.
 - b. Photoelectric Type: Edwards' SIGA-PS, Notifier's FSP-751, or Simplex's 4098-9714/9798.
 - c. Remote Alarm Indicator For Use With Smoke Sensors: Edwards' SIGA-LED, Notifier's RA-400, or Simplex's 4098-9782.
- 3. Carbon Monoxide Detector:
 - a. Detector shall be used to UL 2075 for gas and vapor detectors and sensors. Unit to be equipped with sounder and trouble relay. Provide dual color LED indication which blinks to indicate normal standby, alarm or end of life. Unit shall send a supervisory signal to the Central Monitoring Station. Unit operating voltage 12/24 VDC, 85 dB alarm signal. Provide fire alarm system monitor module to enable the detector to be addressable. Design make: System Sensor C01224TR.
- C. Air Duct Smoke Sensors (Intelligent, Addressable, Analog):
 - 1. Photoelectric Type: Edwards' SIGA-PS w/SIGA-DH, Notifier's FSD-751P, or Simplex's 4098-9752/3 with 4098-9714.
 - a. Listed for the air velocity present at each air duct smoke sensor's location.
 - b. Sampling tube to suit installation.
 - c. Local relay (for fire safety control functions from duct detector when applicable):
 - 1) Relay operation programmable from FACP.
 - 2) Form C contact(s) rated minimum 1A @ 28Vdc power-limited, 1/2A @ 120Vac nonpower-limited.
 - 3) 24Vdc auxiliary power circuit(s) as required to suit relay operation and function.

- 2. Remote Alarm Indicator For Use With Air Duct Smoke Sensors: LED type indicator mounted on single gang stainless steel faceplate.
- D. Manual Fire Alarm Boxes:
 - 1. Addressable:
 - a. Single Action Pull Type: Edwards' SIGA-270, Notifier's, NBG-12LX, or Simplex's 2099-9795.

2.03 NOTIFICATION APPLIANCES

- A. General:
 - 1. Provide UL 464 listed audible signal appliances:
 - a. Classified "Public Mode Only" to suit application.
 - b. Marked "F. A. Service" to suit application.
 - 2. Provide UL listed visible signal devices:
 - a. For public mode applications, UL 1971 "Signaling Devices for the Hearing Impaired".
 - b. For wall mounting or ceiling mounting to suit application.
- B. Combination Audible/Visible Appliances Wall Mounted:
 - 1. Type AV: Edwards' Genesis Series, Notifier's SpectrAlert Series, or Simplex's TrueAlert Series:
 - a. Xenon flashtube strobe:
 - 1) AV: Adjustable; 15, 30, 75, 95, 110, 135 & 185 candela.
 - b. Clear lens having FIRE imprinted thereon in red letters, or clear lens with red base having FIRE imprinted thereon in white letters.
 - c. Audible alarm notification appliance as indicated on the drawing.
 - 1) Horn.
 - 2) Speaker.
 - 3) Bell.
 - 4) Chime (Electro/Mechanical).
 - 5) Chime (Electronic).
 - d. Surface or flush wall mounted as indicated on the Drawings.
- C. Visible Appliances Wall Mounted:
 - 1. Type V: Edwards' Genesis Series, Notifier's SpectrAlert Series, or Simplex's TrueAlert Series:
 - a. Xenon flashtube strobe:
 - 1) V: Adjustable; 15, 30, 75, 95, 110, 135 & 185 candela.
 - b. Clear lens having FIRE imprinted thereon in red letters, or clear lens with red base having FIRE imprinted thereon in white letters.
 - c. Surface or flush wall mounted as indicated on the Drawings.

- D. Audible Appliances Wall Mounted:
 - 1. Horns:
 - a. Type H: Edwards' Genesis Series, Notifier's SpectrAlert Series, or Simplex's TrueAlert Series:
 - 1) Surface or flush wall mounted as indicated on the Drawings.

2.04 MODEM UNITS

- A. Modems: Edwards' SHM-M/SHM-F, Notifier's TP1-232, or Simplex's 4100-0131 FSK Series:
 - 1. Input circuit suitable for operation on 120 V ac primary (main) power supply and 24 V dc secondary (standby) power supply.
 - 2. Full duplex operation.
 - 3. UL-864 listing.
 - 4. Dedicated leased line operation.
 - 5. RS232C to DC converter.
 - 6. DC to RS232C converter.
 - 7. Recessed mounted cabinets, housing components of each unit.

2.05 TERMINAL STRIP CABINETS

A. Lockable, vandal resistant, surface mounted cabinets constructed of 14 gage steel, size as recommended by the Company producing the system. Equip cabinets with barrier type double screw terminals rated 300 V minimum, meeting UL 94 requirements for materials classed 94 V-0. Use identification strips, tags or labels to identify each conductor. Paint cabinets fire department red and stencil on front in 1/2 inch high white letters, the purpose of each terminal strip cabinet.

2.06 POWER-LIMITED FIRE ALARM CIRCUIT CONDUCTORS

- A. All electrical characteristics shall meet the requirements of the Company producing the system (conductor to conductor capacitance, dc resistance, velocity of propagation etc.).
- B. Label all circuits.
- C. No T-taps allowed.
- D. Multiconductor Cables NFPA 70 type FPLP, FPLR, FPL:
 - 1. Insulated copper conductors.
 - 2. Conductors twisted, shielded and jacketed as recommended by the Company producing the system.
 - 3. Voltage rating of not less than 300 volts (Voltage rating not marked on cable except where cable has multiple listings and voltage marking is required for one or more of the listings).
- E. Other types of cables may be used in accordance with NFPA 70 Table 760-61 "Cable Uses and Permitted Substitutions", as approved, if listed as being suitable for the purpose.

2.07 NON-POWER-LIMITED FIRE ALARM CIRCUIT CONDUCTORS

- A. All electrical characteristics shall meet the requirements of the Company producing the system (conductor to conductor capacitance, dc resistance, velocity of propagation, etc.).
- B. Conductors twisted, shielded and jacketed as recommended by the Company producing the system.
- C. Label all circuits.
- D. No T-taps allowed.
- E. Single Conductors:
 - 1. No. 18 and No. 16 AWG: Insulated copper conductors suitable for 600 volts, N.E.C. types KF-2, KFF-2, PAFF, PTFF, PF, PFF, PGF, PGFF, RFH-2, RFHH-2, RFHH-3, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, ZFF.
 - 2. Larger Than No. 16 AWG: Insulated copper conductors suitable for 600 volts, in compliance with NFPA 70 Article 310.
 - 3. Conductors with other types and thickness of insulation may be used if listed for nonpower-limited fire alarm circuit use.
- F. Multiconductor Cables NFPA 70 Types NPLFP, NPLFR, NPLF:
 - Conductors:
 - a. Conductor Sizes No. 18 and No. 16 AWG: Insulated copper conductors rated 600 volts, NFPA 70 types KF-2, KFF-2, PAFF, PTFF, PFF, PGF, PGFF, RFH-2, RFHH-2, RFHH-3, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, ZFF.
 - b. No. 14 AWG and Larger: Insulated copper conductors suitable for 600 volts, one of the types listed in NFPA 70 Table 310-13 or one that is identified for nonpower-limited fire alarm circuit use.
 - 2. Cable Listing and Marking: NPLFP, NPLFR, and NPLF marked to suit listings and may be marked with a maximum usage voltage rating of 150 volts.

2.08 MC CABLE

- A. Metal-Clad Cable, NFPA 70 Type MC:
 - 1. All electrical characteristics shall meet the requirements of the Company producing the system (conductor to conductor capacitance, dc resistance, velocity of propagation, etc.).
 - 2. Conductors twisted, shielded and jacketed as recommended by the Company producing the system.
 - 3. Interlocked flexible galvanized steel armor sheath conforming to UL requirements for Type MC metal clad cable.
 - 4. Insulated copper conductors suitable for 600 volts:
 - a. No. 18 and No. 16 AWG: A type listed in NFPA 70 Table 402-3 with a maximum operating temperature not less than 90°C, or types KF-2, KFF-2, PAF, PAFF, PTFF, PF, PFF, PGF, PGFF, PTF, PTFF, SF-2, SFF-2, ZF, ZFF.

- b. No. 14 AWG and Larger: One of the types listed in NFPA 70 Table 310-13 or of a type identified for use in Type MC cable.
- 5. Acceptable Companies: AFC Cable System, Inc., Coleman Cable Co.
- 6. Connectors for MC cable: AFC Fitting Inc.'s AFC Series, Arlington Industries Inc.'s Saddle Grip, or Thomas and Betts Co.'s Tite-Bite with antishort Bushings.

2.09 2-HOUR FIRE RATED CABLE ASSEMBLIES

- A. Fire Alarm Circuit Integrity (CI) Cable: Cables identified as meeting the requirements for circuit integrity shall have the additional classification using the suffix "CI". Examples: FPLP-CI, FPLR-CI, FPL-CI, NPLFP-CI, NPLFR-CI, NPLP-CI.
 - 1. Cables shall have a minimum 2-hour fire resistance rating for the cable when tested in accordance with the Standard for Tests of Fire Resistive Cables-UL 2196.
- B. Other 2-hour Fire Resistive Cables: Listed in UL Buildings Materials Directory, product category Electrical Circuit Protective Systems (FHIT), and Fire Resistive Cables (FHJR):
 - 1. Type MC/CI: Rockbestos Surprenant Cable Corp.'s VITALink MC Circuit Integrity Cable (FHIT System No. 17).
 - a. PVC jacketing.
 - 2. Type FPL/EMT: Rockbestos Surprenant Cable Corp.'s VITALink FA UL Listed Type FPL installed within 3/4" EMT steel conduit (FHIT System No. 22).

2.10 SIGNS, LABELS, MARKERS, AND NAMEPLATES

- A. Procedure Sign: Card holder with aluminum or stainless-steel frame, plexiglass front and sheet aluminum card backing plate. Minimum size card 8 x 10 inches. For each procedure sign furnish l blank card in holder and 5 spare blank cards suitable for typing future procedures thereon.
- B. Alarm Notification Locator: Card holder with aluminum or stainless-steel frame, plexiglass front and sheet aluminum card backing plate. Minimum size card 8 x 10 inches. Type on card the switch numbers and location of notification appliances controlled by each switch.
- C. Floor Locator: 8-1/2 x 11 inch (minimum) plan of the building floor plan. Show location of all major equipment associated with the system. Also show location of each manual fire alarm box. Enclose each floor plan in clear plastic envelope so that floor plans can be removed and updated.
- D. Wiring Diagram: One-line diagram showing interconnection of all major components associated with the system. Encase with aluminum or stainless-steel frame, and plexiglass front.

- E. Nameplates: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
 - 3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.
- F. Fire Alarm Signs: 9 x 12 inches, metal, with the words "FIRE ALARM" imprinted thereon in white letters upon a red background. Include a white arrow pointing down, left or right showing the route to, or actual location of the fire alarm stations. Frame the outside edges of the signs in red and white diagonal stripes.
 - 1. Sign Mounting Styles:
 - a. Single face for mounting flat against the wall.
 - b. Double faced for mounting extended from wall.

G. Markers:

- a. Premarked self-adhesive; W.H. Brady Co.'s B292, B708, Ideal Industries' Mylar/Cloth wire markers, or Markwick Corp.'s permanent wire markers, Plastic Extruded Parts Inc.'s Flexible Sleeve or ID Band Markers, or Thomas and Betts Co.'s E-Z Code WSL self-laminating.
- b. Other Styles: To suit application by W.H. Brady Co., Ideal Industries, Marwick Corp., Plastic Extruded Parts, Inc., or Thomas and Betts Co.

2.11 SYSTEM KEYING

A. All system locks, key switches, etc., shall operate with the same key.

2.12 ACCESSORIES

A. Include accessories required to perform the functions summarized in SYSTEM DESCRIPTION and indicated on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install system in accordance with the Company's printed instructions unless otherwise indicated.
- B. Do not install smoke detecting devices until the Work (including cleaning) of all trades in the area has been completed. Protect installed smoke detecting devices from airborne dust and debris.

C. Mount smoke detecting devices, and seal air holes in the back of the devices (including interior of raceways and holes associated with installation of boxes and raceways) so that air flow from inside of housing or from the periphery of the housing will not prevent entry of smoke during a fire or test condition. Seal air holes with gaskets, expanding silicone foam, or other sealants as approved.

D. Wiring For Survivability:

- Signals from manual fire alarm boxes and other fire alarm initiating devices
 within a building transmitted over the same signaling line circuit shall not
 interfere with the manual fire alarm box signals when both types of initiating
 devices are operated at the same time.
- 2. Failure of equipment or a fault on one or more installation wiring conductors of one notification appliance circuit shall not result in functional loss of any other notification appliance circuit.
- 3. Connect FACP and other system components requiring a primary power supply to dedicated branch circuits.
 - a. Do not connect FACP to a 2-pole device that can trip both poles at once, such as a 2 pole circuit breaker with handle tie (omit the tie).
- 4. Splices in wiring in vertical risers is prohibited.
- 5. Avoid splices in horizontal runs. When splices are necessary, use junction boxes. Exception: For 2-hour fire rated cable assembly, use UL listed methods to maintain 2-hour rating.
 - a. Make splices with mechanical or hydraulic type pressure connectors. The use of wire nuts is prohibited.
 - b. Paint cover of junction boxes fire department red.
- 6. Protect notification appliance circuits and other circuits necessary for the operation of the notification appliance circuits from the point at which they exit the fire alarm panel until the point that they enter the notification zone that they serve using one or more of the following methods:
 - a. A 2-hour rated cable assembly.
- 7. Wiring Class A, Style 6, 7, D, E, or Z Signaling Line Circuits, Initiating Device Circuits and Notification Appliance Circuits: Do not install both legs of Class A, Style 6, 7, D, E, or Z circuits in same cable assembly, enclosure, or raceway back to FACP.
 - a. Run return legs along another route to obtain maximum benefit of these alternate path circuits.

E. Identification, Labeling, Marking:

- 1. Procedure Sign: Install adjacent to FACP and remote annunciator (RAP).
- 2. Alarm Notification Appliance Locator: Install adjacent to RAP.
- 3. Floor Locator:
 - a. Install adjacent to FACP.
- 4. Nameplates:
 - a. Install on each manual fire alarm box a nameplate stating: Floor number, and location (1st Fl, east, etc.).
 - b. Install adjacent to RAP and switch module a nameplate indicating function of module.

- c. Label the device used as the circuit disconnecting means for the dedicated branch circuits serving the system "FIRE ALARM CIRCUIT CONTROL" with white letters on a red background.
- d. Install nameplate on each remote alarm indicator stating the location of its smoke detecting device and the area protected by the smoke detecting device and its function (IN DUCT SMOKE DETECTOR ALARM FOR).
- 5. Power-Limited Circuits: Mark circuits at terminations, indicating that circuit is a power-limited fire protective signaling circuit.
- 6. Fire Alarm Signs: Where directed, install 6 single face signs mounted flat against the wall at conspicuous locations, drawing attention to the manual fire alarm boxes. Fasten signs to walls with vandal resistant fasteners.
- 7. Identification of Circuits: Identify wires and cables by system and function in interconnection cabinets, and FACP's to which they connect with premarked, self-adhesive, wraparound type markers. Designations shall correspond with point-to-point wiring diagrams.
- 8. Battery Data: Insert a copy of the battery warranty in each battery compartment and mark on batteries the date placed in service.
- 9. Alarm Verification Warning Marking: Affix to the inside of each FACP, a list indicating:
 - a. Affected circuits.
 - b. Delay (seconds).
 - c. The smoke detector model numbers used.
- F. Fire Suppression Systems Signal Attachments:
 - 1. Wire tamper switches.
 - 2. Wire flow switches.
 - 3. Wire sprinkler system signal attachments.
- G. Protective Devices: Install where indicated on the drawings.
 - 1. Where devices are installed on wood or masonry surfaces, attach protective devices directly to the surface with vandal resistant fasteners.
 - 2. Where devices are installed on suspended ceiling provide additional supports in the ceiling, such as channel support system, angle iron or additional runner bars. Fasten the additional supports rigidly to the ceiling runner bar system. Attach frame or brackets of protective device to the supports with vandal resistant fasteners. Install metal spacers between the protective device frame and the supports so that the ceiling tiles will not be a part of the support system.
 - 3. Use finishing collar between surface and protective device where protective device cannot be mounted tight against surface due to job conditions.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed system and then operate it long enough to assure that it is performing properly.

- 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 - 1. Preparation: Notify the Director's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - 2. Supply all equipment necessary for system adjustment and testing.
 - 3. Make the following tests:
 - a. Test the system in accordance with NFPA 72, Chapter 7.
 - 1) Follow test methods stated in Table 7-2.2.
 - 2) Record results on NFPA 72 Figure 1-6.2.1 Record of Completion.
 - b. Test system operation step by step as summarized in SYSTEM DESCRIPTION.
 - 4. Submit written report of test results signed by Company Field Advisor and the Director's Representative. Also complete an NFPA Record of Completion.
 - a. Mount a copy of the written report of test results, and the NFPA 72 Record of Completion in plexiglass enclosed frame assemblies adjacent to the FACP (one framed assembly for each report).

3.03 INSULATED CONDUCTOR SCHEDULE - TYPES AND USE

- A. Signaling Line Circuits, Initiating Device Circuits and Notification Appliance Circuits:
 - 1. Power-Limited Circuits: For interior wiring (in raceways) use power-limited fire alarm circuit multiconductor cable types specified in PART 2 except where a 2-hour fire rated cable assembly is required.
 - a. Number of conductors and conductor size as recommended by the Company producing the system, except that conductor size shall not be less than No. 18 AWG for signaling line circuits and not less than No. 16 AWG for initiating device circuits and notification appliance circuits.
 - b. Using Nonpower-Limited Wiring On Power-Limited Circuits: Wiring size and types specified for nonpower-limited circuits may be used for power-limited circuits if power-limited circuits are reclassified and the power-limited markings are eliminated. Refer to NFPA 70 Article 760-52(a) Exception No. 3.
 - 2. Nonpower-Limited Circuits: For interior wiring (in raceways) use nonpower-limited fire alarm circuit single conductors or multiconductor cable types specified in PART 2 except where a 2-hour fire rated cable assembly is required.

- a. Number of conductors and conductor size as recommended by the Company producing the system, except that conductor size shall not be less than No. 18 AWG for signaling line circuits, not less than No. 16 AWG for initiating device circuits, and not less than No. 14 AWG for notification appliance circuits.
- 3. Where wiring is specifically indicated on drawings not to be run in raceway, use metal-clad cable type MC (concealed, unless otherwise indicated), except where a 2-hour fire rated cable assembly is required.
- B. Other Circuits for Which 2-Hour Fire Rated Cable Assembly is Specified or Indicated:
 - 1. Use CI cable in rigid steel conduit, MI cable, MC/CI cable or FPL/EMT.
 - a. Where MI or MC/CI cable is used and run in areas subjecting cable to corrosion, use PVC or HDPR jacketed cable (nonmetallic jacketed cable is not suitable for use in ducts, plenums or other spaces used for environmental air). Use nonmetallic jacketed cable in the following areas:
- C. Control Circuits: Associated with the Fire Alarm System: Use Class 1, 2, and 3 wiring specified in Section 260519.
- D. Primary Supply Circuits and Secondary Supply Wiring:
 - 1. Use electric light and power wiring specified in Section 260519.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-In-Place Concrete: Section 033001.

1.02 **DEFINITIONS**

- A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.
 - 1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
 - 2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
 - a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
 - b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
 - 3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
 - 4. Subbase: Select granular material or subbase course Type 2, which is placed immediately beneath pavement or concrete slabs.
 - 5. Foundation Bearing Grade: Grade/elevation at which the bottom-of-footings are constructed.
 - 6. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Standard Proctor).
 - 7. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 - 8. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
 - 9. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director.
 - 10. Grading Limit Line (Shown on Drawings): Limits of grading, excavations and filling required for the work of this contract. Unless specifically noted otherwise, the Grading Limit Line and Contract Limit Line shall be considered the same.

1.03 PROJECT CONDITIONS

- A. Protect existing trees and plants during performance of the Work. Box trees and plants indicated to remain within the grading limit lines with temporary steel fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.
- B. Cold Weather Requirements: When freezing temperatures are predicted, do not excavate to final required elevations for pipe, conduit or equipment requiring concrete work unless concrete can be placed immediately. Retain enough earth over the bottom elevation of excavations to prevent frost penetration.

PART 2 PRODUCTS

2.01 MATERIALS

A. Select Granular Material: Stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation and material requirements specified below:

Sieve		Dougont Dogging
Sieve Size	Size opening (mm)	Percent Passing
2 inch	50.8	100
1/4 inch	6.35	30-65
No. 40	0.425	5-40
No. 200	0.075	0-10

- 1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
- 2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
- 3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
- B. Subbase Course Type 2: Stockpiled, crushed ledge rock or approved blast furnace slag. Comply with the gradation and material requirements specified below:

Sieve		Dougont Dossing
Sieve Size	Size opening (mm)	Percent Passing
2 inch	50.8	100
1/4 inch	6.35	25-60
No. 40	0.425	5-40
No. 200	0.075	0-10

- 1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
- 2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
- 3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
- C. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Danaant Dassing
Sieve Size	Size opening (mm)	Percent Passing
4 inch	101.6	100
No. 40	0.425	0-70
No. 200	0.075	0-15

- D. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size shall not exceed 2/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, land fill, muck, and peat shall be considered unsuitable for fill and backfill, except topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.
- E. Cushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Donaont Dossing
Sieve Size	Size opening (mm)	Percent Passing
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

F. Pea Gravel: Comply with DOT Article 703-02 for screened gravel.

Sieve		Dougant Dossins
Sieve Size	Size opening (mm)	Percent Passing
1/2 inch	12.7	100
1/4 inch	6.35	90-100
1/8 inch	3.17	0-15
No. 200 Sieve	0.075	0-1

G. Item B-12: Equal Blend of No.1 and No. 2 Crushed Stone that complies with material requirements of DOT Article 703-02, crushed stone only.

Sieve		Dougout Dossing
Sieve Size	Size opening (mm)	Percent Passing
1-1/2 inch	38.1	100
1 inch	25.4	95-100
½ inch	12.7	45-60
½ inch	6.35	0-15

H. No. 1 Coarse Aggregate: Crushed Stone that complies with material requirements of DOT Article 703-02 and meets the following gradation.

Sieve		Damant Daming
Sieve Size	Size opening (mm)	Percent Passing
1 inch	25.4	100
1/2 inch	12.7	90-100
1/4 inch	6.35	0-15

I. No. 2 Crushed Stone: Comply with the applicable portions of DOT Article 703-02.

Sieve		Dougout Dossing
Sieve Size	Size opening (mm)	Percent Passing
1-1/2 inch	38.1	100
1 inch	25.4	90-100
1/2 inch	12.7	0-15

J. Marker Tape: FL Industries Blackburn/Holub's Type YT6, or Seton Nameplate Corporations Type 6 ELE, imprinted with message suited to item buried below.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clear and grub trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

3.02 REMOVAL OF TOPSOIL

- A. Remove existing topsoil from areas where excavation or fill is required.
- B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.
 - 1. Topsoil shall be tested prior to stockpiling. Stockpile only quantities of topsoil approved in writing for re-use. Dispose of excess topsoil as specified.

3.03 UNDERGROUND UTILITIES

A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.

3.04 EXCAVATION AND TRENCHING

- A. Excavate earth as required for the Work.
- B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings or as directed by local officials. If the erosion and sedimentation controls specified by the local officials are more stringent than those specified on the Contract Drawings contact the Director's Representative.
- Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).
 - Trenches: Deposit excavated material on one side of trench only. Trim banks of
 excavated material to prevent cave-ins and prevent material from falling or sliding
 into trench. Keep a clear footway between excavated material and trench edge.
 Maintain areas to allow free drainage of surface water.
- D. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade, and shape stockpiles for proper drainage as approved by the Director's Representative.
- E. Concrete Slabs, Floors, and Bases: Excavate to the following depths below bottom of concrete for addition of Subbase Course Type 2:
 - 1. Exterior: 12 inches unless otherwise indicated.
 - 2. Interior: 6 inches unless otherwise indicated.
- F. Conduit, and Cable: Provide sufficient trench width for installation and to accommodate special backfill when specified.
- G. Pavement: Excavate to subgrade surface elevation.
- H. Open Ditches: Cut ditches to cross sections and grades indicated.
- I. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.
 - 1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.

J. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.05 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and trenches. Pump out any accumulated water.
- B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.
- C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
- D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.06 PLACING FILL AND BACKFILL

- A. Surface Preparation of Fill Areas: Strip topsoil, remaining vegetation, and other deleterious materials prior to placement of fill. Break up or scarify old pavements to a maximum of 2 square feet. Prior to placement of fill, smooth out and compact areas where wheel rutting has occurred due to stripping or earthwork operations.
- B. Excavations: Backfill as promptly as Work permits, but not until completion of the following:
 - 1. Inspection, testing, approval, and recording locations of underground utilities.
 - 2. Removal of concrete formwork.
 - 3. Removal of trash and debris.
- C. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice. Do not backfill with excavated material unless it meets the requirements of this Section.
 - 1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum 6 inch thick (loose depth) layers.

- 2. For Open Graded Stone/Clean Stone (Item B-12, No. 1 crushed stone, No. 2 crushed stone, etc.) in access of six inches: Material must be wrapped in separation fabric.
- D. Under Exterior Concrete Slabs and Bases:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Place 12 inches of Subbase Course Type 2 over subgrade surface.
- E. Under Exterior Pavement and Walks:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Subbase Course Type 2 over subgrade surface.
- F. Under Interior Concrete Slabs and Bases:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Place 6 inches of Subbase Course Type 2 over subgrade surface
- G. Landscape Areas: Place suitable material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use material containing rocks over 4 inches in diameter within the top 12 inches of suitable material.
- H. Crushed Stone Areas Around Concrete Pads: Provide 6 inches minimum thickness of crushed stone around concrete pads extending to limits indicated.
- I. Rigid Nonmetallic Conduit: Except where concrete encasement is required place cushion material a minimum of 4 inches deep under conduit, 4 inches on both sides, and 12 inches above top of conduit. Complete balance of backfill as specified.
- J. Direct Burial Cable: Place sand a minimum of 6 inches deep under cable, 6 inches on either side, and 12 inches above top of cable. Complete balance of backfill as specified.
- K. Marker Tape: Install marker tape 4 inches below finish grade directly over the following:
 - 1. Direct burial cable.
 - 2. Conduit.

3.07 COMPACTION

- A. All materials with exception of open graded stone (No. 2 Coarse aggregate, No. 1 Coarse aggregate, Item B-12, etc.):
 - Compact each layer of fill and backfill for the following area classifications to the
 percentage of maximum density specified below and at a moisture content
 suitable to obtain the required densities, but at not less than three percent drier or
 more than two percent wetter than the optimum content as determined by ASTM
 D 698 (Standard Proctor).

- a. Concrete Slabs and Steps: 95 percent.
- b. Landscaped Areas: 90 percent.
- c. Pavements and Walks: 95 percent.
- d. Pipes and Tunnels: 95 percent.
- e. Pipe Bedding: 95 percent.
- 2. If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved
- B. Open graded Stone: Place material in maximum twelve inch lifts. Each lift shall be raked smooth and compacted through several passes of a walk behind vibratory roller. Compaction Testing is **not** required.

3.08 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract to a level 4 inches below the finish grades unless otherwise indicated. Provide a smooth uniform transition to adjacent areas.

3.09 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove from State Property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

3.10 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be recompacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.11 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION

SECTION 233113

METAL DUCTWORK

PART 1 GENERAL

1.01 REFERENCES

- A. American Conference of Governmental Industrial Hygienists (ACGIH).
- B. National Fire Protection Association (NFPA).
- C. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. General Commissioning Requirements: Section 019113.
- B. Commissioning Process: Section AGCP in Appendix.

1.03 SUBMITTALS

- A. Shop Drawings:
 - 1. Layouts for all areas.
 - 2. Layouts of mechanical equipment rooms.
 - 3. Details of intermediate structural steel members required to span main structural steel for the support of ductwork.
 - 4. Method of attachment of duct hangers to building construction.
 - 5. Coordinate shop drawings with related contracts prior to submission.
- B. Product Data: Material, gage, type of joints, sealing materials, and reinforcing for each duct size range, including sketches or SMACNA plate numbers for joints, method of fabrication and reinforcing.

1.04 QUALITY ASSURANCE

- A. SMACNA: Gages of materials, fabrication, reinforcement, sealing requirements, installation, and method of supporting ductwork shall be in accordance with the following SMACNA manuals, unless otherwise shown or specified:
 - 1. HVAC Duct Construction Standards.
- B. Conform to the applicable requirements of NFPA 90A, 90B, 91 and 101.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sheet Metal:

- 1. Aluminum: ASTM B-209, Alloy 3003, Temper H-14.
- 2. Galvanized Steel: ASTM A653, Class LFQ (lock forming quality), coating designation G-90.

B. Duct Hangers:

- 1. Strap Hangers: Same material as ducts, except that hangers for stainless steel ducts in unfinished spaces may be galvanized steel.
- 2. Rod Type Hangers: Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with 2 removable nuts each end for positioning and locking rod in place. Unless stainless steel, galvanized or cadmium plated; shop coat with metal primer.

C. Miscellaneous Fasteners and Upper Hanger Attachments:

- 1. Sheet Metal Screws, Machine Bolts and Nuts: Same material as duct, unless otherwise specified.
- Concrete Inserts: Steel or malleable iron, galvanized; continuously slotted or individual inserts conforming with MSS SP-58, Types 18 & 19, Class A-B.
- 3. C Clamps: Fee & Mason Co.'s 255L with locking nut, and 255S with retaining strap.
- 4. Metal Deck Ceiling Bolts: B-Line Systems, Inc.'s Fig. B3019.
- 5. Welding Studs: Erico Fastening Systems, capacitor discharge, low carbon steel, copper flashed.
- 6. Structural (carbon) Steel Shapes and Steel Plates: ASTM A36, shop primed.
- 7. Stainless Steel Shapes and Plates: ASTM A276 and ASTM A666.
- 8. Machine Bolt Expansion Anchors:
 - a. Non-caulking single unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 1.
 - b. Non-caulking double unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 2.
 - c. Self-drilling type: FS FF-S-325, Group III, Types 1 and 2.

2.02 FABRICATION - GENERAL

- A. Fabricate ductwork from galvanized sheet metal, except as follows:
 - 1. Fabricate the following ductwork from aluminum:
 - a. Exhaust ductwork from locker/shower areas.
- B. Dissimilar Metals: Separate dissimilar metals used for ductwork with 12 oz vinyl coated woven fiberglass duct connector fabric, such as Duro Dyne's Glasseal. No separation is required between screws or rivets and the materials in which they are inserted.

2.03 REGISTERS AND GRILLES INSTALLED IN EXPOSED DUCTWORK

- A. Frames are not required for registers and grilles installed directly in uninsulated exposed ductwork.
- B. Cut openings in ducts, forming a double thickness of metal, to attach registers or grilles with sheet metal screws. Bend back edges of openings into duct, on all 4 sides, a minimum of 1 inch to provide the thickness of metal stated above. Provide felt or sponge rubber gasketing, all 4 sides of duct openings, for supply grilles and supply registers.

2.04 AIR DIFFUSERS INSTALLED IN EXPOSED DUCTWORK

- A. Frames are not required for diffusers installed directly in uninsulated exposed ductwork.
- B. Cut and form openings in ducts, to accommodate the specified volume control damper and adjustable equalizing grid assembly. Reinforce openings as required and approved. Provide felt or sponge rubber gasketing, around duct opening, for supply diffuser assemblies.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Install ductwork to allow maximum headroom. Properly seam, brace, stiffen, support and render ducts mechanically airtight. Adjust ducts to suit job conditions. Dimensions may be changed as approved, if cross sectional area is maintained.
- B. Provide necessary transformation pieces, and flexible fabric connections for ductwork connected to air handling equipment or air inlet and outlet devices.

3.02 SEALING SEAMS, JOINTS, AND PENETRATIONS

A. Conform with Seal Class A for all ductwork for all pressure classes.

3.03 HANGERS FOR DUCTS, UNDER 2 INCHES W.G.

- A. Install hangers for ducts as specified in the SMACNA Manual, with the following exceptions:
 - 1. Rectangular ducts up to 42 inches wide, not having welded or soldered seams, and supported from overhead construction; extend strap hangers down over each side of the duct and turn under bottom of duct a minimum of 2 inches. Secure hanger to duct with 3 full thread sheet metal screws, one in the bottom and 2 in the side of the duct.
 - 2. Rectangular ducts 43 inches wide and over, and all sizes of duct with welded or soldered seams, and supported from overhead construction; use trapeze hangers.

3. Prime coat plain steel rods threaded at the site immediately after installation with metal primer.

3.04 UPPER HANGER ATTACHMENTS

A. General:

- 1. Secure upper hanger attachments to structural steel or steel bar joists wherever possible.
- 2. Do not use drive-on beam clamps, flat bars or bent rods, as upper hanger attachments.
- 3. Do not attach hangers to steel decks which are not to receive concrete fill.
- 4. Do not attach hangers to precast concrete planks less than 2-3/4 inches thick.
- 5. Avoid damage to reinforcing members in concrete construction.
- 6. Metallic fasteners installed with electrically operated or powder driven tools may be used as upper hanger attachments, in accordance with the SMACNA Manual, with the following exceptions:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.
- B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by ductwork support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 - 1. Secure upper hanger attachments to steel bar joists at panel points of joists.
 - 2. Do not drill holes in main structural steel members.

END OF SECTION

SECTION 233300

DUCTWORK ACCESSORIES

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Metal Ductwork: Section 233113.

1.02 REFERENCES

- A. ACGIH: American Conference of Governmental Industrial Hygienists.
- B. AMCA: Air Movement and Control Association.
- C. NFPA: National Fire Protection Association.
- D. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.
- E. UL: Underwriters Laboratories, Inc.

1.03 SUBMITTALS

A. Product Data: Catalog sheets, diagrams, standard schematic drawings, and installation instructions for each manufactured product. Submit SMACNA Figure Numbers for each shop fabricated item.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Unless otherwise shown or specified, comply with the applicable requirements of the following:
 - a. SMACNA: Gages of materials, fabrication, sealing, and installation shall be in accordance with the SMACNA Manuals.
 - 1) HVAC Duct Construction Standards.
 - b. AMCA: Certify damper and/or louver ratings in accordance with AMCA 511.
 - c. NFPA: Standards Nos. 90A, 90B, 91, 96, and 101.
 - d. UL: Standards No. UL181, UL555, and UL555S.

1.05 MAINTENANCE

- A. Special Tools:
 - 1. One bar deflection key for every five supply grilles and/or every five return grilles.
 - 2. One operator key for every five supply registers and/or every 5 return or exhaust registers.

3. Two keys or socket wrenches for each type of damper adjustment screw or device on manual damper regulators.

PART 2 PRODUCTS

2.01 GRILLES AND REGISTERS

- A. Unless otherwise specified, fabricate grille and register faces, and frames of steel with factory applied white baked-on enamel.
- B. Fabricate grille, register faces, and frames of aluminum with an etched and acrylic coated finish when installed in shower area.
- C. Supply, Return, and Exhaust Registers (S-2, R-2, E-2): Fixed single deflection type.
 - 1. Register Face: 20 gage construction of same material as bars.
 - 2. Face Bars/Vanes: Installed in register face.
 - a. Deflection Angle: 35 degrees.
 - b. Nominal Bar/Vane Spacing: 0.66 inch or 0.75 inch on center.
 - c. Sidewall registers shall have horizontal face bars/vanes.
 - 3. Damper Assembly: Opposed multi-blade type consisting of frame or screwdriver slot blades, and key operated movement of the locking type.
 - a. Operators: Key operated type projecting through frame or screwdriver slot. Operator keys are removable or may be permanently driven in place, as directed.
- D. Perforated Registers (R-1, E-1): Aluminum perforated face plate and 3/16 inch holes on 1/4 inch staggered centers.
 - 1. Removable flush face.
 - 2. Minimum 51% free area.
 - 3. Back pan shall be one piece stamped heavy gauge aluminum.
 - 4. Diffuser neck shall have 1 1/8" depth for duct connection.
 - 5. Opposed blade damper operable from face.

2.02 AIR DIFFUSERS

- A. Unless otherwise specified, fabricate diffusers of aluminum with factory-applied finish as follows:
 - 1. Baked-on white enamel for installation in suspended lay-in tile ceilings.
- B. General:
 - 1. Roll or round and reinforce all exposed edges of diffusers.
 - 2. Internal diffuser parts shall be readily removable to permit cleaning and access to ducts.
 - 3. Design removable parts and assemblies so that they cannot be reassembled in a manner that would produce an incorrect air distribution pattern.
 - 4. Secure internal assemblies with fasteners that allow removal without use of special tools.
 - 5. Do not use neck or duct connection sizes indicated to size diffusers.

- 6. Complete with volume control damper and adjustable equalizing grid, fabricated of same material and with same finish as diffuser.
- 7. Damper shall be adjustable by means of operator handle and rod device, which is designed to be locked in any position, and is operable from diffuser face.

C. Square Diffusers (S-1):

- Construction:
 - a. Diffusers shall consist of a seamless, one-piece, precision formed backpan that incorporates a round inlet collar of sufficient length for connecting rigid or flexible duct.
 - b. An inner plaque assembly shall be incorporated and shall drop no more than ¼ inch below the ceiling plane to assure proper air distribution performance.
 - c. The inner plaque assembly shall be completely removable from the room side to allow for full access to any dampers or other ductwork components located near the diffuser neck.
 - d. The diffuser shall integrate with all duct sizes shown on the plans without affecting the face size and appearance of the unit.
 - e. The face panel shall have smooth edges and rounded corners to blend with the back cone.
- 2. Paint Specification:
 - a. All components shall have a baked-on powder coat finish.
- 3. Mounting Frame:
 - a. The diffuser mounting frame shall be suitable for lay-in or surface mount applications.
- 4. Accessories:
 - a. The diffuser shall be supplied with a steel volume control damper.

2.03 DAMPERS

- A. Control Dampers (Aluminum):
 - 1. Types:
 - a. Standard Damper: 3.2cfm/sq ft maximum leakage rate at 2000 fpm and 1 inch wg for 48 inch wide damper (based on AMCA 500).
 - b. Low Leakage: 2.7 cfm/sq ft maximum leakage rate at 4000 fpm and 1 inch wg for 48 inch wide damper (based on AMCA 500).
 - 2. Frame: Extruded aluminum hat channel, 1/8 inch thick, and mounting flanges, and welded joints.
 - a. Frame Size:
 - 1) Dampers 12 inches high and under: 5 inches x 1/2 inch top and bottom frames.
 - 2) Dampers over 12 inches high: 5 inches x 1 inch
 - 3. Blades:
 - a. Standard Damper: Constructed of 1/8 inch thick extruded aluminum with replaceable extruded vinyl double edge blade seals mechanically locked into extruded blade slots.

- b. Low Leakage Damper: Airfoil type constructed of 0.71 thick extruded aluminum, with integral reinforcing tube running full length of blade, and replaceable extruded vinyl double edge blade seals mechanically locked into extruded blade slots.
- c. Blade Action:
 - 1) Modulating Dampers: Opposed blade.
 - 2) Fully Open/Fully Closed Dampers: Parallel blade.
- d. Single blade dampers are acceptable for ducts up to 14 inches high.
- 4. Axles: 1/2 inch plated steel hex positively locked to blade and connected to frame through extruded hole with molded synthetic sleeve bearings.
- 5. Jamb Seals: Flexible metal compression type.
- 6. Damper Operation: Electric motor operated. Weld actuator mounting bracket to damper frame.
- 7. Linkage:
 - a. Single Section Dampers: In-frame fixed type with removable 1/2 inch dia control shaft extending 6 inches from damper frame.
 - b. Multiple Section Dampers: On-blade fixed type with factory installed jackshaft.
- 8. Finish: Mill.

B. Insulated Control Dampers:

- 1. Low Leakage Type: Class I motorized, leakage rated damper with a maximum leakage rate of 4 CFM per square foot at 1.0 inch water gauge when tested in accordance with AMCA 500D.
 - a. Frame: 16 gage galvanized steel hat channel, minimum 4 inches wide, with corner braces, and welded joints.
 - b. Blades: Double skin, 16 gage galvanized steel insulated with one inch thick fiberglass, with vinyl edge seals, and longitudinal reinforcing grooves.
 - c. Blade Action:
 - 1) Volume Control Dampers: Opposed blade.
 - 2) Fresh Air and Make-up Air Control Dampers Interlocked with Exhaust Fans: Parallel blade.
 - d. Axles: Minimum 7/16 inch plated steel hex positively locked to blade, and connected to frame through extruded hole with molded synthetic sleeve bearings.
 - e. Jamb Seals: Flexible metal compression type.
 - f. Damper Operation: Electric motor operated. Weld actuator mounting bracket to frame.
 - g. Linkage:
 - 1) Single Section Dampers: In-frame fixed type with removable 1/2 inch dia control shaft extending 6 inches from damper and outboard support bearing.
 - 2) Multiple Section Dampers: On-blade fixed type with factory installed jackshaft.
 - h. Finish: Mill galvanized.

- C. Manual Damper Regulators:
 - 1. For Dampers Installed in Exposed, or Accessible Concealed Ductwork: Indicating quadrant with heavy metal extended stem (for insulation) handle and means for locking damper in all positions.
- D. Fire Dampers, Dynamic Systems:
 - 1. UL Classified and Labeled:
 - a. Mark dampers in accordance with UL555, including but not limited to the following:
 - 1) Fire Damper, 1-1/2 hr fire resistance rating.
 - 2) For use in dynamic systems.
 - 3) Maximum rated air flow and pressure difference across damper.
 - 4) Directional arrow indicating air flow.
 - 5) Mounting position (horizontal or vertical, or both).
 - 2. Acceptable Manufacturers:
 - a. Air Balance, Inc., or Ruskin Manufacturing Div., Phillips Industries.
 - 1) Furnish Style, or Type B (blades out of air stream when damper in open position).

2.04 DAMPER ACTUATORS

- A. Acceptable Manufacturers: Johnson Controls, Inc., Belimo, and Seimens.
- B. Electric/Electronic Type:
 - 1. Positive positioning, spring return, and sized in accordance with actuator manufacturer's printed recommendations for each damper size.
 - 2. Actuators for outdoor dampers shall fail closed upon loss of electric power.
 - 3. Actuator Response: Linear in response to sensed load.
 - 4. Voltage: 120 VAC or 24 VAC.
 - 5. Actuator Timing:
 - a. Open Damper: 90 seconds.
 - b. Spring Return: 30 seconds.
 - c. Spring Close: 30 seconds.
- C. Hydraulic, thermodynamic and battery type actuators are not acceptable.
- D. Auxiliary End Switches: Required on electric/electronic actuators for the following applications:
 - 1. 100 percent Outside Air Systems: Outside air damper switch delays start of unit until damper is open. Set switch to start unit when damper is 50 percent open.
 - 2. In-line Exhaust Fan Systems (Over 500 cfm): Exhaust damper switch delays start of fan until damper is open.

2.05 TURNING VANE ASSEMBLIES

- A. Fabricate vane assemblies of same material as ductwork in which installed.
 - 1. Vanes: Individual hollow airfoil type, rigidly connected to vane rails.
 - 2. Weld, screw, or rivet rails to ductwork.

2.06 FLEXIBLE CONNECTIONS - FABRIC

- A. Static Pressures under 6 inches WG: Woven Fiberglass fabric with Hypalon coating; similar to Duro Dyne Corp.'s Durolon.
- B. Factory prefabricated and pre-assembled connectors of fabric materials specified above are acceptable with minimum 24 gage galvanized steel edges similar to Duro Dyne Corp.'s Metal-Fab or Super Metal-Fab as required by free fabric length.

2.07 GASKET MATERIAL

- A. Registers, Grilles, and Diffusers Installed in Exposed, Uninsulated Ductwork: 1/4 inch thick felt or sponge rubber material, of width as required by flange.
- B. Flanged Joints in Ducts: 1/8 inch thick reinforced inert plastic of the self-conforming type, of same width as flange.

2.08 SEALANTS

- A. Acceptable Manufacturers: Duro Dyne Corp.; Foster Products Div., H.B. Fuller Co.; Hardcast Inc.; United Sheet Metal Div., United McGill Corp.
- B. U.L. Listed adhesives (liquid or mastic), scrim, tapes, or combinations thereof, as required for pressure class; suitable for system operating temperatures; compatible with media conveyed within, insulation (if any), and ambient conditions.

2.09 FLEXIBLE DUCT

- A. Conform to NFPA 90A, and UL181 Class I:
 - 1. Uninsulated Type: Factory assembled duct consisting of continuous, seamless, metalized polyester tear resistant duct with encapsulated steel helix.
 - 2. Pre-insulated Type: Factory assembled.
 - a. Internal Core: Continuous material suitable for service, with encapsulated steel helix that completely shields fiberglass insulation from air stream.
 - b. Outer Vapor Barrier Jacket: Seamless, tear resistant metalized polyester.
 - 3. Operating Conditions:
 - a. Maximum Operating Temperature: 125 degrees F.
 - b. Maximum Operating Static Pressure (Positive): 3 inch wg.
 - c. Maximum Operating Static Pressure (Negative): 2 inch wg.
 - d. Maximum Air Velocity: 1500 fpm.

4. Metal Clamps: Stainless steel with cadmium plated hex bolt.

2.10 DUCT ACCESS DOORS

- A. Prefabricated or Fabricated at Site: Minimum 12 x 12 inch size, of same material and finish as duct unless otherwise shown or specified.
 - 1. For uninsulated duct designed for under two inches wg: Fabricate single panel door of same gage as duct, with all edges folded, size door to overlap opening perimeter by one inch.
 - 2. For insulated duct and duct designed for two inches wg and over: Fabricate hollow metal doors in accordance with the SMACNA Manual. Fill void in doors for insulated duct with thermally equivalent insulation.
 - 3. Gasketing: A 3/4 inch wide, 1/8 inch thick urethane gasket, around all four sides of duct opening.
 - a. Exception: Where access doors are required by NFPA 96 in cooking equipment exhaust ductwork, gasket with Fibrefrax Grade 110 paper by Carborundum Co.

B. Access Door Hardware:

- 1. Piano Hinges: Galvanized steel with brass pins, continuous type, full height of door.
- 2. Butt Hinges: Galvanized steel with brass pins, approximately 2 inches x 1-9/16 inches wide for doors under 24 inches high and 3 inches x 2 inches wide for doors over 24 inches and higher.
- 3. Sash Locks: Galvanized, cadmium plated, or aluminized steel or cast aluminum.
- 4. Door Latches: Ventfabrics, Inc. Ventlock No. 260 or Duro Dyne Corp. Code No. SP-20 Series.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Unless otherwise shown or specified, install the Work of this Section in accordance with the manufacturer's printed installation instructions and the SMACNA Manual.

3.02 FLEXIBLE FABRIC CONNECTORS (INSTALLATION)

- A. Make ductwork connections to air handling equipment with flexible fabric connectors. Install connectors with sufficient slack to prevent vibration transmission.
- B. Free Fabric Length: Install fabric connectors a minimum of three inches in length for ducts having a maximum diameter of 18 inches, or maximum side dimension of 30 inches, and a minimum of five inches in length for duct diameters over 18 inches or side dimensions over 30 inches.

- C. Secure fabric connectors to fans, casings and ducts as follows:
 - 1. Round Connectors: Secure with No. 12 USS gage x 1 inch wide galvanized steel draw bands. Secure bands with bolts and nuts.
 - 2. Rectangular Connectors: Secure with 1 inch x 1/8 inch thick flat galvanized steel bars, with screws or bolts on maximum 8 inch centers, or with approved sheet metal slip joints. Tightly crimp fabric into sheet metal joint and secure complete joint with sheet metal screws on maximum 6 inch centers.
- D. Fabric connectors may be factory pre-fabricated pre-assembled units, with minimum No. 24 USS gage metal edges, secured to fabric with double lock seams.
- E. Do not paint fabric connectors.

3.03 ACCESS DOORS

- A. Install gasketed access doors in ductwork at each of the following:
 - 1. Motor operated dampers.
 - 2. Manually operated volume control devices.
 - 3. All locations where operating parts of any kind are installed and elsewhere as indicated.
 - 4. In-line damper actuators installed in air stream.
 - 5. Fire Dampers
- B. Access doors are not required, where a manually operated damper has an exposed damper regulator, with an indicating quadrant.

END OF SECTION

SECTION 238316

RADIANT FLOOR SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. HVAC Piping: Section 232000.
- B. Valves: Section 230523.
- C. Temperature Control System Electric Electronic: Section 230933.
- D. Pumps: Section 232123
- E. Wiring for Motors and Motor Controllers: Section 260523.
- F. General Commissioning Requirements: Section 019113.
- G. Commissioning Process: Section AGCP in Appendix.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Provide engineering analysis using manufacturer's software.
 - 2. Submit shop drawings showing representative radiant floor tube spacing, manifold locations, zoning requirements, appropriate construction details, and field connection details. Include information on all parts of the system being provided by the manufacturer.
 - 3. Provide mechanical schematic indicating heat source, mechanical piping and accessories from heat source to manifolds, circulators, water tempering, and zone controls. Indicate supply water temperatures and flow rates to manifolds.
- B. Product Data: Manufacturer's catalog sheets and specifications for each item showing dimensions, temperature capacities both constant and intermittent, pressure ratings (both operating and burst, flow rates, material composition, and bend radius. Provide installation instructions for each item specified.
- C. Control Sequence: Submit control manufacturer's sequence of operation for the radiant floor heating portion of this project. Provide a written sequence describing operation and logic along with a schematic wiring diagram.
- E. Maintenance Data: Submit maintenance instructions, including repair of damaged components, corrosion protection instructions, and a spare parts list.
- F. Warranty: Submit manufacturer's written warranty.

- G. Radiant Design Printout: Submit radiant design which must include the following information:
 - 1. Material List: A complete list of components that will be supplied.
 - 2. Zone List:
 - a. Individual zone square footage with recommended tubing spacing and high intensity heating square footage.
 - b. Heating intensity in BTU/hr/sq. ft.
 - c. The required heat (in BTUH), and radiant capacity.
 - d. GPM, Total Differential Head, and Delta T.
 - e. Tube type, length, diameter, and quantity of circuits.
 - 3. Heat Loss by Room
 - a. Heat Loss (BTU/hr) through each exposed surface including walls, windows, doors and ceiling.
 - b. Include infiltration in ACH as determined by ASHRAE crack method.
 - 4. Nomograph for individual rooms indicating: floor surface temperature vs. GPM vs. BTU/hr/sq. ft. vs. tube spacing. This report should also illustrate the required BTU/hr/sq. ft. and the maximum the installed floor heating system could potentially deliver.
- H. Quality Control Submittals:
 - 1. Certificates: Affidavit required under QUALITY ASSURANCE Article.
 - 2. Company Field Advisor Data:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company, listed specifically for this project.
 - 3. Included with the submittal must be documentation of 10 years of successful installations of submitted material including job names and on-site contacts for reference.
- I. Commissioning Documents:
 - 1. Prefunctional Checklists.
 - 2. Functional Checklists.
- J. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, including repair of damaged components, corrosion protection instructions, and a spare parts list to the Director's Representative.

1.03 QUALITY ASSURANCE

- A. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 40 working hours for the following:
 - 1. Render advice regarding installation, and suitability of each control device for its particular application.
 - 2. Witness installation of heat distribution tube layout, manifold, etc.
 - 3. Witness installation of concrete.

- 4. Assist in initial start-up of the system, and render advice on final adjustment of the system.
- 5. Witness final system test, then certify with an affidavit that the system is installed in accordance with the Contract Documents and is operating properly.
- 6. Train facility maintenance personnel on the operation, programming and routine maintenance of the system for a period of (2)-8 hour sessions, 30 days apart.
- B. Warranty: Tubing shall have a minimum of a twenty-five (25) year, non-prorated commercial warranty against failure due to defect in material or workmanship, beginning at the date of substantial completion, even when tubing is installed at temperatures below freezing and \ or is exposed to sunlight for up to 30 days. The warranty must include all costs associated with the repair and/or replacement of the hydronic system, including materials and labor.

1.04 CODES, STANDARDS, AND LISTINGS

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. Certified to ASTM International by NSF:
 - 1. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing.
 - 2. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot-and Cold-Water Distribution Systems.
- C. Certified to ASTM International, UL, NFPA and ULC by Intertek:
 - 1. ASTM E84, Standard Test Method for Surface Burning Characteristics of Test Materials.
 - 2. ASTM E119, UL 263 and NFPA 251 Fire Tests of Building Construction and Materials.
 - 3. CAN/ULC S101-04, Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. Certified to Canadian Standards Association (CSA) by NSF:
 - 1. CAN/CSA B137.5 Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications.
- E. Certified to International Code Council (ICC) by NSF:
 - 1. International Mechanical Code (IMC)
 - 2. International Building Code (IBC)
- F. Certified to International Association of Plumbing and Mechanical Officials (IAPMO) by NSF:
 - 1. Uniform Mechanical Code (UMC)

- G. International Association of Plumbing and Mechanical Officials (IAPMO):
 - 1. Certificate of Listing
- H. National Sanitary Foundation (NSF) International:
 - 1. NSF PW (Potable Water)
 - 2. NSF RFH (Radiant Floor Heating)
 - 3. NSF CL TD and CL R (as specified in NSF Protocol P 171)
- I. Plastics Pipe Institute (PPI)
 - 1. Technical Report TR 3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
 - 2. Technical Report TR 4 Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds

1.05 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's instructions for unloading radiant floor heating materials and components, and moving them to their final locations. Handle system components carefully to prevent damage, breaking or scoring. Do not install damaged system components; refer to manufacturer's guidelines. Project architect/ engineer to determine whether to repair or replace. Store radiant floor tubing and components so as to protect from physical damage, construction debris. Do not expose tubing to direct sunlight for more than 30 days.

PART 2 PRODUCTS

2.01 RADIANT HEATING SYSTEM

- A. General: Provide radiant tubing in lengths and locations as indicated, with capacities, sizes, spacing, and depths as indicated by drawings, schedules, and radiant design/heat loss computer printout. The radiant tubing supplier must supply a complete system with any ancillary components required for an operating system.
- B. Design Requirements:
 - 1. Cross-linked Polyethylene Tubing (PEX): Standard Grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-3 as listed in TR-4. The following three standard-grade hydrostatic ratings are required:
 - a. 200 degrees F (93 degrees C) at 80 psi (551 kPa).
 - b. 180 degrees F (82 degrees C) at 100 psi (689 kPa).
 - c. 73.4 degrees F (23 degrees C) at 160 psi (1102 kPa).
- C. Performance requirements: Provide Hydronic system that is manufactured, fabricated and installed to comply with regulatory agencies and authorities with jurisdiction, and maintain performance criteria stated by the tubing manufacturer without defects, damage, or failure.
 - 1. Cross-linked Polyethylene Tubing (PEX):
 - a. Show compliance with ASTM F877

- b. Show compliance with DIN 4726 regarding oxygen diffusion concerns where applicable.
- c. Show compliance with NFPA 90A requirements of flame spread/smoke development rating of 25/50 in accordance with ASTM E84 through certification listings with Intertek.
- d. Show compliance with ASTM E119, UL 263, NFPA 251, and CAN/ULC S101 through certification listings with Intertek:
 - (1) Intertek Design No. WR/WA 60-01: 1 hour wood or steel stud/gypsum wallboard wall assembly.
 - (2) Intertek Design No. WR/FCA 60-01: 1 hour wood frame floor/ceiling assembly
 - (3) Intertek Design No. WR/FCA 120-01: 2 hour concrete floor/ceiling assembly
- e. Tubing must be capable of withstanding exposure to direct sunlight without degradation for a period of at least thirty (30) days prior to installation. Tubing must be capable of being installed directly on conventional base rock or sand fill material. It must be capable of being pulled across fill material and over rewire/ rebar without detrimental effect to the outer cover or the integral aluminum oxygen barrier. The tubing can be pulled through holes drilled in construction framing and can be stapled directly to the top or underside of the subfloor without the use of aluminum plates. Tubing must be capable of bending at minimum bend radius (Refer to Part 3), even at temperatures below freezing without detrimental effect. Additionally, the tubing can be kinked without detrimental effect and must be capable being restored to its original condition after kinking without the use of applied heat or a physical repair.

2.02 RADIANT TUBING

- A. Material:
 - 1. Cross-linked polyethylene (PEX)
 - 2. Manufactured by PEX-a to ensure the highest level of oxidation protection.
- B. Material Standard:
 - 1. Manufactured in accordance with ASTM F876 and ASTM F877
 - 2. Tested for compliance by an independent third-party agency.
- C. Pressure Ratings:
 - 1. Standard Grade hydrostatic design
 - 2. Pressure ratings as issued by the Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry (SPI).
- D. Temperature/Pressure Ratings: shall be capable of withstanding temperatures of:
 - 1. 73.4°F (23°C) at 160 psi (1.10 MPa)
 - 2. 180°F (82.2°C) at 100 psi (0.69 MPa)
 - 3. 200°F (93.3°C) at 80 psi (0.55 MPa).

- E. Minimum Bend Radius (Cold Bending):
 - 1. No less than six times the outside diameter.
 - 2. Use the tubing manufacturer's bend supports if radius is less than stated.
- F. Barrier Tubing Type: Watts Radiant RadiantPEX+
 - Oxygen Diffusion Barrier
 - a. Tubing has an oxygen diffusion barrier that shall not exceed an oxygen diffusion rate of 0.10 g/cubic meter (.000062 lb/cu. ft.) per day at 104 degrees F (40 degrees C) water temperature in accordance with German DIN 4726.
 - b. Tubing also adds a protective polypropylene layer to the outside of the EVOH barrier.
 - 2. Nominal Inside Diameter: Provide tubing with nominal inside diameter in accordance with ASTM F876, as indicated:
 - a. ³/₈ inch (9.53 mm)
 - b. ½ inch (12.7 mm)
 - c. 5/8 inch (15.88 mm)
 - d. ³/₄ inch (19.05 mm)
 - e. 1 inch (25.4 mm)

2.03 MANIFOLDS AND FITTINGS

- A. Manifolds (Commercial, Stainless Steel)
 - 1. Provide 1" (25 mm) or larger stainless steel by the respective tubing manufacturer for system compatibility.
 - a. Install manifolds with optional isolation valves located on both the supply and return manifold.
 - b. Each manifold location shall have the ability to vent air manually from the system.
 - 2. Provide Copper manifolds approved for use in systems free of ferrous materials, or isolate ferrous material to eliminate corrosion damage due to oxygen diffusion.
 - 3. Balancing:
 - a. Design individual loop lengths across the manifold with 10% of each other in length.
 - b. Install supply and return piping to the manifold in a reverse-return configuration to ensure self-balancing.
 - c. Where the supply and return piping is in direct-return configuration, use manifolds with balancing valves or balance flow setters on the return leg of each manifold to the mains.
 - 4. Manifolds shall be fitted with ball valves (mini or standard size) or zone valves (electric or non-electric type) for flow control and / or isolation purposes as specified by drawings and / or schedules. Manifolds must be fitted with unions for acceptance of pressure test kits. Manifolds will be supplied with vent & purge assembly installed on the return.
- B. Manifold Mounting Boxes
 - 1. Each box shall be designed to e surface mounted on a concrete masonry unit wall. Size to completely cover manifold and accessories.
 - 2. Each manifold box is constructed of powder-coated sheet metal, providing increased resistance to corrosion and job-site abuse.

- 3. Inside Manifold Mounting Brackets:
 - a. Manifold boxes come with 2 fixed horizontal attachment rails and 2 adjustable rails.
 - b. Each Watts Radiant manifold option will utilize different rail positions, depending on the bracket used.

C. Fittings

- 1. For system compatibility, use fittings offered by the tubing manufacturer.
 - a. The fitting assembly shall comply with ASTM F877 and CAN/CSA B137.5 requirements.
 - b. Fittings shall be designed to work with either ASTM F1807 CrimpRings or ASTM F2098 CinchClamps or a Compression ferrule, and are designed to be used with ASTM F876 (SDR-9) rated PEX tubing.
 - c. Available connections:
 - (1) Sweat
 - (2) NPT
 - (3) BSP
 - d. Material:
 - (1) UNS 31400 Copper Alloy
 - (2) UNS 36000 Copper Alloy
 - (3) UNS 37700 Copper Alloy
- D. Accessories (to be provided with radiant tubing package):
 - 1. Repair kit: two (2) for each size of radiant floor tubing used in the project.
 - 2. Cable tie: one (1) every eighteen inches (18") of tubing for slab applications.
 - 4. Tubing unwinder: minimum of one (1) per project. Contractor to determine if more are necessary.
 - 5. Pressure test kit: One (1) per zone.
 - 6. Tubing cutter: Minimum of one (1) per project.

2.04 CONTROL VALVES

- A. Tempering Valves:
 - 1. MixTemp 180 Mixing Valve:
 - a. The MixTemp 180 is a 3 port, non-electric nix valve for use in Hydronic heating systems.
 - (1) Hot, cold, and mix ports are clearly marked "H," "C," and "M."
 - b. This mix valve shall be capable of delivering water temperatures ranging from 90° to 160° F (32° to 71° C) +/- 3° F.
 - c. The Hydronic mix valve shall have a cast bronze body.
 - d. Copper, stainless steel and EPDM internal parts
 - e. There are no ferrous components to corrode.
 - f. The actuator for the piston shall have lineal expansion characteristics, and shall be completely filled with a temperature-sensitive wax.
 - g. Each port on the MixTemp has a union to allow for easy servicing

- h. Available in ³/₄" (19 mm) and 1" (25 mm) female NPT fittings.
 - (1) $\frac{3}{4}$ " Cv = 3.1 gpm (0.195 L/sec)
 - (2) 1" Cv = 3.2 gpm (0.20 L/sec)
- i. Shall have a source of return water cooler than the desired mix temperature to operate properly.
- j. The mix valve shall not be heated in excess of 200°F (93°C) to prevent the liquid-filled actuator from rupture.
 - (1) To prevent damage, temporarily remove the mixing valve from the unions before soldering near the mix valve.

2.05 MANIFOLD IDENTIFICATION

A. Identify piping circuits for heating system piping at manifold location, Example: (#1 SUPPLY, #1 RETURN) Provide color coded floorplan showing zones and circuit numbers. Display at manifold location.

2.06 FLOOR MOUNTED TEMPERATURE SENSOR

A. Provide sensor as shown on plans. Sensor shall be placed in a 6" x 6" flush mounted junction box with brass cover plate. Junction box shall be filled with mason sand.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions.
 - 1. Install hose sleeves where recommended by manufacturer.
 - 2. Provide 1/2" x 6" Insulation wrap around hoses where they cross construction joints in concrete.
 - 3. Pressurize the system to between 50 and 100 psi prior to any concrete pours, for a minimum of 24 hours. Locate and repair any areas that are not maintaining pressure.
 - 4. Pressurize the system to between 50 and 100 psi during any concrete pours. Immediately repair any areas which are found to be leaking.
 - 5. Pressurize the system to between 50 and 100 psi after the concrete pours, for a minimum of 24 hours. Locate and repair any areas that are not maintaining pressure.
 - 6. Install access panels centered in front of each manifold set, surface or wall mount as directed. Coordinate mounting height with the Directors Representative.
- B. Minimum Bend Radius for Radiant Tubing

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3/8" I.D. = Four (4) inch radius
1/2" I.D. = Five (5) inch radius
5/8" I.D. = Six (6) inch radius
1" I.D. = Ten (10) inch radius
```

3.02 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Company field advisor will be on-site for initial system installation to supervise design conformance. The manufacturer's representative will give written approval of the installation to the State, prior to the commencement of any concrete slab pours.
- B. Preliminary System Tests:
 - 1. Preparation: Have the Company Field Advisor check and adjust the completed system, including pressure test, and then operate it long enough to assure that it is performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct the acceptance test.
 - b. Training Facility personnel.
 - 1) The Company Field Advisor shall instruct authorized State Personnel in the operation and maintenance of the system and accessories for a minimum of 4 hours exclusive of pre-start-up and start-up time.
- C. System Acceptance Test:
 - 1. Preparation: Notify the Director's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Individually test control devices.
 - 3. Supply equipment necessary for system adjustment and testing.
 - 4. Submit a typewritten report of the test results, signed by the Company Field Advisor and the Director's Representative. Enclose a copy of the report in a metal frame covered with plastic sheet glazing and mount it adjacent to the control panel.
- D. Manufacturer's Field Service: Have the Company Field Advisor adjust the completed system and operate it long enough to assure that it is operating properly, during the heating season.

3.03 CLOSEOUT PROCEDURES

- A. Director's Instructions: Provide services for company field advisor to instruct Director's personnel in operation and maintenance of radiant floor system.
 - 1. Schedule training with Director's Representative, provide at least 5 days notice of training date.

END OF SECTION

SECTION 213000

FIRE PUMP SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Sprinkler Systems: Section 211313.
- B. Wiring for Motors and Motor Controllers: Section 260523.

1.02 REFERENCES

- A. National Fire Protection Association Standard 20 Centrifugal Fire Pumps.
- B. Underwriters Laboratories Inc. 448 Pumps for Fire-Protection Service.
- C. NEMA MG-1 Motors and Generators.
- D. NEMA ICS-6 Enclosures for Industrial Control and Systems.

1.03 SYSTEM DESCRIPTION

- A. Fire Pump System: The fire pump system shall consist of a fire pump, fire pump motor, combination automatic transfer switch and fire pump controller, jockey pump, jockey pump motor, jockey pump controller, associated valves, gauges, and test apparatus to supply water to the sprinkler system.
 - 1. The jockey pump maintains a minimum pressure in the sprinkler system.
 - 2. The fire pump starts in the event of a pressure drop below the minimum pressure maintained by the jockey pump.
- B. Emergency Power System: A gas-alternator emergency system is being provided under the Electric Contract to power the emergency feeder to the fire pump system in the event of failure of the normal power source. The automatic transfer switch provided under the Electric Contract and the automatic transfer switch provided with the fire pump system both control operation of gas-alternator unit.
 - 1. For sequence of operation for automatic transfer switch provided under Electric Contract, refer to Section 263623 in the Electrical Contract.
 - 2. Sequence of Operation For Fire Pump Automatic Transfer Switch: In normal operating condition, the mechanism of the fire pump transfer switch is in the normal position and gas-alternator unit is shut down. Sequence of transfer operation occurs as follows:
 - a. The voltage on any phase of the normal fire pump feeder drops below 90 percent of normal at the load terminals of the circuit breaker within the fire pump controller, initiating in the fire pump transfer switch a non-adjustable time delay of 3 seconds to override voltage fluctuations and momentary outages.

- 1) Phase reversal of the normal power source causes a simulated normal source power failure upon sensing phase reversal.
- b. At the end of the 3 second time delay, gas-alternator unit automatically starts
- c. A voltage-frequency device in the fire pump transfer switch prevents transfer until the emergency feeder voltage rises to 90 percent of normal and the proper electrical parameters are obtained.
- d. The fire pump transfer switch transfers load to the emergency feeder.
- e. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
- f. When voltage on all phases of the normal feeder is restored to 90 percent voltage, transfer from emergency to normal feeder is initiated with an adjustable time delay (set at 10 minutes) in the transfer switch.
- g. The transfer switch transfers load to the normal feeder at the end of the time delay. Exception: If the emergency power source should fail and the normal power source has been restored, retransfer to the normal source of power shall be immediate, bypassing the retransfer delay timer.
- h. The unit continues to run unloaded 5 minutes, after which the fire pump transfer switch control equipment shuts down the engine and resets the system. Exception: The unit continues to run if power is required for the emergency feeder served by the automatic transfer switch provided under the Electric Contract.

1.04 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittal Requirements" in Section 013300 does not apply to this Section.
- B. Submittal Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.
- C. Shop Drawings:
 - 1. Outline drawings showing equipment layout and dimensions.
 - 2. Certified performance curve for each pump, shop tested, indicating GPM, bhp, and efficiency, from free delivery to shut off head.
 - 3. Wiring diagrams for electrical power and control wiring.
 - a. Deliver 2 copies of approved wiring diagrams to the Electrical Contractor for installation of fire pump automatic transfer switch control wiring for dual control of gas-alternator unit.
- D. Product Data:
 - 1. Catalog sheets, specifications, and installation instructions.
 - a. Indicate UL listing for the system.
 - b. Certify that the products comply with NFPA 20
 - c. Show that the short circuit withstand rating of the fire pump system is greater than the short circuit ampere capability of the circuit to which it is connected.

- d. Show that the continuous current ratings of the components are in compliance with the referenced codes and standards.
- 2. Bill of materials.
- E. Quality Control Submittals:
 - 1. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company, listed specifically for this project.
- F. Contract Closeout Submittals:
 - 1. System acceptance test report.
 - 2. Certificate: Affidavit, signed by the Company Field Advisor and notarized certifying that the system meets the contract requirements and is operating properly.
 - 3. Operation and Maintenance Data:
 - a. Deliver 2 copies, covering the installed products, to the Director's Representative. Include:
 - 1) Operation and maintenance data for each product.
 - 2) Parts lists.
 - 3) Lubrication charts.
 - 4) Name, address, and telephone number of nearest fully equipped service organization.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. The fire pump system shall be listed by Underwriters Laboratories Inc.
 - 2. Unless otherwise specified herein, conform to the requirements and recommendations of NFPA 20 Centrifugal Fire Pumps.
- B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 24 working hours for the following:
 - 1. Render advice regarding installation and final adjustment of the system.
 - 2. Witness final system test and then certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.
 - 3. Train facility personnel in operation, and routine maintenance of the system.

PART 2 PRODUCTS

2.01 ELECTRICAL REQUIREMENTS - GENERAL

A. Short Circuit Withstand Rating: The fire pump system will be connected to a circuit capable of delivering not more than 100 kAIC symmetrical amperes at 480 volts.

- B. Continuous Current Ratings: Not less than required by the referenced codes and standards.
- C. Premises Wiring System: 480 volt, 3 phase, 4 wire.

2.02 MOTORS

- A. Motor (Nameplate) Voltage:
 - 1. 277/480 V, Three Phase, 4W Premises Wiring Systems:
 - a. Motors 1/2 HP and Larger:
 - 1) 480 Volt Circuit: NEMA standard motor voltage 460 V, three phase, 60 Hz. 440 V motors are not acceptable.
- B. Horsepower Capacity: Each motor shall not be overloaded by the apparatus it operates under any condition of operation. Where a minimum horsepower capacity is listed, furnish a motor larger than the minimum, if required in any particular case. Pay any additional cost due to necessary increase in feeder sizes, circuit breaker sizes, etc., provided under the Electric Contract.
- C. Service Factor: The "Service Factor" is a multiplier, which, applied to the normal horsepower rating, indicates a permissible loading within the accepted safe limits of temperature rise for the insulation system. Service factor for each motor shall conform to NEMA standards.
- D. Temperature Rise and Insulation System Class: Conform to NEMA standards.
- E. Motor Housing: Conform to NEMA requirements for a drip-proof machine unless otherwise specified or indicated.

2.03 FIRE PUMP ASSEMBLY

- A. Type: Factory assembled unit specifically designed for fire service, and comprised of fire pump and fire pump motor mounted on steel drip rim base.
- B. Fire Pump: Single stage, vertical mounted, vertical inline, bronze fitted, double suction centrifugal pump.
- C. Fire Pump Motor:
 - 1. Specifically listed for fire pump service.
 - 2. Comply with NEMA standard MG-1 and be marked as complying with NEMA Design B standards.
 - 3. Vertically mounted, open drip-proof, squirrel cage induction motor, suitable for starting with a wye-delta closed transition controller.

2.04 COMBINATION AUTOMATIC TRANSFER SWITCH AND FIRE PUMP CONTROLLER

A. Manufacturer: Eaton Cutler Hammer Model FT-30, or approved equal.

B. Automatic Transfer Switch:

- 1. Listed for Fire Pump Service, dedicated to fire pump.
- 2. Isolating switch located in automatic transfer switch compartment, ahead of the alternate input terminals of the transfer switch.
 - a. Isolating switch supervised to indicate when it is open.
 - b. Interlock switch to prevent starting of gas-alternator when isolating switch is open.
- 3. Accessories as required to perform the functions specified in SYSTEM DESCRIPTION.
- 4. Mounted in barriered compartments of fire pump controller.
- 5. Time Delays:
 - a. Non Adjustable: Factory set at 3 seconds to override momentary outages.
 - b. Adjustable: Time range of 0-30 minutes for retransfer to normal feeder with feature to run unit for 5 minutes unloaded.
- 6. Test switch to simulate normal feeder failure (unit start and transfer to emergency feeder).
- 7. Two identified pilot lights to indicate switch position (power source).
- 8. Engine start contacts.
- 9. Spare auxiliary contact on main shaft (closed on normal).
- 10. Spare auxiliary contact on main shaft (closed on emergency).

C. Fire Pump Controller:

- 1. Specifically listed for service entrance rated electric motor driven fire pump service, across-the-line, reduced voltage, automatic controller with isolating switch, and circuit breaker (disconnecting means).
- 2. Isolating switch located in fire pump controller compartment ahead of circuit breaker (disconnect means) input terminals.
 - a. Each line terminal of isolating switch equipped with surge protective device. Comply with ANSI Standard C62.1 or C62.11.
- 3. NEMA 2 enclosure housing controller and automatic transfer switch in barriered compartments, floor mounted utilizing floor mounting feet.
- 4. Visible indicator, connected to line side of controller, indicating:
 - a. Power available (operating voltage is available to contactor coil).
 - b. Phase reversal.
- 5. Auxiliary contacts for connection to the building fire alarm signaling system. Separate contacts for each of the following:
 - a. Loss of alarm supervisory power.
 - b. Controller has operated into a motor running condition (fire pump running).
 - c. Loss of line power on line side of fire pump controller, in any phase.
 - d. Phase reversal on line side of fire pump controller.
 - e. Automatic transfer switch isolating switch open.
- 6. Silencing switch for audible alarm. (Visual indication remains until alarm condition has been restored to normal).
- 7. Silencing switch for trouble conditions. The silencing switch silences the audible trouble signal only. Upon restoration to normal condition, the panel automatically resets or the audible trouble signal sounds again to indicate the abnormal position of a manual reset switch (ring back feature).

2.05 JOCKEY PUMP

- A. Pump Type: Vertical, multiple stage, end suction, in-line centrifugal type, directly connected to motor.
- B. Motor: Vertically mounted, open drip-proof, squirrel cage induction motor.
- C. Controller: Service entrance rated at 65 kAIC, full voltage magnetic, designed as jockey pump controller, by Eaton Cutler Hammer Model XTJP, or approved equal, having:
 - 1. NEMA 2 enclosure.
 - 2. Three position, hand-off (H-O-A) selector switch mounted in controller enclosure.
 - 3. Running period timer.
 - 4. Pressure switch, externally mounted, 0-300 psi, suitable for fresh water.
 - 5. Secondary control power transformer (maximum control voltage 120 volts).

2.06 FIRE PUMP SYSTEM PIPING ACCESSORIES

- A. Jockey Pump:
 - 1. Pressure relief valve.
- B. Fire Pump:
 - 1. Automatic air release valve.
 - 2. Casing relief valve.
 - 3. Compound suction gage.
 - 4. Discharge gage.

2.07 HOSE VALVE HEADER/TEST CONNECTION

- A. Type:
 - 1. Single 2-1/2 inch npt x 2-1/2 inch angle hose valve male hose thread outlets with caps and chains; label with "PUMP TEST CONN."; all brass with polished finish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Unless otherwise shown as specified, install the Work of this Section in accordance with NFPA 20, and the manufacturer's printed instructions.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed system and then operate it long enough to assure that it is performing properly.

- 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 - 1. Preparation: Notify the Director's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Perform tests required by NFPA 20.
 - b. Test each system function step by step as summarized in SYSTEM DESCRIPTION.
 - 3. Supply all equipment necessary for system adjustment and testing.
 - 4. Submit written report of test results signed by Company Field Advisor and the Director's Representative. Mount a copy of the final report in a plexiglass enclosed frame assembly adjacent to the fire pump controller.

END OF SECTION

SECTION 221100

PLUMBING PIPING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Through Penetration Firestops: Section 078400.
- B. Sealants: Section 079200.
- C. General Commissioning Requirements: Section 019113

1.02 SUBMITTALS

- A. Product Data:
 - 1. Catalog sheets and specifications indicating manufacturer name, type, applicable reference standard, schedule, or class for specified pipe and fittings.
 - 2. Material Schedule: Itemize pipe and fitting materials for each specified application in Pipe and Fittings Schedule in Part 3 of this Section. Where optional materials are specified indicate option selected.

PART 2 PRODUCTS

2.01 STEEL PIPE AND FITTINGS

- A. Steel Pipe for Threading: Standard weight, Schedule 40, black or galvanized; ASTM A 53 or ASTM A 135.
- B. Steel Pipe for Roll Grooving: Standard weight, Schedule 40, black or galvanized; ASTM A 53, Grade B, Type F for sizes 3/4 inch to 1-1/2 inch, and Type E or S for sizes 2 inch to 24 inch, or ASTM A 135.
- C. Malleable Iron, Steam Pattern Threaded Fittings:
 - 1. 150 lb Class: ASME B16.3.
- D. Cast Iron Fittings:
 - 1. Drainage Pattern, Threaded: ASME B16.12.
 - 2. Steam Pattern, Threaded: ASME B16.4.
 - a. Standard Weight: Class 125.
 - b. Extra Heavy Weight: Class 250.
 - 3. Flanged Fittings and Threaded Flanges: ASME B16.1.
 - a. Standard Weight: Class 125.
 - b. Extra Heavy: Class 250.
- E. Unions: Malleable iron, 250 lb class, brass to iron or brass to brass seats.

- F. Couplings: Same material and pressure rating as adjoining pipe, conforming to standards for fittings in such pipe. Use taper tapped threaded type in screwed pipe systems operating in excess of 15 psig.
- G. Nipples: Same material and strength as adjoining pipe, except nipples having a length of less than one inch between threads shall be extra heavy.

2.02 COPPER AND BRASS PIPE, TUBING AND FITTINGS

- A. Copper Tube, Type K and L: ASTM B 88.
- B. Wrot Copper Tube Fittings, Solder Joint: ASME B16.22.
- C. Cast Copper Alloy Tube Fittings, Solder Joint: ASME B16.18.
- D. Chrome Plated Grade A Red Brass Threaded Pipe, Standard Weight: ASTM B 43.
 1. Plating: 0.02 mil chromium over 0.2 mil nickel plating, high polish finish.
- E. Chrome Plated Cast Brass Threaded Pipe Fittings, 125 lb Class: ASME B16.15.
 1. Plating: 0.02 mil chromium over 0.2 mil nickel plating, high polish finish.
- F. Unions: Cast bronze, 150 lb Class, bronze to bronze seats, threaded or solder joint.
- G. Plumber's Tube: Seamless, semi-annealed, minimum 65 percent copper, No. 18 B & S Gage.

2.03 CAST IRON PIPE AND FITTINGS

- A. Bell and Spigot Soil Pipe: Service Weight, Bitumin coated; ASTM A 74.
- B. Bell and Spigot Soil Pipe Fittings: Service Weight, Bitumin coated; ASTM A 74.
- C. Hubless Pipe: Bitumin coated; Cast Iron Soil Pipe Institute Standard No. 301.
- D. Hubless Pipe Fittings: Drainage Pattern, Bitumin coated; Cast Iron Soil Pipe Institute Standard No. 301.
- E. Hubless Joint Couplings: Stainless steel shield and clamp assembly, and elastomer sealing sleeve; CISPI-310.
- F. Water Pipe Fittings: Bitumin coated, cement-mortar lined; AWWA C110.

2.04 DUCTILE IRON PIPE AND FITTINGS

- A. Water Pipe: Bitumin coated and cement-mortar lined; AWWA C151.
 - 1. 3 and 4 Inch Sizes: Class 51.
 - 2. 6 inch Size and Over: Class 50.
- B. Fittings: Bitumin coated and cement-mortar lined; AWWA C110.

2.05 HIGH DENSITY POLYETHYLENE (HDPE) PIPING AND FITTINGS

- A. Pipe: PE 3408, ASTM D 2513, unless otherwise required by the serving gas supplier.
- B. Fittings:
 - 1. Butt Fusion Fittings: ASTM D 3261.
 - 2. Socket Fusion Fittings: ASTM D 2683.

2.06 JOINING AND SEALANT MATERIALS

- A. Thread Sealant:
 - 1. LA-CO Industries', Slic-Tite Paste with Teflon.
 - 2. Loctite Corp.'s No. 565 Thread Sealant.
 - 3. Thread sealants for potable water shall be NSF approved.
- B. Thread Sealant (Natural Gas Piping): Rectorseal Corp.'s T Plus 2 non-hardening pipe dope with teflon.
- C. Solder: Solid wire type conforming to the following:
 - 1. Type 3: Lead-free tin-silver solder (ASTM B 32 Alloy Grade E, AC, or HB); Engelhard Corp.'s Silvabrite 100, Federated Fry Metals' Aqua Clean, or J.W. Harris Co. Inc.'s Stay-Safe Bridgit.
- D. Soldering Flux for Soldered Joints: All-State Welding Products Inc.'s Duzall, Engelhard Corp.'s General Purpose Liquid or Paste, Federated Fry Metals' Water Flow 2000, or J.W. Harris Co. Inc.'s Stay-Clean.
- E. Gaskets For Use With Ductile Iron Water Pipe and Cast Iron Drainage Pipe: Synthetic rubber rings (molded or tubular): Clow Corp.'s Belltite, Tyler Pipe Industries Inc.'s Ty-Seal, or U.S. Pipe and Foundry Co.'s Tyton.
- F. Anti-Seize Lubricant: Bostik Inc.'s Never Seez or Dow Corning Corp.'s Molykote 1000.

2.07 PACKING MATERIALS FOR BUILDING CONSTRUCTION PENETRATIONS

A. Mechanical Modular Seals: Thunderline Corp.'s Link Seal wall and floor seals designed for the service of piping system in which installed.

2.08 DIELECTRIC CONNECTORS

- A. Dielectric Fitting: Bronze ball valve with end connections and pressure rating to match associated piping.
 - 1. Nipples with inert non-corrosive thermoplastic linings are not acceptable.
- B. Flange Electrical Insulation Kit: Consisting of dielectric sleeves and washers, and dielectric gasket.
 - 1. Rated 150 psi at 250 degrees F: ANSI Class 150, full faced neoprene gasket with bolt holes, double phenolic washers, and mylar sleeves; Model 150 by APS, Lafayette, LA 70596, (337) 233-6116.

2.09 PIPE SLEEVES

- A. Type A: Schedule 40 steel pipe.
- B. Type B: No. 16 gage galvanized sheet steel.
- C. Type C: Schedule 40 steel pipe with 1/4 inch steel collar continuously welded to pipe sleeve. Size steel collars as required to span a minimum of one cell or corrugation, on all sides of the rough opening thru the metal deck.
- D. Type D: No. 16 gage galvanized sheet steel with 16 gage sheet steel metal collar rigidly secured to sleeve. Size metal collars as required to span a minimum of one cell or corrugation, on all sides of the rough opening thru the metal deck.

2.10 FLOOR, WALL AND CEILING PLATES

- A. Cast Brass: Solid type with polished chrome plated finish, and set screw.
 - Series Z89 by Zurn, 929 Riverside Drive, Grosvenordale, CT 06255, (800) 243-1830.
 - 2. Model 127XXXX by Maguire Mfg., Cheshire CT 06410, (203) 699-1801.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install piping at approximate locations indicated, and at maximum height.
- B. Install piping clear of door swings, and above sash heads.
- C. Make allowances for expansion and contraction.
- D. Allow for a minimum of one inch free air space around pipe or pipe covering, unless otherwise specified.

- E. Install horizontal piping with a constant pitch, and without sags or humps.
 - 1. Water Piping: Pitch 1/4 inch per 10 feet upward in direction of flow, unless otherwise noted. If it is not possible to maintain constant pitch, establish a new low point and continue. At the low point, provide a 1/2 inch drip leg and gate valve with a hose bibb end. Provide an air vent at the high point.
 - 2. Drainage Piping: Pitch 1/4 inch per foot downward, in direction of flow, unless otherwise noted.
 - 3. Vent Piping: Pitch 1/4 inch per foot upward, unless otherwise noted.
- F. Install vertical piping plumb.
- G. Use fittings for offsets and direction changes, except for Type K soft annealed copper temper water tube.
- H. Cut pipe and tubing ends square; ream before joining.
- I. Threading: Use American Standard Taper Pipe Thread Dies.
 - 1. Thread brass pipe with special brass threading dies.

3.02 DRAINAGE SYSTEMS

- A. Fittings:
 - 1. Use long turn drainage pattern fittings, unless space conditions prohibit their use; in such cases, short turn pattern fittings may be used.
 - 2. Vertical Offsets: Make vertical offsets with 45 degree elbows, or 1/8 bends.
 - 3. Tucker Fittings: Tucker fittings may only be installed in vertical piping.

B. Cleanouts:

- 1. Install cleanouts with sufficient side and end clearance to allow for the removal of the cleanout plug, and the use of cleaning tools.
- 2. Lubricate cleanout plugs with anti-seize lubricant.

3.03 DOMESTIC WATER PIPING SYSTEM

- A. Connect runouts to the upper quadrant of the main, and run upward at not less than 45 degrees before extending laterally.
- B. Make final connections to plumbing fixtures and equipment with unions, or flanges:
 - 1. Do not use unions in ferrous piping larger than 3 inches.
 - 2. Do not use unions in brass or copper piping larger than 2 inches.

3.04 NATURAL GAS PIPING SYSTEM

- A. Install gas piping system in conformance with the National Fuel Gas Code, NFPA 54, or as required by the serving gas supplier.
- B. Use non-hardening pipe dope on threads. Do not use thread seal tape.

3.05 PIPE JOINT MAKE-UP

- A. Threaded Joint: Make up joint with a pipe thread compound applied in accordance with manufacturer's printed application instructions for the intended service.
 - 1. Chrome Plated Brass Pipe: Tighten joint with a strap or Parmalee wrench; do not mar pipe finish. Install piping so that no threads are visible.
- B. Soldered Joint: Thoroughly clean tube end and inside of fitting with emery cloth, sand cloth, or wire brush. Apply flux to the pre-cleaned surfaces. Install fitting, heat to soldering temperature, and join the metals with type solder specified. Remove residue.
- C. Flanged Pipe Joint:
 - 1. Install threaded companion flanges on steel pipe; flanges on galvanized pipe are not required to be galvanized.
 - 2. Provide a gasket for each joint.
 - a. Hot Water Pipe Gasket: Coat with a thin film of oil before making up joint.
 - 3. Coat bolt threads and nuts with anti-seize lubricant before making up joint.
- D. Rubber Ring Push-on Joint: Clean hub, bevel spigot, and make up joint with lubricated gasket in conformance with the manufacturer's printed installation instructions.
- E. Hubless CI Pipe Joint: Make up joint with hubless fitting and couplings, in conformance with the manufacturer's printed installation instructions.
- F. Mechanical Joint: Make up joint in conformance with the manufacturer's printed installation instructions, with particular reference to tightening of bolts.
- G. High Density Polyethylene Pipe Joint (HDPE): Follow manufacturer's printed installation instructions.
- H. Dissimilar Pipe Joint:
 - 1. Joining Dissimilar Threaded Piping: Make up connection with a threaded coupling or with companion flanges.
 - 2. Joining Dissimilar Non-Threaded Piping: Make up connection with adapters recommended by the manufacturers of the piping to be joined.

3.06 PIPING PENETRATIONS

A. Sleeve Schedule: Unless otherwise shown, comply with the following schedule for the type of sleeve to be used where piping penetrates wall or floor construction:

type	of siecve to be used where piping penetral	ies wan of moor construc
	CONSTRUCTION	SLEEVE TYPE
1.	Frame construction.	None Required
2.	Foundation walls.	A*
3.	Non-waterproof interior walls.	B*

4.	Non-waterproof interior floors on	D*
	metal decks.	
5.	Earth supported concrete floors.	None Required
6.	Fixtures with floor outlet waste piping.	None Required
7.	Metal roof decks.	C
8.	Waterproof floors not on metal decks.	A
9.	Waterproof walls.	A

^{*}Core drilling is permissible in lieu of sleeves where marked with asterisks.

- B. Diameter of Sleeves and Core Drilled Holes:
 - 1. Unless otherwise specified, size holes thru floors and walls in accordance with the through penetration fire stopping system being used.
 - 2. Size holes thru exterior walls or waterproofed walls above inside earth or finished floors, and exterior concrete slabs in accordance with the following:
 - a. Uninsulated (Bare) Pipe: Inside diameter of sleeve or core drilled hole 1/2 inch greater than outside diameter of pipe, unless otherwise specified.
 - b. Insulated Pipe: Inside diameter of sleeve or core drilled hole 1/2 inch greater than outside diameter of insulation, unless otherwise specified.
 - c. Mechanical Modular Seals: Size holes in accordance with the manufacturer's recommendations.
- C. Length of Sleeves (except as shown otherwise on Drawings):
 - 1. Walls and Partitions: Equal in length to total finished thickness of wall or partition.
 - 2. Floors with Finish: Equal in length to total finished thickness of floor and extending 1/2 inch above the finished floor level, except as follows:
 - a. In furred spaces at exterior walls, extend sleeve one inch above the finished floor level.
 - 3. Roofs: Equal in length to the total thickness of roof construction, including insulation and roofing materials, and extending one inch above the finished roof level.
- D. Packing of Sleeves and Core Drilled Holes:
 - 1. Unless otherwise specified, pack sleeves or cored drilled holes in accordance with Section 078400 FIRESTOPPING.
- E. Weld metal collars of Type C and D sleeves to the upper surface of the metal deck. Seal voids under the metal collar as recommended by the manufacturer of the metal deck.

3.07 FLOOR, WALL AND CEILING PLATES

- A. Install plates for exposed uninsulated piping passing thru floors, walls, ceilings, and exterior concrete slabs as follows:
 - 1. In Finished Spaces:
 - a. Piping 4 Inch Size and Smaller: Solid or split, chrome plated cast brass.
 - 2. Fasten plates with set screws.
 - 3. Plates are not required in pipe shafts or furred spaces.

3.08 PIPE AND FITTING SCHEDULE

- A. Where options are given, choose only one option for each piping service. No deviations from the selected option will be allowed.
- B. Compressed Air (Above Ground) Pressures up to 175 psig:
 - 1. Option No. 1: Type L hard drawn copper tube, with cast copper alloy or wrot copper solder type fittings, and joints made up with Type 3 solder.
- C. Domestic Water (Above Ground):
 - 1. 3 inch and Under: Type L hard drawn copper tube, with cast copper alloy or wrot copper solder type fittings, and joints made up with Type 3 solder, or hydraulic press joints.
- D. Domestic Water (Below Ground):
 - 1. 2-1/2 inches and Under: Type K soft annealed copper tube with water tube type flared fittings.
 - 2. 3 inches and Over: Coated ductile iron water pipe and fittings, with mechanical or push-on joints.
- E. Drainage (Sanitary, including oil waste) Above Ground:
 - 1. Service weight, coated, cast iron bell and spigot pipe and fittings with rubber ring push-on joints.
 - 2. Hubless, coated, cast iron pipe, fittings, and joint couplings.
- F. Drainage Piping (Sanitary, including oil waste) Below Ground:
 - 1. Service weight, coated, cast iron bell and spigot pipe and fittings, with rubber ring push-on joints.
- G. Natural Gas Piping including associated vent:
 - 1. Inside Building: Standard weight black steel pipe, with 150 lb malleable iron fittings, and threaded joints.
 - 2. Underground: HDPE piping with butt or socket fusion fittings, unless otherwise required by serving gas supplier.
- H. Vent Piping: Same materials that are used for piping system to which vent is connected.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 **DEFINITIONS**

- A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.
 - 1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
 - 2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
 - a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
 - b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
 - 3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
 - 4. Subbase: Select granular material or subbase course Type 2, which is placed immediately beneath pavement or concrete slabs.
 - 5. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Standard Proctor).
 - 6. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 - 7. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
 - 8. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director.
 - 9. Grading Limit Line (Shown on Drawings): Limits of grading, excavations and filling required for the work of this contract. Unless specifically noted otherwise, the Grading Limit Line and Contract Limit Line shall be considered the same.

1.02 PROJECT CONDITIONS

A. Cold Weather Requirements: When freezing temperatures are predicted, do not excavate to final required elevations for pipe, conduit or equipment requiring concrete work unless concrete can be placed immediately. Retain enough earth over the bottom elevation of excavations to prevent frost penetration.

PART 2 PRODUCTS

2.01 MATERIALS

A. Select Granular Material: Stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation and material requirements specified below:

Sieve Size Size opening (mm)		Percent Passing		
1/4 inch	6.35	30-65		
No. 40	0.425	5-40		
No. 200	0.075	0-10		

- 1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
- 2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
- 3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
- B. Subbase Course Type 2: Stockpiled, crushed ledge rock or approved blast furnace slag. Comply with the gradation and material requirements specified below:

Sieve Size Size opening (mm)		Dougout Dossing		
		Percent Passing		
2 inch	50.8	100		
1/4 inch	6.35	25-60		
No. 40	0.425	5-40		
No. 200	0.075	0-10		

- 1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
- 2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
- 3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
- C. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve Size Size opening (mm)		Downent Dessing		
		Percent Passing		
4 inch	101.6	100		
No. 40	0.425	0-70		
No. 200	0.075	0-15		

- D. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size shall not exceed 2/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, land fill, muck, and peat shall be considered unsuitable for fill and backfill, except topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.
- E. Cushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size Sieve Size Size opening (mm)		Percent Passing		
No. 60	0.25	0-35		
No. 100	0.15	0-10		

F. Pea Gravel: Comply with DOT Article 703-02 for screened gravel.

Sie	eve	Domaint Dossing		
Sieve Size Size opening (mm)		Percent Passing		
1/2 inch	12.7	100		
1/4 inch	6.35	90-100		
1/8 inch	3.17	0-15		
No. 200 Sieve	0.075	0-1		

G. Item B-12: Equal Blend of No.1 and No. 2 Crushed Stone that complies with material requirements of DOT Article 703-02, crushed stone only.

Sieve		Dougout Dossing		
Sieve Size	Size opening (mm)	Percent Passing		
1-1/2 inch	38.1	100		
1 inch	25.4	95-100		
½ inch	12.7	45-60		
½ inch	6.35	0-15		

H. No. 1 Coarse Aggregate: Crushed Stone that complies with material requirements of DOT Article 703-02 and meets the following gradation.

S	ieve	Dougant Dossing			
Sieve Size Size opening (mm)		Percent Passing			
1 inch	25.4	100			
1/2 inch	12.7	90-100			
1/4 inch	6.35	0-15			

I. No. 2 Crushed Stone: Comply with the applicable portions of DOT Article 703-02.

Sieve Sieve Size Size opening (mm)		Damant Dassins		
		Percent Passing		
1-1/2 inch	38.1	100		
1 inch	25.4	90-100		
1/2 inch	12.7	0-15		

PART 3 EXECUTION

3.01 UNDERGROUND UTILITIES

A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.

3.02 EXCAVATION AND TRENCHING

- A. Excavate earth as required for the Work.
- B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings or as directed by local officials. If the erosion and sedimentation controls specified by the local officials are more stringent than those specified on the Contract Drawings contact the Director's Representative.
- C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 Labor, Part 1926 (OSHA).
 - Trenches: Deposit excavated material on one side of trench only. Trim banks of
 excavated material to prevent cave-ins and prevent material from falling or sliding
 into trench. Keep a clear footway between excavated material and trench edge.
 Maintain areas to allow free drainage of surface water.
- D. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade, and shape stockpiles for proper drainage as approved by the Director's Representative.

- E. Concrete Slabs, Floors, and Bases: Excavate to the following depths below bottom of concrete for addition of Subbase Course Type 2:
 - 1. Interior: 6 inches unless otherwise indicated.
 - 2. Exterior: 12 inches unless otherwise indicated.
- F. Bell and Spigot Pipe Trenches: Open only enough trench length to facilitate laying pipe sections. Unless otherwise indicated on the Drawings, excavate trenches approximately 24 inches wide plus the outside pipe diameter, equally divided on each side of pipe centerline. Cut trenches to cross section, elevation, profile, line, and grade indicated. Accurately grade and shape trench bottom for uniform bearing of pipe in undisturbed earth. Excavate at bell and coupling joints to allow ample room for proper pipe connections.
- G. Tubing and Piping (other than Bell and Spigot): Provide sufficient trench width for installation and to accommodate special backfill when specified.
- H. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.
 - 1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.
- I. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.03 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and trenches. Pump out any accumulated water.
- B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.
- C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
- D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.04 PLACING FILL AND BACKFILL

- A. Excavations: Backfill as promptly as Work permits, but not until completion of the following:
 - 1. Inspection, testing, approval, and recording locations of underground utilities.
 - 2. Removal of trash and debris.
- B. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice. Do not backfill with excavated material unless it meets the requirements of this Section.
 - 1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum 6 inch thick (loose depth) layers.
- C. Under Exterior Concrete Slabs and Bases:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Place 12 inches of Subbase Course Type 2 over subgrade surface.
- D. Under Interior Concrete Slabs and Bases:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Place 6 inches of Subbase Course Type 2 over subgrade surface.
- E. Plastic Pipe in Trenches: Place cushion material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.
- F. Copper Tubing, and Steel Gas Pipe: Place cushion material a minimum of 6 inches deep under pipe, 6 inches on either side, and 12 inches above top of pipe. Complete balance of backfill as specified.

3.05 COMPACTION

- A. All materials with exception of open graded stone (No. 2 Coarse aggregate, No. 1 Coarse aggregate, Item B-12, etc.):
 - Compact each layer of fill and backfill for the following area classifications to the
 percentage of maximum density specified below and at a moisture content
 suitable to obtain the required densities, but at not less than three percent drier or
 more than two percent wetter than the optimum content as determined by ASTM
 D 698 (Standard Proctor) or 1557 (Modified Proctor).
 - a. Structures (entire area within ten feet outside perimeter): 95 percent.
 - b. Concrete Slabs and Steps: 95 percent.

- c. Pipes and Tunnels: 95 percent.
- d. Pipe Bedding: 95 percent.
- 2. If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved

3.06 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract to a level 4 inches below the finish grades unless otherwise indicated. Provide a smooth uniform transition to adjacent areas.

3.07 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove from State Property and dispose of excess and unsuitable materials.

3.08 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be recompacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.09 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION



Design and Construction

Division of Construction, 35th Floor, Corning Tower The Governor Nelson A. Rockefeller Empire State Plaza Albany, New York 12242

Phone: (518) 474-0331 FAX: (518) 474-8201

SCHEDULE OF SUBMITTALS (REVISED 11/15/2021)

PROJECT NO.: 45552

FACILITY: FISHKILL PROVIDE SUB-HEADQUARTERS BUILDING DOT REGION 8

CONTRACTOR:

PROJECT MANAGER: BRIAN JONES, P.E.

DESIGN CONSULTANT: LaBella Associates, D.P.C.

ENGINEER-IN-CHARGE:

LEGEND

PACK: SUBMITTAL PACKAGE

SD: SHOP DRAWINGS

PD: PRODUCT DATA

SAM: SAMPLES

QCS: QUALITY CONTROL SUBMITTALS

LEED: LEED SUBMITTALS

CCS: CONTRACT CLOSEOUT SUBMITTALS

SUBMITTAL REVIEW RESPONSIBILITY:

F: OGS FIELD OFFICE

F/O: OGS FIELD OFFICE / OFFICE (ALBANY)

D: CONSULTANT / DESIGNER
S: OGS SCHEDULING DEPARTMENT
RSM: Regional Safety Manager

INSTRUCTIONS TO THE CONTRACTOR

- Refer to Section 013300 Submittals of the Project Manual for general requirements regarding submittals and to Section 017716 -CONTRACT CLOSEOUT for project closeout submittals.
- 2. Refer to Sections of the specifications indicated herein for details of the requirements for each submittal listed.
- 3. Indicate in the rows (spaces) following each item:
- **a.** Critical submittals and long lead items (mark with an 'X'). Some critical submittals may already be identified by the design team. Confirm that these are critical submittals.
- **b.** The date the item will be submitted, and date approval is required (allow at least 3 weeks), and the date delivery of the material or equipment is necessary for completion of the work in accordance with the Progress Schedule. The date entered for the submittal is the last date a substitution will be considered. Proposed substitutions must be made prior to the date entered if more than one substitution is to be submitted for approval. Spaces which contain N/A do not require dates.
- **4.** An example of a Submittal Transmittal (BDC-42) can be located at: http://www.ogs.ny.gov/BU/DC/forms/ContractorConstForms.asp
- **5.** Submit Contract Closeout Submittals (CCS) prior to final inspection.

INSTRUCTIONS TO THE CONSULTANT / DESIGNER

- 1. Cut and paste required information from each Division (Div.X) tab and place in the S.O.S. tab.
- 2. Delete Division (Div.X) tabs after the S.O.S. tab has been in-filled.
- **3.** Indicate F, F/O or D in column E. Items in Div.1 have defaults that can be modified as necessary.
- Indicate items that are critical submittals in column F.Note:

The following list of submittals is furnished for your convenience in scheduling submittals. The list is not warranted to be complete and does not take precedence over the contract documents. Enter additional submittals, as required and modify this schedule to the specific project. This S.O.S. will be used to populate the submittals website log.

Updated: 10/16/2015

Printed: 11/12/2021

Project No.: 45552-C



Design and Construction
Division of Construction, 34th Floor, Corning Tower
The Governor Nelson A. Rockefeller Empire State Plaza
Albany, New York 12242
Phone: (518) 474-0331 FAX: (518) 474-8201

			SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-C					
			PROJECT NO.: 45552-C	Send		Contro	otorio Broico	tod Datos
	SUBMITTALS FOR APPROVAL				Critical Submittals	Allow at lea	ctor's Projected Dates ast 4 weeks for Approval e for any resubmission)	
				F	Mark "X"			
Spec				F/O D	for all that apply	Projected Transmittal	Projected Approval	Projected Delivery
Section	Sub Section	Туре	Description	S	шат арріу	Date:	Date:	Date:
007213			GENERAL CONDITIONS					
			APTICLE 6: Decignate in writing competent cuporticion and/or management representatives					
			ARTICLE 6: Designate in writing competent supervision and/or management representatives as required - include contact number in case of an emergency after work hours,					
007213		PD	including weekends and holidays (see 011000 Summary of Work)	F	Х			
007213		PD	ARTICLE 8: Permits and licenses	F	Х			

011100	4.04.0	200	SAFETY O'th On a sife O of the Plan	DOM	V			
	1.04.A	QCS	Site Specific Safety Plan Employee Safety Orientation Training and Certificates	RSM F	Х			
	1.04.B 1.04.A.14	QCS	Emergency Action and Evacuation Plan	F	Х			
011100	1.07.7.14	QU3	Emorgono, Action and Evacuation Figure	'	^			
013113			PROJECT SCHEDULE					
013300			SUBMITTALS					
	1.07.B	PD	Schedule of Submittals (This form completed and editted)	F	Х			
013300	1.07.A	QCS	Submittal Coordinator Qualifications	F/O	Х			
017716			CONTRACT CLOSEOUT					
	1.04	ccs	Project Record Documents	F				
	1.05	ccs	Operation and maintenance, 2 copies	F				
	1.06	ccs	Warranties Spare Parts and Maintenance Materials	F F				
017716	1.07	ccs	Spare Parts and Maintenance Materials	Г				
015213			STATE FIELD OFFICE					
			Site Plan: Show location of field office where directed. Indicate holding tank, utility services,					
015213	1.02.B	SD	and connections	F	Х			
015213	2.01	PD	Mobile or Relocatable Office Units Submit within 15 days after award of Contract.	F	X			
	2.02.A	PD	Furniture Submit within 15 days after award of Contract.	F	X			
	2.02.B	PD	Office Equipment - Submit within 15 days after award of Contract.	F	X			
			Provide certification insignia from NY State Dept. of State certifying trailer unit is code					
015213	1.04.C	QCS	compliant.	F	Х			
047400			FIFT D ENGINEERING					
017123			FIELD ENGINEERING Submit the name, address, telephone number, and registration number of the Land Surveyor					
017123	1.03.A	PD	before starting the survey work	F				
017123	1.03.B	PD	On request, submit documentation verifying accuracy of survey work	F				
			Upon completion of the Work, submit a certificate signed and sealed by the Land Surveyor,					
017123	1.03.C	ccs	stating that the elevations and locations of the Work are in conformance with the Contract Documents	F				
017120	1.00.0	000	Record location data for control points in sketch form and turn over 6 copies of sketches and	·				
017123	1.04.B	ccs	computations to the Director's Representative	F				
017123	1.04.C	ccs	Submit Record Documents	F				
017716	4.04	000	CONTRACT CLOSEOUT Project Record Documents	_				
	1.04	ccs	Operation and maintenance, 2 copies	F F				
	1.06	ccs	Warranties	F				
	1.07	ccs	Spare Parts and Maintenance Materials	F				
1.2								
023313			UNDERGROUND UTILITY LOCATOR SERVICE					
022242	1 04 4	PD	Submit detailed experience and qualifications description of underground utility locator service	D	×			
	1.04.A							
023313	1.04.B	QCS	Investigative Report	F/O	Х			

Updated: 10/16/2015 Printed: 11/12/2021

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-C **Contractor's Projected Dates** Send SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) Mark "X" F/O Spec D that apply Transmittal Delivery Section Sub Section Type Description S Date: Date CONCRETE FORMWORK 031100 031100 1.04.A.1 PD Form systems and ties D Χ STEEL CONCRETE REINFORCEMENT 032100 032100 D Χ 1.03.A SD Placing drawings for bar reinforcement 032100 1.03.B.1 QCS Certificates: Affidavit required under Quality Assurance Article D X FIBROUS CONCRETE REINFORCEMENT 032101 032101 1.03.B PD Monofilament Fibrous Concrete Reinforcement D Χ 032101 1.03.B PD Mixes D Х SAM One pound of fibrous reinforcement strands D Χ 032101 1.03.C D 032101 1.04.A QCS Certificates: Affidavit required under Quality Assurance Article Х 032101 1.04.B QCS Company Field Advisor Data D Χ CAST-IN-PLACE CONCRETE 033000 D 033000 1.04.B.1 PD Mix Design 033000 1.04.B.2 PD Portland Cement D Χ Х 033000 1.04.B.3 Fly Ash D 033000 1.04.B.4 Air-entraining Admixture Х D PD 033000 1.04.B.5 PD Water-reducing Admixture D Χ 033000 1.04.B.6 High Range Water-reducing Admixture (Superplasticizer) D Χ PD 033000 1.04.B.7 PD Accelerating Admixture D Х 033000 1.04.B.8 D Χ Aggregates 033000 1.04.B.9 Chemical Hardener (Dustproofing) D Χ D 033000 1.04.B.10 Chemical Curing and Anti-Spalling Compound Х Bonding Agent (Adhesive) D Х 033000 1.04.B.11 PD D Χ 033000 1.04.B.12 PD **Expansion Joint Fillers** D Χ 033000 1.04.C.1 ocs **Batching Plant Records** Concrete Pumping Equipment Data D Χ 033000 1.04.C.2 QCS D Χ 033000 1.04.C.3 QCS Minutes of the previous pre-installation conference LOW DENSITY CONCRETE 033400 D 33400 1.03 B PD Product Data 1.03 c Certificates F QCS 33400 STRUCTURAL PRECAST CONCRETE 034100 034100 1.03.A.1 SD Submit fully dimensioned fabrication and erection drawings D Х 034100 1.03.A.2 SD **Design Calculations** D Χ 034100 1.03.A.3 SD Revised copies shall be submitted for formal approval and record. D Χ Manufacturer's and Installer's Qualification Data D Χ 034100 1.03.B QCS 034500 ARCHITECTURAL PRECAST CONCRETE 034500 1.05.A SD Submit fully dimensioned fabrication and setting drawings D 034500 2.01.A PD Cement D 2.01.B PD D 034500 Aggregates D 034500 2.01.C PD Mortar D 034500 2.01.E PD Air-entraining Admixture 034500 2.01.F D PD Reinforcing Steel 034500 2.01.G PD Metal Accessories D 034500 2.01.H PD Shop Paint for Galvanized Steel D 034500 2.01.1 PD Galvanizing Repair Paint D For each type and color of finish required, 12 x 12 x 1-1/2 inch thick samples showing color, 034500 1.05.B SAM pattern, texture, and finish D D 034500 1.05.C.3 QCS Manufacturer's Qualifications Data 034500 1.05.C.1.A QCS Design Data: Design Mix D 034500 Design Data: Design Calculations D 1.05.C.1.B

Updated: 10/16/2015 Printed: 11/12/2021

QCS

034500 1.05.C.2.A

Preliminary Test Specimens: Strength Test Cylinders

D

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-C **Contractor's Projected Dates** Send SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) Mark "X" F/O Projected Spec D that apply Fransmittal Approval Delivery Section Sub Section Type Description S Date: Date 040513 MORTAR AND MASONRY GROUT 040513 1.02.A.1 PD Portland Cement D D 040513 1.02.A.2 PD Masonry Cement 040513 PD D 1.02.A.3 Lime 040513 1.02.A.4 PD Sand(s) D 040513 1.02.A.5 PD Color Pigments D 042000 UNIT MASONRY 042000 1.01.A.1.a PD Mortar: Portland Cement D Х 042000 1.01.A.1.b Mortar: Lime D Х 042000 1.01.A.1.c Mortar: Sand D Χ 042000 1.01.A.2 PD Masonry Wall Reinforcement D Х 042000 2.03.G PD Partition Top Anchors D X Flashing D PD Х 042000 2.03.F 042000 2.03.H D Χ PD Cavity Drainage Material 042000 2.03.C PD Masonry Wall Ties D Χ Veneer Block D Χ SAM 042000 2.03.A 042000 1.01.C.1.a QCS Test Reports: Concrete Masonry Units D Χ Х 042000 1.01.C.2 QCS Certificates: Affidavit required under Quality Assurance Article D **GLASS UNIT MASONRY** 042300 Glass Blocks D 042300 1.02.A PD 042300 1.02.A PD Panel Reinforcement D 042300 1.02.A PD Panel Anchors D 042300 1.02.A Asphalt Emulsion D Glass-Fiber Expansion Strips D 042300 1.02.A 042300 1.02.A PD Plastic-Foam Expansion Strips D D 042300 1.02.B.1 SAM Glass Block D 042300 1.02.B.2 SAM Reinforcement 042300 1.02.B.3 SAM **Expansion Strip** D Mortar Color Sample F 042300 1.02.B.4 SAM 051200 STRUCTURAL STEEL (Allowable Stress Design) Initial Submission: Drawings of proposed job standards for shop and field connections, including standard and special connections, complying with the requirements 051200 1.06.A.1 D Χ Initial Submission: Erection drawings indicating sizes, weights, and locations of all structural 051200 1.06.A.1 051200 1.06.A.1 SD Initial Submission: Anchor bolt and base plate plans D Subsequent Submission: Index sheets and revised erection drawings to which erection D 051200 1.06.A.5 SD marks have been added X 1.06.A.5 051200 SD Subsequent Submission: Detail drawings of all structural members D Х 1.06.B.1 D Х Shop paint 051200 PD Χ 051200 1.07.A.1 QCS Test Reports: Steel manufacturer's mill test reports D 051200 1.07.A.1 Certificates: Submit evidence, in triplicate, of steel material compliance with this Specification D Χ QCS Fabricator's and Erector's Qualifications Data D Χ 051200 1.07.C QCS Χ 051200 1.07.C QCS Welding Procedure Specifications D 051200 1.09 Х QCS Welder's Certification D 053100 FLUTED STEEL DECKS Show application to project. Prepare separate drawings, coordinated with, but not superimposed on, joist drawings or structural steel erection drawings 053100 1.04.A SD 053100 1.04.C.1 PD Sheet steel deck D Х D Χ 053100 1.04.C.2 PD Shop Primer Paint 053100 Welding Electrodes D Х 1.04.C.3 053100 1.04.C.4 PD Mechanical and Side-lap Fasteners D Х Χ 053100 1.05.A Certificates: Affidavit required under Quality Assurance Article D QCS

Updated: 10/16/2015 Printed: 11/12/2021

054000 1.05.A

COLD-FORMED METAL FRAMING

Erection and fabrication drawings for all load carrying metal framing and accessories

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PROJECT NO.: 45552-C

			PROJECT NO.: 45552-C			1		
			SUBMITTALS FOR APPROVAL	Send to:	Critical Submittals	Allow at lea	ctor's Project ast 4 weeks for e for any resi	or Approval
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0				F/O	Mark "X" for all	Projected	Projected	Projected
Spec Section	Sub Section	Туре	Description	D S	that apply	Transmittal Date:	Approval Date:	Delivery Date:
054000	1.06.C	SD	Delegated Design stamped calculations	D	Х	Date:	Date:	Date:
054000	2.01.A	PD	Framing (including Studs, Tracks, Joists, Perimeter Channel, and Rafters)	D	X			
054000	2.01.A	PD	Bracing, Bridging, Strapping, Reinforcement, Stiffeners, Plates, Gussets, Clip Angles, and					
054000	2.01.B.1	PD	Hangers	D	Х			ł
054000	2.01.B.2	PD	Power-Actuated Fasteners	D	Х			
054000	2.01.B.3	PD	Self-Drilling Fasteners	D	Х			
054000	2.01.C	PD	Galvanizing	D	Х			
054000	2.01.D	PD	Galvanizing Repair Paint	D	Х			
054000	1.06.D	QCS	Certificates: Affidavit required under Quality Assurance Article.	D	Х			
055100			ALUMINUM INCLINED STAIRS					
			Application to Project: Elevations, dimensions, connections, size and type of fasteners, and					
055100	1.03.A	SD	fabrication and installation details.	D				
055100	1.03.B	PD	Inclined ship ladders	D				
055100	1.03.C	QCS	Quality Control Submittals	D				
062000			FINISH CARPENTRY					
062000	1.03.A	SD	Fabrication Details and Connections	D				
062000	1.03.B	SAM	Plastic Laminate	D				
071326			RUBBERIZED ASPHALT SHEET MEMBRANE WATERPROOFING SYSTEM					
			Submit the shop drawings, product data, and samples specified below at the same time as a					
071326	1.03.B	PACK	package;	D				
	1	DEV	Deviation from Contract Document showing existing conditions and details	D				
	1	PD	Sheet Membrane Waterproofing	D				
		PD	Protection Board and Adhesive	D				
		PD	Drainage Composite	D				<u> </u>
		PD	Insulation	D				<u> </u>
	1	PD	Insulation Adhesive	D				
			Any revision of the membrane manufacturer's product data as necessary to suit requirements of the Contract Documents	D				
	+	PD	-	D				
	+	PD	Manufacturer's Warranty Sample	D				
	+	SAM	Rubberized Asphalt Sheet Membrane	D				
	+	SAM	Flashing Cap Sheet Protection Board	D				
	+	SAM	Drainage Composite	D				
	+		Membrane Waterproofing Manufacturer's Certification	D				
	1	QCS QCS	Applicator's Certification	D				
	+	QCS	Company Field Advisor	D				
071326	1.03.G	CCS	Warranty Extension	F				
011020	1.00.0	303	y amonom	†				
072100			BUILDING INSULATION					
072100	2.01.A	PD	Rigid (Board) Insulation: Extruded polystyrene thermal insulation boards; ASTM C 578, Type IV, manufactured with CFC-free blowing agents	D				
012100	2.V1.A	טיז	Rigid (Board) Insulation: Extruded polystyrene thermal insulation boards; ASTM C 578, Type	-				
072100	2.01.B	PD	IV, manufactured with CFC-free blowing agents	D				
072100	2.01.C	PD	Rigid (Board) Insulation: Expanded molded polystyrene thermal insulation boards; ASTM C 578, Type I.	D				
0.2100			1					
072100	2.01.D	PD	Rigid (Board) Insulation: Rigid cellular polyisocyanurate thermal insulation boards surfaced with other materials.	D				
072100	2.01.E	PD	Foam Insulation, two-components system consisting of amino plast resin and catalyst foaming agent surfactant.	D				
072100	2.02	PD	Mineral Fiber Insulation: Glass or other inorganic fibers and resinous binders formed into flexible blankets, batts or rolls; ASTM C 665.	D				_
072100	2.03	PD	Adhesive for Bonding Insulation	D				
072100	1.02.B.1	SAM	Blanket, Batt or Roll	F				
072100	1.02.B.2	SAM	Rigid Type	F				
072100	1.02.C	QCS	Certificate Affidavit required under Quality Assurance Article	F				
070411			CDDAY FOAM INCHI ATION					
072114			SPRAY FOAM INSULATION					

PRO.	JECT	NO.:	45552-C
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			PROJECT NO.: 45552-C	Send	0.1111	Contra	ctor's Projec	ted Dates
			SUBMITTALS FOR APPROVAL	to:	Critical Submittals	Allow at lea	ast 4 weeks for e for any resu	or Approval
				F				
				F/O	Mark "X" for all	Projected	Projected	Projected
Spec				D	that apply	Transmittal	Approval	Delivery
Section	Sub Section	Type	Description	S		Date:	Date:	Date:
			Submit the product data and quality control submittals specified at the same time as a	_				
072114	1.04.B		package	D				
072114	1.04.E	ccs	Warranty	F				
			MARCH DETARDED UNDER GLARG ON ORANGE					
072600			VAPOR RETARDER UNDER SLABS ON GRADE					
072600	2.02.A	PD	Vapor Retarder: Extruded single-ply or multi-ply type; Polyethylene or polyolefin - Puncture Resistance	D				
	1			D				
072600	2.02.B	PD	Pressure-Sensitive Tape/Adhesive	D				
072600	2.02.C	PD	Pipe Boots	F				
072600	1.03.B.A	SAM	Vapor Barrier Material					
072600	1.03.B.2	SAM	Pressure-Sensitive Tape	F				
075323			ADHERED EPDM ROOFING SYSTEM					
0.0020			Submit all items, except contract closeout submittals and MSDS, at one time as a complete					
075323	1.04.K	PACK	package.	D				ĺ
-		DEV	Proposed Deviations from Contract Documents	D				
		PD	EPDM (Ethylene, Propylene, Diene, Monomer) Sheet Membrane	D				
		PD	Sheet Flashing	D				
		PD	Inseam Tape	D				
		PD	Cured EPDM Cover Tape	D				
		PD	Uncured EPDM Cover Tape	D				
		PD	Official End of Cover Tape					
			Related Products: Membrane manufacturer's bonding adhesive, splicing cement, lap sealant,					
			water cut-off mastic, nite seal, pourable sealer, splice joint cleaning agent and primer,					
		PD	insulation adhesive, and all other products related to the sheet membrane system.	D				
		PD	Insulation	D				
		PD	Tapered Insulation System	D				
		PD	Tapered Cricket System	D				
		PD	Tapered Edge Strips	D				
			Insulation Adhesive	D				
		PD		D				
		PD	Sealant					
		PD	Materials For Vapor Retarder Over Concrete Decks	D				
		SAM	Sheet Membrane	D				
		SAM	Sheet Flashing	D				
				_				
		SAM	EPDM Cover Tape	D				
		SAM	Inseam Tape	D				
		SAM	Insulation	D				
		SAM	Self-Adhesive Vapor Retarder	D				
			Fire Hazard Certification	D				
		QCS	Material Certification Membrane Manufacturer's Certification	D				
			Membrane Manufacturer's Certification	D				
		QCS	Installer's Certification	D				
		SAM	Warranty: Sample Copy	D				
075323	1.04.I	CCS	Manufacturer's Warranty	F				
J. JJ23	1.07.1	503		<u>'</u>				
076000			FLASHING AND TRIM					
076000	1.04.A	SD	Show the manner of forming, jointing and securing the metal flashings and trim	D				
076000	2.01.A	PD	Prefinished Galvanized Steel Sheet	D				
076000	2.01.B	PD	Aluminum Sheet	D				
	2.01.C	PD	Prefinished Aluminum Sheet	D				
076000	2.02.A	PD	Nails	D				
076000	2.02.B	PD	Screws, Bolts and other Fastening Accessories	D				
076000	2.02.B 2.02.C	PD	Anchors	D				
				F				
076000	1.04.C.1	SAM	Materials for Flashings	F				
076000	1.04.C.2	SAM	Anchors Croyal Stan					
076000	1.04.C.3	SAM	Gravel Stop	F				
077253			SNOW GUARDS					
011200								
			For each type of product, include construction details, material descriptions, dimensions of					
	1.03.A	PD	individual components and profiles, and finishes.	D				i

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	PROJECT NO.: 45552-C									
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				F/O	Mark "X"					
Spec				D D	for all that apply	Projected Transmittal	Projected Approval	Projected Delivery		
Section	Sub Section	Туре	Description	S	шат арріу	Date:	Date:	Date:		
			Roof plans showing layouts and attachment details of snow guards. Include calculation of							
077253	1.03.B	SD	number and location of snow guards	D						
077050	4 02 D	000	Analysis reports signed and sealed by the qualified professional engineer responsible for their	D						
077253 077253	1.03.D 1.03.E	QCS	preparation. Qualification Data	D						
077253	1.03.E 1.03.F	QCS	Product Test Reports	D						
077253	1.03.F 1.03.C.1	SAM	Rail-Type Snow Guards: Bracket and 12-inch-long rail.	F						
077253	1.03.C.1.A	SAM	For units with factory-applied finishes, submit manufacturer's standard color selections	F						
011233	1.03.C.1.A	SAIVI	r-or units with ractory-applied linishes, submit manufacturer's standard color selections	'						
078400			FIRESTOPPING							
070400			Submit the following items specified the same time as a package: Product Data, Samples,							
078400	1.04.A	PACK	Quality Control Submittals and Firestop Schedule	D						
	-	PD	Firestopping Schedule							
		PD	Through-Penetration Firestop Devices, Forming Materials, And Fill, Void or Cavity Materials							
		PD	Accessories							
		PD	Identification Labels							
		SAM	Each Product requested							
		QCS	Design Data							
		QCS	Installer's Qualifications Data							
		QCS	Company Field Advisor Data							
		455								
079200			JOINT SEALERS							
079200	2.01.A	PD	Type 1 Sealant	D						
079200	2.01.B	PD	Type 1A Sealant	D						
079200	2.01.C	PD	Type 1B Sealant	D						
079200	2.01.D	PD	Type 1D Sealant	D						
079200	2.01.E	PD	Type 2 Sealant	D						
079200	2.01.F	PD	Type 3 Sealant	D						
079200	2.01.G	PD	Type 5 Sealant	D						
079200	2.01.H	PD	Sealant Colors	D						
079200	2.02.A	PD	Self-Expanding Cork Joint Filler	D						
079200	2.02.B	PD	Closed Cell Neoprene Joint Filler	D						
079200	2.03.A	PD	Adhesive Closed-Cell PVC Gasket	D						
079200	1.02.B.1	SAM	Sealant Sealant	D						
079200	1.02.B.1	SAM	Joint Fillers	D						
079200	1.02.B.3	SAM	Gaskets	D						
	1.02.B.3 1.02.B.4		Backer Rods	D						
079200			Bond Breaker Tape	D						
	1.02.B.5		Installer's Qualifications Data	D		1				
079200 079200	1.02.C.1		Company Field Advisor Data	D		1				
0/9200	1.02.C.2	ųc3	Sompany Flore Author Data			1				
081102			STEEL DOORS AND FRAMES							
	1.04.B.1.A	SD	Quality Assurance Package	D						
081102	1.04.B.1.A 1.04.B.1.B	SD	Door and Frame Schedule with Product Data Package	D						
081102	1.04.B.1.B 1.04.A.2	CCS	Closeout Submittal Package	F		1				
001102	1.VT.F.4	503								
083325			COMPOSITE SECTIONAL OVERHEAD DOORS							
083325	1 04 4	SD	Application to Project	D						
083325	1	PD	Overhead Door Assemblies	D				 		
	1		Finishes	D				1		
-	1.04.B	PD		D						
	1.04.B	PD	Operators Electric Motor and Controls Data	D				1		
	1.04.B.1	PD	Electric Motor and Controls Data Full door section end	F				<u> </u>		
083325	1.04.C	SAM		D						
083325	1.04.D	QCS	Manufacturer's Certification Spring Life of counterbalance mechanism							
083325	1.04.E.1	ccs	Operation and Maintenance Data	F]		1		
083325	1.04.E.2	ccs	Replacement Parts List	F				1		
205:::			ALLIMBUM WINDOWS							
085113			ALUMINUM WINDOWS	-						
	1.05.A	SD	Fabrication details and connections	D						
085113	1.05.B	PD	Aluminum window Types/Grade/Performance Class	D				 		
085113	1.05.C.1	SAM	Corner section of frame, sash, and insect screen	D				<u> </u>		

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Spec Section	Sub Section	Туре	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery
085113	1.05.C.2	SAM	Color Samples	D		Date.	Date.	Date:
085113	1.05.D.1	QCS	Installer's Qualifications Data	D				
000110	1.00.5.1	400						
085200			WOOD WINDOWS					
085200	1.03.A	SD	Show fabrication details and connections to adjacent construction.	D				
085200	1.03.B	PD	Casement Window Units	D				
085200	1.03.C1	SAM	Corner of frame and sash (each type)	D				
085200	1.03.C.2	SAM	Color Samples	D				
085200	1.03.D	QCS	Test Reports: Certified testing laboratory reports, indicating that window units have been tested	D				
003200	1.03.0	QUS	lested					
087100			FINISH HARDWARE					
087100	1.03.D.1	SD	Quality Control Package	D				
087100	1.03.D.2	SD	Finish Hardware Package	D				
087100	1.03.D.3	ccs	Closeout Submittals Package	F				
088100			GLASS AND GLAZING					
088100	2.01.A	PD	Type I Glass	D				
088100	2.01.B	PD	Type M Glass	D				
088100 088100	2.02.A 2.02.D	PD PD	Type 5 Glazing Material Spacers	D D				
088100	2.02.E	PD	Compressible Filler Rod	D				
088100	1.02.B	SAM	Glass: 12 x 12 inch pieces for each type of glass specified	D				
			Test Reports: Certified test data to sufficiently substantiate glass or glass assembly					
088100	1.02.C.1	QCS	compliance with requirements specified	D				
088100	1.02.C.2	QCS	Certificates: Affidavit required under Quality Assurance Article	D				
089100			STATIONARY METAL WALL LOUVERS					
089100	1.02.A	SD	Show fabrication details and connections to adjacent Work.	D				
089100	1.02.B	PD PD	Steel Louvers Louver Screens	D D				
089100	2.02.A	PD	Louver Screens	D				
092116			GYPSUM BOARD SYSTEMS					
	2.01.A	PD	Framing	D				
092116	2.02.A	PD	Gypsum Board	D				
092116	2.02.B	PD	Fire Resistant Gypsum Board	D				
092116		PD	Moisture Resistant Gypsum Board	D				
092116			Moisture and Fire Resistant Gypsum Board	D				
092116		PD	Steel Drill Screws	D				
092116		PD	Laminating Adhesive Interior Trim	D D				
092116 092116	1	PD PD	Sound Attenuation Blankets	D				
	2.05.A 2.05.B	PD	Accoustical Sealant for Exposed and Concealed Joints	D				
	2.05.C	PD	Accoustical Sealant for Concealed Joints	D				
	2.06.A	PD	Joint Tapes	D				
092116	2.06.B	PD	Joint Compound	D				
095300			SUSPENDED ACOUSTICAL CEILING SYSTEMS					
095300	1.03.A	SD	Ceiling plans and details	D				
095300	1.02.B.1	PD	Suspension System Type ID/EG	D				
095300	1.02.B.2	PD	Suspension System Type HD/EG Suspension System Type HD/CG	D D				
095300 095300	1.02.B.3 2.02.A	PD PD	Acoustical Unit - Type III	D				
095300	1.03.C.1	SAM	Suspension System Materials	D				
095300	1.03.C.1		Acoustical Units	D				
095300	1.03.D	QCS	Certification: Manufacturer's written statement	D				
095300	1.03.E	ccs	Maintenance Instructions - 2 copies	F				
			Furnish quantities equal to 2 percent of acoustical units and exposed suspension system					
095300	1.07.A	ccs	components installed	F				
000755			PEANLESS ELOOP SYSTEM					
096723	1 02 4	DD	SEAMLESS FLOOR SYSTEM Decorative quartz enoxy flooring	D				
096723	1.03.A	PD	Decorative quartz epoxy flooring	U				<u> </u>

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			PROJECT NO.: 45552-C	ı				
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Spec Section	Sub Section	Туре	Description	F F/O D	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
096723	2.02.D	PD	Sealer	D		Date.	Date.	Date.
096723	1.03.B.1	SAM	Flooring and Base Combination	D				
096723	1.03.B.2	SAM	Liquid Binder for Reinforcement	D				
096723	1.03.B.3	SAM	Clear Sealer	D				
096723	1.03.C.1	QCS	Test Reports	D				
096723	1.03.C.2	QCS	Certificates - Article 3.01	D				
096723	1.03.C.3	QCS	Installer's Qualifications Data	D				
096723	1.03.C.4	QCS	List of Completed Installations	D -				
096723	1.03.D	ccs	Maintenance Data - 2 copies	F				
007722			FIBER REINFORCED PLASTIC PANELS					
097723 097723	2.01.A	PD	Plastic Panels	D				
097723	2.01.A 2.01.B	PD	Substrate Backer: Particleboard; ANSI A208.1, Grade 1-M-1	D				
097723	2.01.C	PD	Accessories and Moldings: One piece extruded vinyl or aluminum	D				
097723	2.01.D	PD	Fasteners	D				
097723	2.01.E	PD	Adhesive	D				
097723	1.03.B.1	SAM	Plastic Panels	D				
097723	1.03.B.2	SAM	Accessories and Moldings	D				
097723	1.03.B.3	SAM	Fasteners	D				
097723	1.03.B.4	SAM	Adhesive	D				
097723	1.03.B.5	SAM	Color Samples	D				
097723	1.03.C	QCS	Fabricator's Qualifications Data	D				
097723	1.03.D	ccs	Maintenance Data - 2 copies	F				
099101			CONSTRUCTION PAINTING	-				
099101	1.03.A	PD	Painting Schedule - Exterior and Interior Substrates	D D				
099101	2.03.B.1	PD	Paint Type EAL-3: Exterior Acrylic Latex, Gloss Enamel	В				
099101	2 02 D 2	PD	Paint Type ESP: Exterior Steel Zinc-Rich Primer, Flat	D				
099101	2.03.B.2 2.03.C1	PD	Paint Type IAL-3: Interior Acrylic Latex, Semigloss Enamel	D				
099101	2.03.C.2	PD	Paint Type IAL-4: Interior Acrylic Latex, Gloss Enamel	D				
099101	2.03.C.3	PD	Paint Type ISP: Interior Steel Primer, Flat	D				
099101	2.03.C.4	PD	Paint Type AU: Aliphatic Urethane, Gloss Finish	D				
099101	2.03.D	PD	Colors	D				
			Finish Paint Samples: Two finish paint samples applied over recommended primers for each					
099101	1.03.C	SAM	substrate to be painted.	D				
099101	1.03.D.1		Test Reports	D				
099101	1.03.D.2		Certificates of Quality Assurance Article	D				
099101	1.07.A	ccs	Extra Materials: Other Paint Types: One gallon, each type.	F				
099659			HIGH-BUILD GLAZED COATINGS					
099659	2.01.A	PD	Primers, Sealers, and Undercoats	D				
099659	2.01.A 2.01.B	PD	HBGC-3 Coating System	D				
099659	1.03.B	SAM	Samples: Each coating system and color required	D				
099659	1.03.C.1	QCS	Test Reports	D				
099659	1.03.C.2	QCS	Applicators Qualifications Data	D				
099659	1.03.C.3	QCS	Certificates - Quality Assurance Article	D				
099659	1.07.A	ccs	Extra Materials: Furnish one extra gallon of each type and color of coating material specified	F				
101423			SIGNS					
101423	1.02.A	SD	Show Fabrication and mounting details	D				
101423	2.01.A	PD	Engraved Stock (ES) Plastic	D				
101423	2.01.B	PD	Sealant Mounting (SM)	D				
				_				
101423	1.02.C.1	SAM	Full size of each sign type and copy type specified including mounting accessories. T	D/F/O				
101423	1.02.C.2	SAM	Color Samples	D/F/O				
101423	1.02.D	QCS	Sign Fabricator Qualification Data	D				
400400			COMPARTMENTS					
102100 102100	1.04.A	SD	COMPARTMENTS Fabrication details and connections	D				
102100	1.U4.A	อบ	i aprication details and connections	ט		<u> </u>		<u> </u>

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	PROJECT NO.: 45552-C										
			SUBMITTALS FOR APPROVAL	Send to:	Critical Submittals	Allow at lea	ctor's Projec ast 4 weeks fo ie for any resi	or Approval			
Spec Section	Sub Section	Туре	Description	F/O D	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:			
102100	2.01.A	PD	Solid Phenolic Core Panels	D		Dute.	Date.	Dutc.			
102100	2.01.B	PD	Fittings and Fasteners	D							
102100	2.01.C	PD	Concealed Reinforcing	D							
102100	2.01.D	PD	Overhead bracing	D				<u></u>			
102100	2.01.E	PD	Wall Supports	D							
102100	2.01.F	PD	Cut-Outs and Reinforcement	D							
102100	2.01.G.1.A 2.01.G.1.B	PD PD	Door Hardware - Hinges Door Hardware - Slide Bolt	D D							
102100	2.01.G.1.B	PD	Door Hardware - Sinde Boit Door Hardware - Combination Stop and Keeper	D							
102100	2.01.G.1.D	PD	Door Hardware - Combination Coat Hook and Bumper	D							
102100	2.01.G.1.E	PD	Door Hardware - Door Pull	D							
102100	2.01.G.2	PD	Chrome plated or stainless steel through bolts, or machine screws as required	D							
102213			WIRE MESH PARTITIONS								
102213	1.04.A	SD	Plans, elevations, details	D				-			
102213	1.04.B.1	PD	Wire and Frames	D							
102213	1.04.B.2	PD	Vertical Posts Ten Copping Post	D							
102213	1.04.B.3	PD	Top Capping Bar	D							
102213	1.04.B.4	PD	Door Hardware - Sliding Doors	D							
102813			TOILET AND BATH ACCESSORIES								
102813	2.15	SD	Grab Bar Details	D							
102813	2.04	PD	Mirrors	D							
102813	2.05	PD	Paper Towel Dispensers - Surface Mounted (PTD-SM)	D							
102813	2.06	PD	Double Roll Toilet Tissue Dispensers - Surface Mounted (DRTTD-SM)	D							
102813	2.07	PD	Waste Receptacles - Surface Mounted (WR-SM)	D							
102813	2.08	PD	Feminine Napkin Disposals - Surface Mounted (FND-SM)	D							
102813	2.09	PD	Lather Soap Dispensers - Surface Mounted (LSD-SM)	D				<u></u>			
102813	2.10	PD	Shower Curtain Rods (SCR)	D				 			
102813	2.11	PD	Shower Curtains (SC)	D				 			
102813	2.12	PD PD	Towel Bars (TB) Towel Hooks (TH)	D D							
102813	2.13	PD	Mop and Broom Holders (M & BH)	D							
102813	2.15	PD	Grab Bars (GB)	D							
102813	2.16	PD	Shower Seats	D							
102813	1.02.B.1	ccs	Operation and Maintenance Data	F							
102813	1.02.B.2	ccs	Parts lists	F							
102813	2.03.A	ccs	Keys: Furnish minimum of 2 keys and an additional 2 keys for every 6 key operated accessories.	F							
102813	2.03.B	ccs	Tools: Furnish socket wrenches compatible with set screws of concealed theft-resistant fastenings. Furnish minimum of 2 wrenches and an additional 2 wrenches for every 6 accessories having such fastenings	F							
104416			FIRE EXTINGUISHERS								
104416	1.04.A	PD	For each type of product	D							
104416	1.05.A	PD	Sample Warranty	D							
104416	1.06.A	ccs	Operation and Maintenance Data	F							
105100			LOCKERS								
105100	1.02.A	SD	Plans, elevations, details	D							
105100	1.03.A	PD	Lockers	D							
105153			BENCHES								
105153	1.01.A	PD	Floor Benches	D							
400115			DDE ENCINEEDED METAL DINI DINC								
133419	1.05.4.4	00	PRE-ENGINEERED METAL BUILDING Erection Drawings	D	X						
133419 133419	1.05.A.1 1.05.A.2	SD SD	Structural Drawings	D	X						
133419	1.05.A.2 1.05.B.1	PD	Roofing panels	D	X						
133419	1.05.B.2	PD	Exterior wall panels	D	X						
133419	1.05.B.3	PD	Interior liner panels	D	X						
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_				F/O	Mark "X" for all	Projected	Projected	Projected
Spec	0	T	D	D	that apply	Transmittal	Approval	Delivery
Section	Sub Section	Туре	Description	S		Date:	Date:	Date:
133419	1.05.B.4	PD	Doors	D	X			
133419	1.05.B.5	PD	Windows	D	Х		ļ	
133419	1.05.B.6	PD	Louvers	D	Х		ļ	
133419	1.05.B.7	PD	Ventilators	D	Х			
133419	1.05.B.8	PD	Trim, exterior and interior	D	Х			
133419	1.05.B.9	PD	Flashings	D	X			
133419	1.05.B.10	PD	Insulation	D	Х			
133419	1.05.B.11	PD	Sealants and gaskets	D	Х		,	
133419	1.05.C.1.A	SAM	Roofing panels	D	Х			
133419	1.05.C.1.B	SAM	Exterior wall panels	D	Х			
133419	1.05.C.1.C	SAM	Interior liner panels	D	Х			
133419	1.05.C.1.D	SAM	Roof and wall insulation	D	X			
	1.05.C.2.A	SAM	Purlin	D	X			
133419	1		Girt	D	X			
	1.05.C.2.B	SAM		1		<u> </u>		
133419	1.05.C.2.C	SAM	Corner, rake and eave trim	D	X	1		
133419	1.05.C.2.D	SAM	Ridge cover	D	X	<u> </u>		
133419		SAM	Pedestrian door frame	D	Х	ļ	<u> </u>	
133419	1.05.C.2.E	SAM	Thermal break, each type	D	Х	L		
133419	1.05.C.3	SAM	Color Samples	D	Х			
133419	1.05.D.1	QCS	Design Calculations	D	Х			
133419	1.05.D.2	QCS	Manufacturer's written certification structure has been designed in conformance	D	Х			
133419	1.05.E.1.A	ccs	Roofing Panel Warranty	F	Х			
133419	1.05.E.1.B	ccs	Exterior Wall Panel Warranty	F	Х			
224126			UNDERGROUND STORAGE TANKS FOR FIRE SUPRESSION WATER					
224126	1.03 B	PD	Product Data	D	Х			
224126	1.03 C	PD	Shop Drawings	D	Х			
224126	1.03 D	QCS	Installation testing results	F	Х			
310000			EARTHWORK					
310000	1.03 A.1	PD	Filter Fabric: Manufacturer's catalog sheets, specifications, and installation instructions	D				
			Absorption System Fill: Submit borrow pit in-situ percolation test reports signed by a N.Y.S.					
310000	1.03 A.2	PD	licensed engineer.	D				
310000	1.03 A.3	PD	Temporary and Permanent Sheeting, Shoring, and Bracing	D				
	2.01 A	PD	Select Granular Material	D				
310000	2.01 B	PD	Subbase Course Type 2	D				
310000	2.01 C	PD	Suitable Material (Fill and Backfill for Landscaped Areas)	D				
310000	2.01 D	PD	Cushion Material	D				
310000	2.01 E	PD	Drainage Fill	D				
310000	2.01 F	PD	No. 1 Coarse Aggregate	D				
310000	2.01 G	PD	No. 3 Coarse Aggregate	D				
310000	2.01 G	PD	Rip Rap	D		 		
			Flowable Fill	D		<u> </u>		
310000	2.01	PD				<u> </u>		
310000	2.02 A	PD	Filter Fabric (GeoTextile)	D		<u> </u>		
310000	2.03 A	PD	Screened Gravel (Wastewater)	D		ļ		<u> </u>
310000	2.03 B	PD	Absorption System Fill	D				
	2.04 A	PD	Landscape Edge Material	D			<u> </u>	<u> </u>
310000	1.03 B.1	SAM	Select Granular Material	F		L		
310000	1.03 B.2	SAM	Subbase Course Type 2	F				
310000	1.03 B.3	SAM	Cushion Material	F				
310000	1.03 B.4	SAM	Drainage Fill	F				
310000	1.03 B.5	SAM	Crushed Stone	F				
310000	1.03 B.6	SAM	Screened Gravel (wastewater)	F				
310000	1.03 B.7	SAM	Absorption System Fill	F				
310000	1.03 C.1	QCS	Subbase Materials	F				
310000	1.03 C.1	QCS	Other Aggregates	F				
310000		QCS		F		 		
310000	1.03 C.3	wc3	L-Nouvellott 1 100cculie	F	l	1		

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Section Sub-Section Type Description				SUBMITTALS FOR APPROVAL			Allow at lea	ast 4 weeks fo	or Approval
Special Color						Mark "Y"			
Section December	Snec					for all			Projected
13.04.0 13.0		Sub Section	Type	Description		that apply			Delivery Date:
1982 1.08 A				'					
1923 1988 P.P. Product data P.P. Product data P.P.				, , , , , , , , , , , , , , , , , , ,					
	312513			EROSION AND SEDIMENT CONTROL					
	312513	1.08 A	PD	Product data	D				
321916 3.01 A.1 PD Top Course	312513	1.08 B	QCS	Installation Instructions	F				
321916 3.01 A.1 PD Top Course									
192196	321216			ASPHALT CONCRETE PAVING					
1921916 2019 3	321216	2.01 A.1	PD	Top Course	D				
192156 2018 PD Asphal Cement Track Coal D D D D D D D D D	321216	2.01 A.2	PD	Binder Course	D				
121216 10.2 B.1 QCS Plant name and location of asphalt concrete supplier	321216		PD		D				
201300	321216	2.01 B	PD		_				
1931-191 1931-1	321216	1.02 B.1	QCS	Plant name and location of asphalt concrete supplier	F				
1931-191 1931-1									
1931-190 193 A-2 PD Portland Cement D D D D D D D D D									
121300 1.03 A.3				·	+				
1.03 A.5		+			1				-
1921300 1.03 A.5 PD									-
1921300 1.03 A.5 PD Detectable Warning Surface D D					+				
321373		1			+				
CONCRETE PAVING JONT SEALANTS					_				
321373 201 A	321300	1.03 B.1	SAM	Bar Supports	F				-
321373 201 A				CONCRETE BANKING LOUIT OF ALANTO					
1921373 20.2 A									
321373 203 A		1			+				
321373 2.03 B		1							-
203 C PD Sond Breaker Tape D Sond Breaker Tape D D Sond Breaker Tape D Sond Breake		+			1				
321373 2.04 PD Color F									
321373 2.04 PD Color F F									
321613		1							
321613 1.04 A PACK same time as a package. D D	321373	2.04	FD	COLO	<u> </u>				
321613 1.04 A PACK same time as a package. D D	321613			PORTLAND CEMENT CONCRETE CURBS					
321613 1.04 A PACK Same time as a package. D	321013								
321613 1.04 B.2 PD Portland Cement D D	321613	1.04 A	PACK		D				ł
321613 1.04 B.3 PD	321613	1.04 B.1	PD	Mix Design	D				
321613 1.04 B.4 PD Air-entraining Admixture D	321613	1.04 B.2	PD	Portland Cement	D				
321613 1.05 A QCS Pump Crew Qualifications F	321613	1.04 B.3	PD	Fly Ash	D				
321723 1.01 A	321613	1.04 B.4	PD	Air-entraining Admixture					
321723 1.01 A	321613	1.05 A	QCS	Pump Crew Qualifcations	F				
321723 1.01 A									
321723 1.01 B SAM Paint F F SAM Paint F SAM Paint SAM PA									
32113 1.01 C QCS Certificates: Affidavit required under Quality Assurance Article F 323113 CHAIN LINK FENCE AND GATES Complete detailed drawings for each height and style of fence and gate required. Include separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications. D 323113 2.01 A PD Class B Steel Tubing STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D 323113 2.03 PD Steel Fabric D 323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames 323113 2.06 PD Sliding Gate Framwork 323113 2.07 PD Swing Gate Hardware D 323113 2.08 PD Rails and Post Braces D 323113 2.09 A PD Fittings and Post Tops									<u> </u>
323113 Complete detailed drawings for each height and style of fence and gate required. Include separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications. 323113 2.01 A PD Class B Steel Tubing STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts 323113 2.03 PD Steel Fabric 323113 2.04 PD Swing Gate Posts 323113 2.05 PD Swing Gate Posts 323113 2.06 PD Silding Gate Framwork 323113 2.07 PD Swing Gate Framwork 323113 2.08 PD Sliding Gate Hardware 323113 2.09 A PD Rails and Post Braces 323113 2.09 B PD Fittings and Post Tops					_				
Complete detailed drawings for each height and style of fence and gate required. Include separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications. 323113 2.01 A PD Class B Steel Tubing D D D D D D D D D D D D D D D D D D D	321723	1.01 C	QCS	Certificates: Affidavit required under Quality Assurance Article	F				
Complete detailed drawings for each height and style of fence and gate required. Include separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications. 323113 2.01 A PD Class B Steel Tubing D D D D D D D D D D D D D D D D D D D	000115			CHAIN LINE FENCE AND CATES					
separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications. 323113 2.01 A PD Class B Steel Tubing STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D 323113 2.03 PD Steel Fabric D 323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames D 323113 2.06 PD Sliding Gate Framwork 323113 2.07 PD Swing Gate Hardware 323113 2.08 PD Sliding Gate Hardware 323113 2.09 A PD Rails and Post Braces D 323113 2.09 B PD Fittings and Post Tops	323113								
323113 1.03 A SD weight, and finish, to ensure conformance to specifications. D 323113 2.01 A PD Class B Steel Tubing D 323113 2.02 A PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts D 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D 323113 2.03 PD Steel Fabric D 323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames D 323113 2.06 PD Sliding Gate Framwork D 323113 2.08 PD Sliding Gate Hardware D 323113 2.09 A PD Rails and Post Braces D 323113 2.09 B PD Fittings and Post Tops D									
323113 2.01 A PD Class B Steel Tubing D STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts D STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D Steel Fabric D Swing Gate Posts D Swing Gate Posts D Swing Gate Frames D Swing Gate Hardware Swing Gate Hardware D Swing Gate Hardware D Swing Gate Hardware D Swing Gate Hardware Swing Gate Hardware D Swing Gate Hardware Swing Gate Hardware	323113	1.03 A	SD	1 '	D				
323113 2.02 A PD Pull Posts 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - End Posts, Corner Posts and Pull Posts 323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D 323113 2.03 PD Steel Fabric D 323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames D 323113 2.06 PD Sliding Gate Framwork D 323113 2.07 PD Swing Gate Hardware D 323113 2.08 PD Sliding Gate Hardware D 323113 2.09 A PD Rails and Post Braces D 323113 2.09 B PD Fittings and Post Tops									
323113 2.02 B PD STEEL FRAMEWORK (FOR FENCES UP TO 6'-0" HIGH) - Line Posts D 323113 2.03 PD Steel Fabric D 323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames D 323113 2.06 PD Sliding Gate Framwork D 323113 2.07 PD Swing Gate Hardware D 323113 2.08 PD Sliding Gate Hardware D 323113 2.09 A PD Rails and Post Braces D 323113 2.09 B PD Fittings and Post Tops D									
323113 2.03 PD Steel Fabric D Steel Fabric 323113 2.04 PD Swing Gate Posts D Steel Fabric 323113 2.05 PD Swing Gate Frames D Steel Fabric 323113 2.06 PD Sliding Gate Framwork D Steel Fabric 323113 2.07 PD Swing Gate Hardware D Steel Fabric 323113 2.08 PD Sliding Gate Hardware D Steel Fabric 323113 2.09 A PD Rails and Post Braces D Steel Fabric 323113 2.09 B PD Fittings and Post Tops D Steel Fabric			PD						<u> </u>
323113 2.04 PD Swing Gate Posts D 323113 2.05 PD Swing Gate Frames D 323113 2.06 PD Sliding Gate Framwork D 323113 2.07 PD Swing Gate Hardware D 323113 2.08 PD Sliding Gate Hardware D 323113 2.09 A PD Rails and Post Braces D 323113 2.09 B PD Fittings and Post Tops D	323113	2.02 B	PD		_				
323113 2.05 PD Swing Gate Frames D Swing Gate Framwork 323113 2.06 PD Sliding Gate Framwork D Swing Gate Hardware 323113 2.07 PD Swing Gate Hardware D Swing Gate Hardware 323113 2.08 PD Sliding Gate Hardware D Swing Gate Hardware 323113 2.09 A PD Rails and Post Braces D Swing Gate Hardware 323113 2.09 B PD Fittings and Post Tops D Swing Gate Hardware	323113	2.03	PD						
323113 2.06 PD Sliding Gate Framwork D Sliding Gate Framwork 323113 2.07 PD Swing Gate Hardware D Sliding Gate Hardware 323113 2.08 PD Sliding Gate Hardware D Sliding Gate Hardware 323113 2.09 A PD Rails and Post Braces D Sliding Gate Hardware 323113 2.09 B PD Fittings and Post Tops D Sliding Gate Hardware			PD		1				
323113 2.07 PD Swing Gate Hardware D			PD		_				
323113 2.08 PD Sliding Gate Hardware D Sliding Gate Hardware 323113 2.09 A PD Rails and Post Braces D Sliding Gate Hardware 323113 2.09 B PD Fittings and Post Tops D Sliding Gate Hardware			PD		_				
323113 2.09 A PD Rails and Post Braces D D 323113 2.09 B PD Fittings and Post Tops D D			PD		_				
323113 2.09 B PD Fittings and Post Tops D			PD	· ·					
					1				
323113 2.09 C PD Stretcher Bars D					_				
	323113	2.09 C	PD	Stretcher Bars	D				<u></u>

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C				F/O	for all	Projected	Projected	Projected
Spec Section	Sub Section	Туре	Description	D S	that apply	Transmittal Date:	Approval Date:	Delivery Date:
323113	2.09 D	PD	Metal Bands (for securing stretcher bars)	D		Date.	Date.	Date.
323113	2.09 E	PD	Wire Ties	D				
	2.09 E 2.09 F	PD	Truss Rods	D				-
323113	+			D				
323113	2.09 G	PD	Concrete	D				
323113	2.09 H	PD	Spiral Paper Tubes					
323113	2.09 J	PD	Tension Wire	D				
323113	2.09 K	PD	Angle Beams	D				
323113	2.09 L	PD	Nuts and Bolts	D				
323113	2.09 M	PD	Expansion Anchors	D				
323113	2.09 N	PD	Shrink-Resistant Grout (Ferrous)	D				
323113	2.16	PD	Finishes	D				
323113	1.03 C.1	SAM	Fence Fabric	F				
323113	1.03 C.2	SAM	Fence and Gate Posts	F				
323113	1.03 C.3	SAM	Miscellaneous Materials and Accessories	F				
329120			TOPSOIL					
			Topsoil for Testing: In the presence of the Director's Representative, take a 5 lb sample from					
			each 1000 cu yds of topsoil to be used on the project. Complete a Topsoil Sample					
			Information Form for each sample. Ship samples and forms (original and 2 copies) to the					
329120	1.01 A.1	SAM	address indicated in Section 013300.	F				
329120	1.01 B	PD	Test Results	D				
329219			SEEDING					
329219	1.01 A	PD	Hydro Mulch: Manufacturer's specifications and application rate	D				
329219	1.01B	PD	Erosion Control Blanket: Manufacturer's specifications and installation instructions	D				
329219	1.02	SAM	Seed Samples	F				
			'					
329301			PLANTS					
323301			List of Plants: Before plant material is shipped to the project site, submit a complete itemized					
329301	1.03 A	PD	list of all plants including the source of supply.	D				
329301	1.03 B.1	PD	Invoice indicating sizes and variety of plant material	D				
329301	1.03 B.2	PD	Certificates of inspection required by State and Federal agencies	D				
329301	1.03 B.3	PD	Labels for each plant or bundles of plants indicating name and size	D				
329301	1		Worker's Qualifications Data	F				
329301	1.03 C.1	QCS	Worker's Qualifications Data	Г				
001101			WATER LITTLETV RICTRIBUTION RIPING					
331101			WATER UTILITY DISTRIBUTION PIPING	-				
	2.02	PD	Ductile Iron Pipe	D				
		PD	Fittings	D				
	2.04	PD	Flexible Expansion Joints	D				
	1.02 B	QCS	Statement of compliance with ANSI/AWWA Specifications.	F				
331101	3.03	QCS	Pressure test results	F				
331103			COPPER TUBING AND FITTINGS (UNDERGROUND)					
331103	2.01 A	PD	Tubing	D				
	2.01 B	PD	Fittings	D				
	3.01 D	QCS	Pressure test results	F				
				1				
331216			WATER UTILITY DISTRIBUTION VALVES					
331216	1 01 Δ	PD	Valve Schedule	D				
331216		PD	Gate Valves	D				
				D				
	2.05	PD	Valve Boxes					
331216	2.06	PD	Valve Keys	D				
331300			DISINFECTION OF WATER UTILITY DISTRIBUTION					
331300	1.02 A.1	CQS	Test Results	F				
331600			UNDERGROUND POTABLE WATER STORAGE TANKS					
331600	1.03 B	PD	Product Data	D	Χ			
331600	1.03 C	PD	Shop Drawings	D	Х			
331600	1.03 D	QCS	Installation testing results	F				
333104			PLASTIC DRAINAGE PIPE (SANITARY)					
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Spec Section	Sub Section	Туре	Description	F/O D	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:		
333104	2.02	PD	PVC Sewer Pipe and Fittings	D						
333104	2.03	PD	Solvent cement	D						
333211			FIELD ERECTED WASTEWATER PUMPING STATIONS							
333211	1.03 A	PD	Product Data	D	X					
333211	1.03 B	PD	Shop Drawings	D	X					
333211	1.03 C	PD	Factory Tests Results	D F	Х					
333211	1.03 D	ccs	O&M Manuals	Г						
333216			PACKAGED WASTEWATER GRINDER PUMP STATIONS							
333216	1.03 A	PD	Product Data	D	Х					
333216	1.03 B	PD	Shop Drawings	D	X					
333216	1.03 C	PD	Factory Tests Results	D	Х					
333216	1.03 D	ccs	O&M Manuals	F						
333913			MANHOLES, FRAMES & COVERS							
333913	1.03 A	SD	Shop Drawings - Show fabrication details and connections to adjacent Work	D				-		
333913	2.01 A	PD	Precast Reinforced Concrete Manholes	D						
333913	2.01 B	PD	Glass-Fiber Reinforced Polyester Manholes	D D						
333913 333913	2.01 C 2.01 D	PD PD	Precast Reinforced Square and Rectangular Concrete Structures Cast-in-Place Concrete for Manhole Invert Channels	D						
333913	2.01 E	PD	Frames, Covers and Grates for Manholes and Catch Basins	D						
333913	2.01 F	PD	Curb Inlet Frames, Grates and Curb Boxes	D						
333913	2.01 G	PD	Drop Inlet Frames and Grates	D						
	2.01 H	PD	Pipe-to-Manhole/Drainage Structure Connections	D						
333913	2.01 I	PD	Mortar	D						
333914			PRECAST CONCRETE WASTEWATER STRUCTURES (SANITARY)	_						
333914	2.01	PD	Septic Tank	D						
333914 333914	2.01 C 2.01 D	PD PD	Tank Configuration Pipe Connections	D D						
333914	2.01 E	PD	Manholes	D						
333914	2.02	PD	Distribution Box	D						
333914	2.03 A	PD	Concrete for Precast Structures	D						
333914	2.03 B	PD	Reinforcing Steel	D						
333914	2.03 C	PD	Access Manhole Frames and Covers	D						
333914		PD	Precast Reinforced Concrete Manhole Riser Sections	D						
333914	2.03 E	PD	Precast Concrete Grade Rings	D						
333914	2.03 F	PD	Concrete Masonry Units for Manholes	D				-		
333914 333914	2.03 G 2.03 H	PD PD	Butyl Rope Sealant Mortar	D D				 		
333914	2.03 H	PD	Non-shrink Grout	D						
333914	2.03 K	PD	Pipe and Fittings	D						
333914	2.03 L	PD	Coal Tar Epoxy Coating	D						
334104			CORRUGATED POLYETHYLENE STORM DRAIN PIPE							
334104	2.02 A	PD	Corrugated Polyethylene Pipe (Smooth Interior)	D						
334104	2.02 B	PD	Fittings	D				 		
334104	2.02 C	PD	Headwalls and End Sections	D						
334104	2.02 D	PD	Perforated Pipe	D				 		
334105			PLASTIC DRAINAGE PIPE (STORM DRAINAGE)							
334105	2.02	PD	PVC Sewer Pipe and Fittings	D						
334105	2.03	PD	Solvent cement	D						
334105	2.04	PD	Cleanout Cover	D						
344113			TRAFFIC SIGNS							
			Show shop drawings, not necessarily to scale, but sufficient enough in detail to show color,							
344113	1.01 A	SD	wording, lettering size and style, overall sign size, construction details and installation details for each type of sign	D						
-	1.01 B	SD	Sign and Post Material product data.	D						
<u> </u>			1 - ·	1						

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-C **Contractor's Projected Dates** Send SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) Mark "X" F/O Spec D Transmittal that apply Approval Delivery Sub Section Section Type Description S Date: Date 444239 **GRIT CHAMBER TANK** Tank dimensions, construction details, and pipe connections D 444239 1.02 A SD D 444239 2.01 PD Grit Chamber 444239 2.02 PD Access Frames and Covers D 444239 2.03 A PD Galvanized Pipe (for vents) D "Resist-All" sealant D 444239 2.03 B PD 444249 **OIL-WATER SEPARATOR** Catalog cuts with dimensions, specifications, installation instructions. Include one copy of 444249 1.04 B operation and maintenance instructions for informational purposes 444249 1.04 C Performance data: Defined by influent and effluent characteristics D 444249 1.04 D Factory Test: Test certification for the tank D Accessory Sensors and Alarms: Schematic wiring diagrams and bill of materials for each 444249 1.04 E SD component of each sensor/alarm system. D Concrete Tank D 444249 2.01 A PD D Fiberglass Tank PD 444249 2.01 B D PD Steel Tank 444249 2.01 C 444249 2.04 A PD Galvanized Pipe (For Vents) D 444249 2.04 B PD Steel Retaining Riser (For Manways): D 444249 2.04 C Concrete Pad With Tank Hold-Down Device D PD D 444249 2.05 A PD Interface and Level Sensor 444249 2.05 B D PD Alarm panel to monitor oil level sensors and activate a visual and audible alarm 444249 2.06 PD D Access Hatch Covers Provide two additional copies of operation and maintenance instructions to the Director's 444249 1.04 F ccs Representative Manufacturer's Warranty: The one year period required by Paragraph 9.8 of the General Conditions is extended to 30 years. The tank manufacturer shall warrant the oil/water separator tank for a period of 30 years against leakage due to internal corrosion, external 444249 1.05 ccs corrosion, and structural failure. Updated 07/29/7/2021 Printed 07/24/2018



Design and Construction

Division of Construction, 35th Floor, Corning Tower The Governor Nelson A. Rockefeller Empire State Plaza Albany, New York 12242

Phone: (518) 474-0331 FAX: (518) 474-8201

SCHEDULE OF SUBMITTALS (REVISED 11/15/2021)

PROJECT NO.: 45552-E

FACILITY: PROVIDE MAINTENANCE SUBHEADQUARTERS, DOT REGION 8 - DUTCHESS COUNTY, 205 LIME KILN RD, EAST FISHKILL, NY

CONTRACTOR:

PROJECT MANAGER: BRYAN JONES, P.E.

DESIGN CONSULTANT: MH PROFESSSIONAL ENGINEERING, PLLC

ENGINEER-IN-CHARGE:

LEGEND

PACK: SUBMITTAL PACKAGE

SD: SHOP DRAWINGS

PD: PRODUCT DATA

SAM: SAMPLES

QCS: QUALITY CONTROL SUBMITTALS

LEED: LEED SUBMITTALS

CCS: CONTRACT CLOSEOUT SUBMITTALS

SUBMITTAL REVIEW RESPONSIBILITY:

F: OGS FIELD OFFICE

F/O: OGS FIELD OFFICE / OFFICE (ALBANY)

D: CONSULTANT / DESIGNERS: OGS SCHEDULING DEPARTMENTRSM: Regional Safety Manager

INSTRUCTIONS TO THE CONTRACTOR

- Refer to Section 013300 Submittals of the Project Manual for general requirements regarding submittals and to Section 017716 -CONTRACT CLOSEOUT for project closeout submittals.
- 2. Refer to Sections of the specifications indicated herein for details of the requirements for each submittal listed.
- 3. Indicate in the rows (spaces) following each item:
- a. Critical submittals and long lead items (mark with an 'X').Some critical submittals may already be identified by the design team.Confirm that these are critical submittals.
- **b.** The date the item will be submitted, and date approval is required (allow at least 3 weeks), and the date delivery of the material or equipment is necessary for completion of the work in accordance with the Progress Schedule. The date entered for the submittal is the last date a substitution will be considered. Proposed substitutions must be made prior to the date entered if more than one substitution is to be submitted for approval. Spaces which contain N/A do not require dates.
- An example of a Submittal Transmittal (BDC-42) can be located at: http://www.ogs.ny.gov/BU/DC/forms/ContractorConstForms.asp
 Submit Contract Closeout Submittals (CCS) prior to final inspection.

INSTRUCTIONS TO THE CONSULTANT / DESIGNER

- **1.** Cut and paste required information from each Division (Div.X) tab and place in the S.O.S. tab.
- 2. Delete Division (Div.X) tabs after the S.O.S. tab has been in-filled.
- **3.** Indicate F, F/O or D in column E. Items in Div.1 have defaults that can be modified as necessary.
- **4.** Indicate items that are critical submittals in column F.

Note:

The following list of submittals is furnished for your convenience in scheduling submittals. The list is not warranted to be complete and does not take precedence over the contract documents. Enter additional submittals, as required and modify this schedule to the specific project. This S.O.S. will be used to populate the submittals website log.

Updated: 10/16/2015

Printed: 11/11/2021

Project No.: 45552-E



Project No.: 45552-E

Design and ConstructionDivision of Construction, 34th Floor, Corning Tower The Governor Nelson A. Rockefeller Empire State Plaza Albany, New York 12242

Phone: (518) 474-0331 FAX: (518) 474-8201

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O for all Projected Projected Projected Spec Sub D that apply Transmittal Approval Delivery Section Section Description Type S Date Date Date: 007213 GENERAL CONDITIONS ARTICLE 6: Designate in writing competent supervision and/or management representatives as required - include contact number in case of an emergency after work hours, including weekends 007213 PD and holidays (see 011000 Summary of Work) F 007213 PD ARTICLE 8: Permits and licenses F 011100 **SAFETY** Site Specific Safety Plan **RSM** 011100 QCS 011100 QCS **Employee Safety Orientation Training and Certificates** 011100 Emergency Action and Evacuation Plan PROJECT SCHEDULE 013113 SUBMITTALS 013300 Schedule of Submittals (This form completed and editted) F 013300 PD F Proof of Payment 013300 QCS Submittal Coordinator Qualifications F/O 013300 QCS CONTRACT CLOSEOUT 017716 F Project Record Documents 017716 ccs ccs Operation and maintenance, 2 copies F 017716 F 017716 ccs Warranties Spare Parts and Maintenance Materials 017716 ccs F UNDERGROUND UTILITY LOCATOR SERVICE 023313 Submit detailed experience and qualifications description of underground utility locator service 023313 1.04.A QCS 023313 1.04.B PD Investigative Report **CAST-IN-PLACE CONCRETE** 033001 Submit product data for design mix(es) and materials for concrete specified below at the same time as a 033001 D 1.03.A **PACK** package D 033001 1.03.B.1 PD Concrete design mix(es) Portland Cement D 033001 1.03.B.2 PD 033001 1.03.B.3 PD Fly Ash D D 033001 1.03.B.4 PD Air-entraining Admixture D

Updated: 10/16/2015 Printed: 11/11/2021

1.03.B.5

PD

033001

Water-Reducing Admixture

PROJECT NO.: 45552-E								
	SUBMITTALS FOR APPROVAL				Critical Submittals	Allow at lea	ctor's Project ast 4 weeks fo ne for any resu	r Approval
				F	Mark "X"			
				F/O	for all	Projected	Projected	Projected
Spec	Sub			D	that apply	Transmittal	Approval	Delivery
Section	Section	Type	Description	S		Date:	Date:	Date:
033001	1.03.B.6	PD	Aggregates	D				
033001	1.03.B.7	PD	Lightweight Coarse Aggregate	D				
033001	1.03.B.8	PD	Chemical Hardener (Dustproofing)	D				
033001	1.03.B.9	PD	Chemical Curing and Anti-Spalling Compound	D				
			Certificates: Affidavit required under Quality					
033001	1.03.C	QCS	Assurance Article	D				

078400			FIRESTOPPING			
010100			Submit the following items specified below the same			
			time as a package: Product Data, Samples, Quality			
078400	1.04.A	PACK	Control Submittals and Firestop Schedule	D		
078400	2.01.A	PD	Firestopping Device and Material	D		
078400	1.04.A.4	PD	Firestopping Schedule	D		
			Through-Penetration Firestop Devices, Forming			
078400	2.01.A	PD	Materials, And Fill, Void or Cavity Materials	D		
078400	2.01.B	PD	Accessories	D		
078400	2.01.C	PD	Identification Labels	D		
078400	1.04.C	SAM	Each Product requested	D		
078400	1.04.D.1	QCS	Design Data	D		
078400	1.04	QCS	Installer's Qualifications Data	D		
078400	1.04.D.2	QCS	Company Field Advisor Data	D		
099102			ELECTRICAL PAINTING			
099102	1.02.A.1	PD	Painting Schedule - Exterior Substrates	D		
099102	1.02.A.2	PD	Painting Schedule - Interior Substrates	D		
099102	2.03.B	PD	Type EAL-3: Exterior Acrylic Latex, Gloss Enamel	D		
				_		
099102	2.03.C.1	PD	Type IAL-3: Interior Acrylic Latex, Semigloss Enamel	D		
099102	2.03.C.2	PD	Type IAL-4: Interior Acrylic Latex, Gloss Enamel.	D		
099102	2.03.D	PD	Colors	D		
099102	1.02.C.1	QCS	Test Reports	D		
099102	1.02.C.2	QCS	Certificates of Quality Assurance Article	D		
260519			WIRING, GENERAL - 600 VOLTS AND UNDER			
			For Electrical Circuit Protective Systems: Show			
			proposed routes and installation details (include UL			
260519	1.01	SD	classification data, listing, and system number)	D		
260519	2.01	PD	Insulated Conductors and Cables	D		
260519	2.02	PD	Connectors	D		
260519	2.03	PD	Tapes	D		
260519	2.04	PD	Wire Pulling Compounds	D		
260519	2.05	PD	Tags	D		
260519	2.06	PD	Wire Management Products	D		
260526			SERVICE GROUNDING AND BONDING			
260526	2.01.A	PD	Ground Clamps (Cable to Pipe)	D		
260526	2.01.B	PD	Ground Clamps (Cable to Rod)	D		
260526	2.01.C	PD	Ground Lugs	D		
260526	2.01.D	PD	Exothermic Type Weld	D		

PROJECT NO.: 45552-E								
		SUBM	ITTALS FOR APPROVAL	Send to:	O: Submittals Allow at least 4 weeks for App (allows time for any resubmiss			or Approval
				F/O	Mark "X"			
Spec	Sub			D	for all that apply	Projected Transmittal	Projected Approval	Projected Delivery
Section	Section	Type	Description	S	шас арргу	Date:	Date:	Date:
260526	2.01.E	PD	Compression Connectors	D				
260526	2.01.F	PD	Rod Electrodes	D				
260526	2.01.G	PD	Plate Electrodes	D				
			Grounding Electrode Conductors and Bonding					
260526	2.01.H	PD	Conductors	D				
260526	2.01.I	PD	Hardware	D				
260529			FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES					
			Show support details if different from methods					
260529	1.01.A	SD	specified or shown on the drawings.	D				
260529	2.01.A	PD	Sleeve Anchors	D				
260529	2.01.B	PD	Wedge Anchors	D				
260529	2.01.C	PD	Self-Drilling Anchors	D				
260529	2.01.D	PD	Non-Drilling Anchors	D				
260529	2.01.E	PD	Stud Anchors	D				
260529	2.02.A	PD	Continuous Slotted Type Concrete Insert, Galvanized	D				
260529	2.02.B	PD	Threaded Type Concrete Insert	D				
260529	2.02.C	PD	Wedge Type Concrete Insert	D				
260529	2.03.A.1	PD	Standard Nuts and Bolts	D				
260529	2.03.A.2	PD	Lag Screws	D				
260529	2.03.A.3	PD	Machine Bolts	D				
260529	2.03.A.4	PD	Wood Screws	D				
260529	2.03.A.5	PD	Plain Washers	D				
260529	2.03.A.6	PD	Lock Washers	D				
260529	2.03.A.7	PD	Toggle Bolts	D				
260529	2.03.B	PD	Stainless Steel Fasteners	D				
260529	2.04	PD	TPR Fasteners	D				
260529	2.05	PD	Powder Driven Fastener Systems	D				
260529	2.06	PD	Hanger Rods	D				
260529	2.07.A	PD	"C" Beam Clamps with Conduit Hangers	D				
260529	2.07.B	PD	"C" Beam Clamps for Hanger Rods	D				
260529	2.08	PD	Channel Support System	D				
260529	2.09.A	PD	Side Beam Fittings	D				
260529	2.09.B	PD	Pipe Straps	D				
260529	2.09.C	PD	Deck Clamps	D				
260529	2.09.D	PD	Fixture Stud and Strap	D				
260529	2.09.E	PD	Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System	D				
260529	2.09.F	PD	Supporting Fasteners (Metal Stud Construction)	D				
260524			EXPOSED CONDUIT - WET LOCATIONS					
260531 260531	2.01.A	PD	Rigid Ferrous Metal Conduit	D				
260531	2.01.A 2.01.B	PD	Liquid-tight Flexible Metal Conduit	D				
	2.01.B	PD	Rigid Nonmetallic PVC Conduit, Fittings, and Accessories	D				
260531	2.01.0	רא	Connectors and Couplings - Couplings (For Rigid	L D				
260531	2.02.A.1	PD	Metal Conduit)	D		<u> </u>		

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O Projected Projected Projected for all Spec Sub D that apply Transmittal Approval Delivery Section Section Type Description S Date: Date: Date: Connectors and Couplings - Watertight Conduit Hubs D 260531 2.02.A.2 PD Connectors and Couplings - Liquid-tight Flexible Metal 260531 2.02.A.3 PD Conduit Connectors D Conduit Bodies (Threaded) D 2.02.B PD 260531 D Expansion Fittings 260531 2.02.C PD Deflection Fittings D 260531 2.02.D PD D 260531 2.02.E.1 PD Sealing Fittings - Horizontal 260531 Sealing Fittings - Vertical with Drain D 2.02.E.2 PD 260531 2.02.E.3 PD Sealing Fittings - Other Type Fittings D D Vertical Conductor Supports 260531 2.02.F PD Conduit Clamps and Back Spacers D 260531 2.02.G PΠ **Drains and Breathers** D 260531 2.02.H INTERIOR RACEWAYS, FITTINGS, AND 260532 **ACCESSORIES** Rigid Ferrous Metal Conduit D 260532 2.01.A PD 2.01.B Intermediate Ferrous Metal Conduit D 260532 PΠ Electrical Metallic Tubing D 260532 2.01.C PD 2.01.D Flexible Metal Conduit D 260532 PD Liquid-tight Flexible Metal Conduit D 2.01.E 260532 PD Rigid Nonmetallic PVC Conduit, Fittings, and D 260532 2.01.F PD Accessories Wireways, Fittings and Accessories D 260532 2.01.G PD Insulated Bushings D 260532 2.02.A PD D PD Plastic Bushings for 1/2 and 3/4 Inch Conduit 260532 2.02.B D Insulated Grounding Bushings 2.02.C PD 260532 Connectors and Couplings D 260532 2.02.D PD 260532 2.02.E PD Conduit Bodies (Threaded) D 260532 **Expansion Fittings** D 2.02.F PD **Deflection Fittings** D 260532 2.02.G PD D 260532 2.02.H PD Hazardous Location Fittings Sealant for Raceways Exposed to Different D 260532 2.02.1 PD Temperatures D 260532 2.02.J PD Vertical Conductor Supports Pulling-In-Line For Installation in Spare and Empty 260532 2.02.K PD Raceways D **OUTLET, JUNCTION, AND PULL BOXES** 260534 260534 Galvanized Steel Outlet Boxes D 2.01 260534 2.02 PD Galvanized Steel Junctions and Pull Boxes D 2.03 PD Threaded Type Boxes D 260534 260534 2.04 PD Corrosion Resistant Boxes D

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260534

260534

260534

260534

260543

2.05

2.06.A

2.06.B

2.07

PD

PD

PD

PD

Specific Purpose Boxes

Combination Finishing Collar/Outlet Box

UNDERGROUND CONDUIT SYSTEM

Outlet Boxes and Related Products for Fire Rated

Finishing Collar

Construction

D

D

D

D

PROJECT NO.: 45552-E								
		SUBMI	TTALS FOR APPROVAL	Send to:	Critical Submittals	Allow at lea	ctor's Project ast 4 weeks fo ne for any resu	r Approval
Spec	Sub			F/O D	Mark "X" for all that apply	Projected Transmittal	Projected Approval	Projected Delivery
Section	Section	Туре	Description	S		Date:	Date:	Date:
260543	2.01.A	PD	Rigid Ferrous Metal Conduit	D				
260543	2.01.B	PD	Rigid Nonmetallic Conduit And Fittings (Concrete Encased)	D				
260543	2.01.C	PD	Conduit Spacers and Levelers	D				
260543	2.01.D	PD	Duct Seal	D				
260543	2.01.E	PD	Drag Line	D				
260543	2.01.F	PD	Thru Wall Sealing Bushings	D				
260543	2.01.G	PD	End Bells	D				
260543	2.01.H	PD	Insulated Grounding Bushings	D				
260548	1.00.1		SEISMIC RESTRAINT OF ELECTRICAL SYSTEMS					
260548	1.03.A	SD	Restraint and assembly details Details and method of installing restraints, anchors,	D				
260548	1.03.B	SD	and supports	D				
	400.0	25	Drawings identifying seismic locations with corresponding details of pre-approved seismic restraints, with seismic loads and seismic force level (Fp) calculations; pre-engineered and stamped by a NYS Licensed Professional Engineer experienced in					
260548	1.03.C	SD	seismic restraint systems Manufacturer product data for all seismic restaint	D				
260548	2.01	PD	components	D				
260548	2.01	PD	Manufacturer product data for all brace components	D				
260548	1.05	QCS	Seismic Restraint Manufacturer's Qualifications Data	D				
260548	1.05	QCS	Company Field Advisor Data	D				
260548	1.05	QCS	Manufacturer's Certificate of Compliance for Seismic Restraints	D				
222772			CHORT CIRCUIT AND CROUND FAULT					
260573			SHORT CIRCUIT AND GROUND FAULT					
260572	4.0E.A	DACK	Studies shall be submitted with the related equipment submittals. Both the studies and equipment submittal must be approved for both to be accepted.	D				
260573 260573	1.05.A 1.05.B	SD	Preliminary STUDIES	D				
260573	1.05.C	PD	Equipment shop drawings	D				
20070	1.00.0		Submit qualifications for individual(s) who will perform the STUDIES for approval prior to commencement of					
260573	1.05.F	QCS	the STUDIES.	D				
260573	1.05.G	SD	Results of the STUDIES shall be summarized in a final report.	D				
260925	1.05.K	ccs	Signed Certificate by Contractor and electric equipment manufacturer that all the fuse ratings and types, settings of all circuit breakers and ground fault system are in accordance with the STUDIES.	F				
260924			AUTOMATIC LIGHTING CONTROLS					
260924	1.02.B	PACK	Submit the shop drawings, and the product data specified below at the same time as a package.	D				

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O Projected Projected Projected for all Spec Sub D that apply Transmittal Approval Delivery Section Section Type Description S Date: Date: Date: Wiring and/or schematic diagram of the control circuits as proposed to be installed (standard 260924 1.02.C SD diagrams will not be accepted D Photoelectric Control D 260924 2.01 PΠ Time Controls - 7 Day Calendar Dial D 260924 2.02 PD Remote Control Switches D 260924 2.03 PD OCCUPANCY SENSORS FOR LIGHTING 260925 CONTROL Submit the shop drawings, and the product data specified below at the same time as a package D 260925 1.01.B **PACK** For Sensor Systems - Composite wiring and/or schematic diagram of each control circuit as proposed to be installed (standard diagrams will not be D 260925 1.01.C.1 SD accepted). For Sensor Systems - Scale drawing for each area showing exact location of each sensor, switching 260925 1.01.C.2 SD module, and on-off-auto switch. D Ceiling Sensor D 260925 2.01.A PD D 260925 2.01.B PD Vacany Sensor Dimmable Wall Switch Occupancy/Vacancy Sensor D 260925 2.01.C PΠ 260925 2.01.D PD Power Packs D D 260925 2.01.E PD Dimming Photo Sensor Spare Parts: One of each switch module F 260925 1.02 ccs 262212 **TRANSFORMERS - DRY TYPE, UNDER 600V** For Transformers Rated 75KVA and Below: Submit the product data, and quality control submittals specified below all at the same time as a package. D 262212 1.02.B.1 PACK For Transformers Rated over 75KVA: Submit the product data, and quality control submittals preliminary data specified below all at the same time 262212 1.02.B.2 **PACK** as a package. D D PD Dry Type Transformers 262212 1.02.C Transformers Rated 75KVA and Below: Submit certified report of the Company's routine commercial **QCS** NEMA tests for each type transformer. D 262212 1.02.D.1 Transformers Rated over 75KVA: Preliminary Data: Submit certified report of the Company's standard QCS tests for each type transformer. D 262212 1.02.D2a Transformers Rated over 75KVA: Final Approval: After approval of preliminary data and after construction of transformers, make routine commercial NEMA tests at the factory on the actual 1.02.D2b QCS transformers and submit certified test reports. D 262212 F 262212 1.02.E.1 ccs Operation and Maintenance Data: Deliver 2 copies

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1.02.E.2

ccs

copies

PANELBOARDS

262212

262416

Energy Efficiency Rebate Documentation: Deliver 2

F

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O Projected Projected Projected for all Spec Sub D that apply Transmittal Approval Delivery Section Section Type Description S Date: Date: Date: Submit the shop drawings, product data, and the quality control submittals specified below at the same 262416 1.02.B **PACK** time as a package. D Χ Cabinet and gutter size. D 262416 1.02.C.1 SD Voltage and current rating D 262416 1.02.C.2 SD Panelboard short circuit rating. Indicate if rating is Fully Rated Equipment Rating, or where acceptable, UL listed Integrated Equipment Short Circuit Rating 262416 1.02.C.3 SD D 262416 1.02.C.4 SD Circuit breaker enumeration (frame, ATE, poles, I.C.) D When indicated on the panelboard schedule, a coordinated selective scheme between the main circuit breaker and branch/feeder circuit breakers so that under fault conditions the branch/feeder circuit breaker clears the fault while the main circuit breaker 262416 1.02.C.5 SD remains closed. D 262416 1.02.C.9 SD Accessories D 262416 2.01 Panelboards D PD 262416 2.02 PD Surge Protective Device D 262416 PD D 2.03 Nameplates List of Completed Installations D 262416 1.02.E.1 QCS D Company Field Advisor Data 262416 1.02.E.2 QCS F 262416 1.02.F.1 **CCS** System acceptance test report Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating 262416 1.02.F.2 ccs properly. F 1.02.F.3 Operation and Maintenance Data: Deliver 2 copies F 262416 ccs 262726 WIRING DEVICES 262726 2.01.A PD Local Switches, Single Pole D 2.01.B Local Switches, Three-Way D 262726 PD Local Switches, Four-Way D 262726 2.01.C PD D Lighted Toggle Switches 262726 2.01.D PD Specification Grade Receptacles D 262726 2.02.A PΠ 262726 2.02.B PD Ground Fault Interrupter Receptacles D Weather Resistant Ground Fault Interrupter Receptacles D 262726 2.02.C PΠ Special Purpose Receptacles D 262726 2.02.D PD Brass Wall Plates D 262726 2.03.A PD Weatherproof Covers D 262726 2.03.B PD 262726 2.03.C PD Covers for Threaded Type Boxes D D **Emergency Shutdown Switches** 262726 2.04 PD D Nameplates 262726 2.05 PD 262726 2.06 PD Generator Transfer Device D SAFETY SWITCHES 262812 SAFETY SWITCHES (SINGLE THROW) - NEMA 1,

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2.02

2.02

PD

PD

3R, 4 (Stainless Steel), 12

Nameplates

262812

262812

D

D

PROJECT NO.: 45552-E								
		SUBMI	TTALS FOR APPROVAL	Send to:	Critical Submittals	Allow at lea	ctor's Project ast 4 weeks for ne for any resu	or Approval
Spec Section	Sub Section	Туре	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
		. , , , ,	2000			54.0.	Date.	Date:
262813			FUSES					
262813	2.01	PD	Fuseholders	D				
262813	2.02	PD	Fuses Rated 600V or Less	D				
262813	1.02.A.1	ccs	Spare Parts: Six spare fuses of each size and category, including any accessories required for a complete installation.	F				
262813	1.02.A.2	ccs	Spare Parts: Special tools if required for installation or removal of fuses	F				
263215			GASEOUS-ALTERNATOR ENGINE SYSTEM					
263215	1.03.B	PACK	Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package	D	х			
263215	1.03.C.1	SD	Manufacturer's drawings showing the construction (outline) of the gas-alternator unit and accessories.	D				
263215	1.03.C.2	SD	Installation details.	D				
263215	1.03.C.3	SD	Housing details including layout of equipment, raceways, piping, etc	D				
263215	1.03.D.2	PD	Bill of materials	D				
263215	1.03.D.3	PD	Detailed sequence of operations (format similar to SYSTEM DESCRIPTION. Company's data indicating fuel consumption with the	D				
263215	1.03.D.4	PD	unit operating at 1/2, 3/4 and full load. Name, address and telephone number of nearest fully	D				
263215 263215	1.03.D.5 2.01.D	PD PD	equipped service organization Gas-Alternator Unit	D D				
263215	2.01.D8b	PD	Lead-acid batteries	D				
263215	2.01.D8f	PD	Battery Charger	D				
263215	2.01.D8d	PD	Battery Rack	D				
263215	2.01.I	PD	Factory installed housing	D				
263215	2.01.E	PD	Engine Fuel Equipment	D				
263215	2.01.F	PD	Remote alarm annunciator	D				
263215	1.02.E.1	QCS	Design Data	D				
263215	1.04.C	QCS	Company Field Advisor Data	D				
263215	1.04	QCS	Completed Installation Lists	D				
263215	1.02.F.1	ccs	Operation and Maintenance Data: Deliver 2 copies	F				
263215	1.02.F.2	ccs	Test Report: System acceptance test report.	F				
			Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating					
263215	1.02.F.3	ccs	properly	F				
263215	1.02.F.4	ccs	Photographs	F				
263215	1.06.A.1	ccs	Spare Parts: Two sets of gaskets for routine engine maintenance.	F				
			Spare Parts: Two spare heating elements for water jacket heater. Furnish spare water jacket heater if					
263215	1.06.A.2	ccs	elements are not replaceable.	F				
263215	1.06.A.3	ccs	Spare Parts: Set of belts.	F		ļ		
263215	1.06.A.4	ccs	Spare Parts: Set of oil filter elements.	F		ļ		<u> </u>
263215	1.06.A.5	ccs	Spare Parts: Set of fuel filter elements	F				

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O for all Projected Projected Projected Sub D that apply Transmittal Approval Delivery Section Description Type S Date: Date: Date: F 1.06.A.6 ccs Spare Parts: Set of air cleaner elements.

F

F

F

F

Spare Parts: Hydrometer for testing anti-freeze

Spare Parts: Test kit for checking chemical condition

Spare Parts: One year supply of coolant conditioner

Spare Parts: Special tools if required for the regular

maintenance and minor repairs of the unit.

263623			AUTOMATIC TRANSFER SWITCH					
			Submit the product data, shop drawings, and quality					
			control submittals specified below at the same time as	_				
263623	1.04.B	PACK	a package	D	Х			
			Installation details (coordination with connected	6				
263623	1.04.C	SD	equipment).	D				
263623	1.04.D.2	PD	Bill of materials	D				
	40450		Detailed sequence of operations (format similar to	6				
263623	1.04.D.3	PD	TRANSFER SWITCH OPERATING DESCRIPTION).	D				
263623	1.04.D.4	PD	Company's data indicating maintenance schedule	D				
000000	4 0 4 D 5		Name, address and telephone number of nearest fully equipped service organization	D				
263623	1.04.D.5	PD	i i					
263623	2.01	PD	Automatic Transfer Switch	D		1	1	
263623	2.02	PD	Nameplates	D		-	1	
263623	1.03.E.1	QCS	Design Data:	D				
263623	1.03.E.2	QCS	Company Field Advisor Data	D				
263623	1.03.E.3	QCS	Completed Installation List	D				
263623	1.03.F.1	ccs	Operation and Maintenance Data: Deliver 2 copies	F				
263623	1.03.F.2	ccs	Test Report: Switch/System acceptance test report	F				
			Certificate: Affidavit, signed by the Company Field					
			Advisor and notarized, certifying that the switch					
000000	4 00 5 0	000	operation with the related equipment meets the	_				
263623	1.03.F.3	ccs	contract requirements and is operating properly Spare Parts: Special tools if required for the regular	F				
263623	1.06	ccs	maintenance and minor repairs of the switch	F				
203023	1.00	003	maintenance and minor repairs of the switch					
265160			LED FIXTURES					
265160								
			Technical information for each fixture that includes feaures, accessories, finishes, physical description					
			including dimensions, energy efficiency data, lumen					
265160	1.03.B.1	PD	output, CRI, and CCT.	D				
			Photmetric data and adjustment factors for each type	_		1		
265160	1.03.B.2	PD	fixture, including manufacturer certification	D				
					1			
265160	1.03.B.4	PD	For Emergency lighting units include battery charger	D				
			LED Driver, including certification data. Include data					
			which proves proposed LED and driver combinations					
265160	1.03.B.5	PD	do not exceed specified total harmonic distortion	D		<u> </u>		
265160	E-202	PD	Type A	D		1	ļ	
265160	E-202	PD	Type AE	D				
265160	E-202	PD	Type B	D				

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Spec

Section

263215

263215

263215

263215

263215

1.06.A.7

1.06.A.8

1.06.A.9

1.06.A.10

ccs

ccs

ccs

ccs

of coolant

PROJECT NO.: 45552-E								
		SUBM	TTALS FOR APPROVAL	Send to:	Allow at least 4 w			or Approval
Spec	Sub			F F/O D	Mark "X" for all	Projected	Projected	Projected
Section	Section	Туре	Description	S	that apply	Transmittal Date:	Approval Date:	Delivery Date:
265160	E-202	PD	Type BE	D				
265160	E-202	PD	Type C	D				
265160	E-202	PD	Type D	D				
265160	E-202	PD	Type DE	D				
265160	E-202	PD	Type E	D				
265160	E-202	PD	Type F	D				
265160	E-202	PD	Type H	D				
265160	E-202	PD	Type J	D				
265160	E-202	PD	Type J1	D				
265160	E-202	PD	Type JE	D				
265160	E-202	PD	Type K	D				
265160	E-202	PD	Type K1	D				
265160	E-202	PD	Type L	D				
265160	1.05.A	QCS	Luminaire Photometric Data Testing Laboratory Qualifications	D				
265160	1.05	QCS	Completed Installation List	D				
200100		455	Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended					
265160	1.03.C	QCS	location and application	D				
265160	1.07	ccs	Warranty	F				
265300			EXIT LIGHT FIXTURES					
265300	E-202	PD	Exit Light Fixtures - Type EX1	D				
265300	E-202	PD	Exit Light Fixtures - Type EX2	D				
265300	E-202	PD	Exit Light Fixtures - Type EX3	D				
265629			STREET LIGHTING AND GROUNDS LIGHTING					
265629	2.01.A	PD	20 Foot Height: Aluminum, 5 inch round tapered shaft	D				
265629	2.02.A	PD	Type PLL-1	D				
265629	2.02.B	PD	Type PLL-2	D				
265629	2.03	PD	Concrete Bases	D				
			I					
265629	2.04	PD	Rigid Ferrous Metal Conduit and Fittings	D				
	2.04 2.05		Rigid Ferrous Metal Conduit and Fittings Rigid Nonmetallic Conduit	D D				
265629		PD						
265629 265629	2.05	PD PD	Rigid Nonmetallic Conduit	D				
265629 265629 265629	2.05 2.06	PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses	D D				
265629 265629 265629 265629	2.05 2.06 2.07	PD PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses Tags Grout Thru Wall Sealing Bushings	D D D				
265629 265629 265629 265629 265629	2.05 2.06 2.07 2.08	PD PD PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses Tags Grout Thru Wall Sealing Bushings Splice Connectors	D D D D D				
265629 265629 265629 265629 265629 265629	2.05 2.06 2.07 2.08 2.09	PD PD PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses Tags Grout Thru Wall Sealing Bushings	D D D D				
265629 265629 265629 265629 265629 265629	2.05 2.06 2.07 2.08 2.09 2.10	PD PD PD PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses Tags Grout Thru Wall Sealing Bushings Splice Connectors Insulated Grounding Bushings TELEPHONE INTERCONNECTION CABINETS AND BOARDS	D D D D D				
265629 265629 265629 265629 265629 265629 265629	2.05 2.06 2.07 2.08 2.09 2.10	PD PD PD PD PD PD	Rigid Nonmetallic Conduit Fuse Holders and Fuses Tags Grout Thru Wall Sealing Bushings Splice Connectors Insulated Grounding Bushings TELEPHONE INTERCONNECTION CABINETS AND	D D D D D				

SCHEDULE OF SUBMITTALS PROJECT NO.: 45552-E **Contractor's Projected Dates** Send Critical SUBMITTALS FOR APPROVAL Allow at least 4 weeks for Approval Submittals to: (allows time for any resubmission) F Mark "X" F/O Projected Projected Projected for all Spec Sub D that apply Transmittal Approval Delivery Section Section Type Description S Date: Date Date: PROTECTED PREMISES FIRE ALARM SYSTEM 283101 Submit the shop drawings, product data, and quality control submittals specified and a Company Field Advisor Letter D 283101 1.04.B PACK Composite wiring and/or schematic diagrams of the complete system as proposed to be installed 283101 1.04.C SD (standard diagrams will not be acceptable). D Bill of materials D 283101 1.04.D.2 PD Detailed description of system operation. Format similar to SYSTEM DESCRIPTION D 283101 1.04.D.3 PD Sample procedure, programming and print-out for 283101 1.04.D.4 PD alarm, acknowledgment, and system reset. D Total electrical load of the complete system in supervisory and alarm conditions D 283101 1.04.D.5 PD Statement from the Company producing the system, for each size and type of single conductor and multiconductor cable proposed for use, indicating that the electrical characteristics meet the requirements of the Company. D 283101 1.04.D.6 PD Data from the Company furnishing the products, proving that detection devices that receive their power from the initiating device circuit or a signaling line circuit of a fire alarm control unit are UL listed for use with the control unit 1.04.D.7 D 283101 PD Detailed description of procedure proposed to test 283101 1.04.D.8 PD individual initiating devices D Name, address and telephone number of nearest fully 283101 1.04.D.9 PD equipped service organization D State grade and number of leased telephone lines 1.04.D.10 required for use with modem units D 283101 PD Fire Alarm Control Panels D 283101 2.01.A PD Remote Auxiliary Power Supplies D 283101 2.01.B PD 283101 2.01.C PD Remote Annunciator/Control Centers D D Ceiling Mounted Sensors - Smoke Sensors 283101 2.02.B.2 PD PD Ceiling Mounted Sensors - Heat Sensors D 283101 2.02.B.3 283101 2.02.B.4 PD Ceiling Mounted Sensors - Carbon Monoxide Sensors D Air Duct Smoke Detectors - Photoelectric Type D 2.02.C.1 PD 283101 Air Duct Smoke Detectors - Remote Alarm Indicator П 2.02.C.2 For Use With Air Duct Smoke Detectors 283101 PD D Manual Fire Alarm Boxes 283101 2.02.D PD Combination Audible/Visible Appliances - Wall 283101 2.03.B PΠ D Mounted Visible Appliances - Wall Mounted D 283101 2.03.C PD Audible Appliances - Wall Mounted D 283101 2.03.D PD 283101 2.04 PD Modem Units D Terminal Strip Cabinets D 283101 2.05 PD 283101 2.06 PD Power-Limited Fire Alarm Circuit Conductors D D Non-Power-Limited Fire Alarm Circuit Conductors 283101 2.07 PD 2.08 PD Metal-Clad Cable D 283101 283101 2.09.A PD Fire Alarm Circuit Integrity (CI) Cable D

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2.09.B

PD

283101

Other 2-hour Fire Resistive Cables

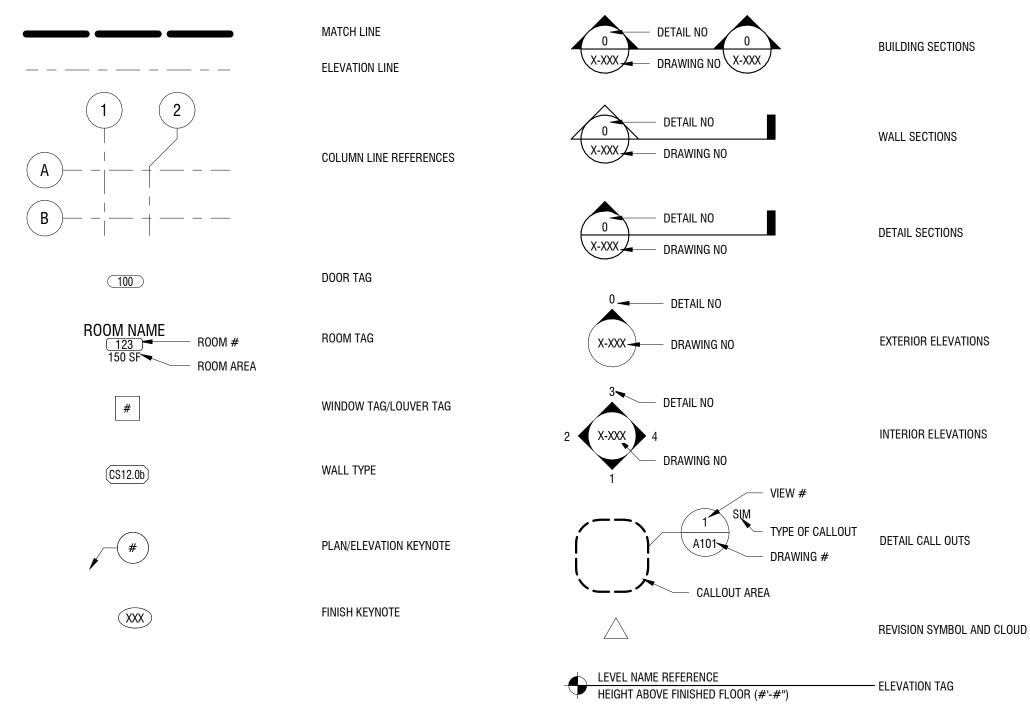
D

PROJECT NO.: 45552-E								
		SUBM	ITTALS FOR APPROVAL	Send to:	Allow at least 4 weeks for A			r Approval
				F/O	Mark "X"			
Spec	Sub			D	for all that apply	Projected Transmittal	Projected Approval	Projected Delivery
Section	Section	Туре	Description	S	шат арргу	Date:	Date:	Date:
283101	2.10.A	PD	Procedure Sign	D				
283101	2.10.B	PD	Alarm Notification Locator	D				
283101	2.10.C	PD	Floor Locator	D				
283101	2.10.D	PD	Wiring Diagram	D				
283101	2.10.E	PD	Nameplates	D				
283101	2.10.F	PD	Fire Alarm Signs	D				
283101	2.10.G	PD	Markers	D				
			Copy of license required by New York State General					
202404	40454	000	Business Law Article 6-D for installing Fire Alarm	D				
283101	1.04.E.1	QCS	Systems Company Field Advisor Data	D				
283101	1.04.E.2	QCS	Company Field Advisor Data	F				
283101	1.04.F.1	ccs	System acceptance test report	F				
			Certificates: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system					
			meets the contract requirements and is operating					
283101	1.04.F2a	ccs	properly	F				
283101	1.04.F2b	ccs	Certificates: NFPA Record of Completion	F				
283101	1.04.F.3	ccs	Operation and Maintenance Data: Deliver 2 copies	F				
			Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed					
283101	1.06.A	ccs	Work	F				
283101	1.06.B.1	ccs	Spare Parts: 50 percent spare of each type fuse	F				
283101	1.06.B.2	ccs	Spare Parts: 30 percent spare of each type lamp (except LED type).	F				
283101	1.06.B.3	ccs	Spare Parts: 10 percent spare of each type initiating device	F				
283101	1.06.B.4	ccs	Spare Parts: 10 percent spare of each type notification appliance	F				
283101	1.06.B.5	ccs	Spare Parts: 10 percent spare of each type protective device	F				
283101	1.06.B.6	ccs	Spare Parts: Twelve rolls of paper for strip printer.	F				
283101	1.06.B.7	ccs	Spare Parts: Four snap-in ribbon cassettes for strip printer	F				
310000			EARTHWORK					
310000	2.01.A	PD	Select Granular Material	D				
310000	2.01.B	PD	Subbase Course Type 2	D				
310000	2.01.C	PD	Selected Fill	D				
310000	2.01.D	PD	Suitable Material (Fill and Backfill for Landscaped Areas)	D				
310000	2.01.E	PD	Cushion Material	D		<u> </u>		
310000	2.01.F	PD	Pea Gravel	D				
310000	2.01.G	PD	Item B-12	D		 		
310000	2.01.H	PD	No. 1 Coarse Aggregate	D		<u> </u>		
310000	2.01.1	PD	No. 2 Crushed Stone	D				
310000	2.01.J	PD	Marker Tape	D		 		
310000	2.01	PD	Sand Filter Material (Electrical Trench)	D		<u> </u>		
310000	3.04	QCS	Excavation Procedure	D		<u> </u>		
310000	3.07	QCS	Compaction	D				

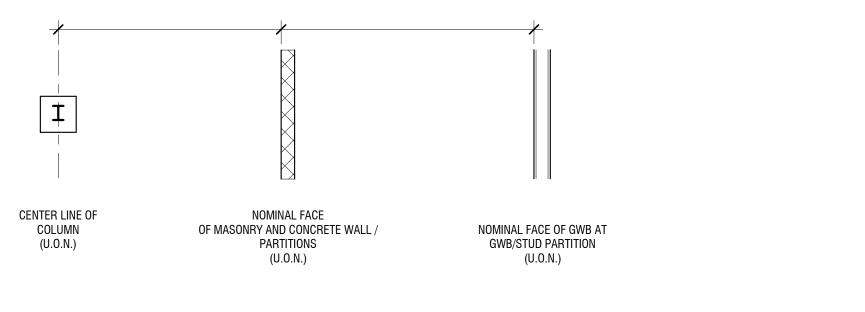
SCHEDULE OF SUBMITTALS								
	PROJECT NO.: 45552-E							
	SUBMITTALS FOR APPROVAL					Allow at lea	ctor's Projec ast 4 weeks fo ne for any resu	r Approval
				F	Mark "X"			
	0.1			F/O	for all	Projected	Projected	Projected
Spec	Sub	_	5	D	that apply	Transmittal	Approval	Delivery
Section	Section	Туре	Description	S		Date:	Date:	Date:
337119			ELECTRIC MANHOLES					
337119	2.01	PD	Precast Manholes	D	Χ			
337119	2.02	PD	Watertight Manhole Frames and Covers	D				
337119	2.03.A	PD	Cable Support Assemblies (Steel)	D				
337119	2.03.B	PD	Cable Support Assemblies (Nonmetallic)	D				
337119	2.04	PD	Grounding and Bonding	D				

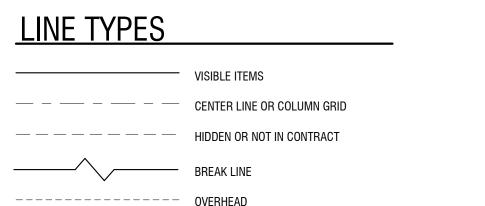
MATERIAL SYMBOLS **CONCRETE MASONRY UNITS** WOOD (FINISHED) RIGID INSULATION CONCRETE NOOD (ROUGH) BATT. OR LOOSE INSULATION NOOD (BLOCKING) BRICK CEMENT, SAND, GROUT, PLASTER PARTICLE BOARD OR GYPSUM WALL BOARD STONE, GRAVEL, OR POROUS FILL PLYW00D

ARCHITECTURAL DRAWINGS SYMBOLS



TYPICAL PLAN DIMENSIONING





WALL/ PARTITION DESIGNATIONS

BRICK FACE
C.M.U. WALL / PARTITION - REFER TO PARTITION TYPES
METAL STUD PARTITION - REFER TO PARTITION TYPES

GENERAL CONSTRUCTION NOTES:

- 1. PROVIDE FOR ALL MATERIALS, CONSTRUCTION METHODS AND CRAFTSMANSHIP.
- 2. VERIFY ALL CONDITIONS, REQUIREMENTS, NOTES, CODES AND DIMENSIONS PRIOR TO THE START OF CONSTRUCTION AND NOTIFY THE DIRECTOR'S REPRESENTATIVE IF CONDITIONS VARY FROM THOSE SHOWN
- 3. PROVIDE ADEQUATE SUPPORT OF FOUNDATION WALLS, LOAD BEARING WALLS AND PARTITIONS DURING
- 4. WORK SHALL BE THOROUGHLY COORDINATED WITH TRADES, DETERMINE THE EXACT ROUTE AND LOCATION OF UTILITIES, MATERIALS AND EQUIPMENT BEFORE FABRICATION AND INSTALLATION.
- 5. PROVIDE ALL BLOCKING, FURRING AND SHIMMING FOR INSTALLATION AND COMPLETION OF WORK.
- ALL WORK SHALL BE PLUMB, LEVEL AND SQUARE
- 7. VERIFY ALL DIMENSIONS REFORE ORDERING MATERIAL OR DOING WORK. NO EXTRA COMPENSATION OR CHARGES WILL BE ACCEPTED DUE TO DIFFERENCES BETWEEN THE ACTUAL MEASUREMENTS AND MEASUREMENTS INDICATED ON THE DRAWINGS.
- 8. PROVIDE SEALANT AT ALL JOINTS BETWEEN DIFFERENT MATERIALS. ALL SEALANTS TO BE TYPE 1B UNLESS OTHERWISE NOTED

GENERAL ARCHITECTURAL NOTES

- 1. DIMENSIONS NOTED AS "CLEAR" ARE TO FINISHED SURFACE AND ARE CRITICAL FOR ACCESSIBILITY REQUIREMENTS OR BUILT-IN FURNISHINGS
- 2. FIELD VERIFY FINISHED DIMENSIONS AND CLEARANCES IN SPACES INDICATED TO RECEIVE BUILT-IN FURNISHINGS OR CASEWORK PRIOR TO FABRICATION.
- 3. ALL VERTICAL CONCRETE SURFACES WHICH WILL BE EXPOSED TO VIEW UPON COMPLETION OF WORK
- SHALL RECEIVE A SMOOTH RUBBED FINISH. 4. SEALANT SHALL BE PROVIDED AT THE INTERIOR AND EXTERIOR PERIMETER OF ALL WINDOWS, DOOR
- FRAMES. I OUVERS OR OTHER ITEMS INSERTED IN AN EXTERIOR WALL 5. WOOD USED FOR BLOCKING OR OTHER PURPOSES ON OR ABOVE THE ROOF DECK, WITHIN 2'-0" OF GRADE AND IN OTHER LOCATIONS OUTSIDE THE BUILDING ENVELOPE WHERE EXPOSED TO THE
- PLYWOOD FROM ALL METALS WITH A SLIP-SHEET INSTALL ALL WORK AS INDICATED AND VERIFY EXACT LOCATION AND ELEVATIONS ON THE JOB.

WEATHER SHALL BE PRESSURE TREATED LUMBER OR PLYWOOD. SEPARATE ALL P.T. LUMBER OR

7. DO NOT SCALE DRAWINGS. REFER TO DIMENSIONS AND SPECIFIED MATERIALS. CONTACT THE DIRECTOR'S REPRESENTATIVE IF ADDITIONAL DIMENSIONS ARE REQUIRED.

CONSTRUCTION SAFEGUARDS NOTES

- SCOPE. THE SAFETY OF THE CONSTRUCTION AREA AND ADJACENT PUBLIC AND PRIVATE PROPERTIES SAFETY SHALL BE PROTECTED DURING CONSTRUCTION AND REMOVALS AS FOLLOWS, IN ACCORDANCE WITH THE 2015 INTERNATIONAL EXISTING BUILDING CODE (IEBC) CHAPTER 15, 2015 INTERNATIONAL BUILDING CODE (IBC) CHAPTER 33, AND THE 2015 INTERNATIONAL FIRE CODE (IFC) CHAPTER 33, AS AMENDED BY NYS FIRE PROTECTION AND UNIFORM CODE (UNIFORM CODE). COMPLIANCE WITH NFPA 241 IS REQUIRED FOR ITEMS NOT SPECIFICALLY ADDRESSED. THIS SPECIFICATION PROSCRIBES MINIMUM SAFEGUARDS FOR CONSTRUCTION TO PROVIDE REASONABLE SAFETY TO LIFE AND PROPERTY FROM FIRE DURING SUCH OPERATIONS.
- CONSTRUCTION INCLUDES ANY CONSTRUCTION, REMOVALS, REMODELING, ALTERATIONS, REPAIRS OR ADDITIONS TO ANY BUILDING OR STRUCTURE.
- MAINTENANCE OF SAFE CONDITIONS, REQUIRED SAFETY ELEMENTS SUCH AS EXITS, EXISTING STRUCTURAL MEMBERS, FIRE PROTECTION DEVICES AND SANITARY SAFEGUARDS SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE THE BUILDING IS NOT OCCUPIED OR WHERE SUCH REQUIRED ELEMENTS ARE BEING ALTERED OR REPAIRED AND ADEQUATE SUBSTITUTE PROVISIONS ARE MADE.
- FIRE SAFETY DURING CONSTRUCTION AND REMOVALS. FIRE SAFETY SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE UNIFORM CODE, INCLUDING IEBC IFC CHAPTER 33.
 - FIRE EXTINGUISHERS. PROVIDE PORTABLE FIRE EXTINGUISHERS FOR PROTECTION DURING CONSTRUCTION AND DEMOLITION AT EACH STAIRWAY ON EACH FLOOR LEVELS WHERE COMBUSTIBLE MATERIALS HAVE ACCUMULATED AND IN EVERY STORAGE AND CONSTRUCTION SHED. EXTINGUISHER SHALL COMPLY WITH IFC SECTION 906, SIZED FOR ORDINARY HAZARD UNLESS GREATER HAZARD IS SPECIFIED. ADDITIONAL PORTABLE FIRE EXTINGUISHER SHALL BE PROVIDED WHERE SPECIAL HAZARD EXISTS, SUCH AS THE STORAGE AND USE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.
 - WATER SUPPLY FOR FIRE PROTECTION. AN APPROVED WATER SUPPLY FOR FIRE PROTECTION, EITHER TEMPORARY OR PERMANENT, SHALL BE AVAILABLE WHEN COMBUSTION MATERIAL IS ON THE SITE
 - FIRE WATCH. WHERE SPECIFIED HEREIN, QUALIFIED PERSONNEL ACTING AS ON-SITE FIRE WATCH SHALL HAVE AN APPROVED MEANS TO NOTIFY THE FIRE DEPARTMENT, AND THEIR SOLE DUTY SHALL BE TO PERFORM CONSTANT PATROLS AND WATCH FOR THE OCCURRENCE OF FIRE.
 - ANY BURNING, CUTTING, OR WELDING SHALL REQUIRE PERMIT AND APPROVAL.
 - TEMPORARY ELECTRICAL INSTALLATIONS SHALL COMPLY WITH NFPA 70.
- MATERIAL HANDLING. EQUIPMENT AND MATERIALS SHALL BE STORED AND PLACED, AND WASTE SHALL BE REMOVED, SO AS NOT TO ENDANGER THE PERSONS OR PROPERTY OR TO IMPEDE A MEANS OF EGRESS. PLACE MATERIALS AND WASTE SO AS NOT TO OBSTRUCT ACCESS TO FIRE HYDRANTS, STANDPIPES, FIRE EXTINGUISHERS, FIRE OR POLICE ALARM BOXES, CATCH BASINS, MANHOLES, RELEVANT UTILITY STRUCTURES, TRAFFIC OR OBSERVATION OF TRAFFIC SIGNALS COMBUSTIBLE DEBRIS SHALL NOT BE ACCUMULATED ON SITE, AND SHALL BE REMOVED AT THE END OF EACH WORK SHIFT. RUBBISH CONTAINERS WITH A CAPACITY EXCEEDING 5.33 CUBIC FEET (40 GALLONS OR 0.15 CUBIC METERS) SHALL HAVE TIGHT-FITTINGS OR SELF CLOSING LIDS, AND SHALL BE CONSTRUCTED OF NONCOMBUSTIBLE MATERIAL THAT MEETS IFC SECTION 3304.2.3 (2). MATERIALS SUSCEPTIBLE TO SPONTANEOUS IGNITION SHALL BE STORED IN A LISTED DISPOSAL CONTAINER.

TO THE BEST OF MY KNOWLEDGE. BELIEF. AND PROFESSIONAL JUDGEMENT. THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CODE AND THE 2016 SUPPLEMENT TO THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE.



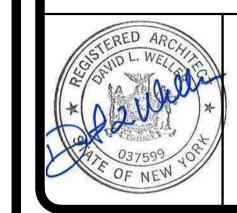
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CONTRACT:

PROVIDE SUB-HEADQUARTERS BUILDING

LOCATION: DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

EAST FISHKILL, NEW YORK CLIENT:

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Revised **Drawing**

ADDENDUM #2 11/15/2021 09/15/2021 REBID DATE DESCRIPTION

45552-**C**,**H**,**P** & **E** NUMBER:

DESIGNED BY: LAB DRAWN BY: WM FIELD CHECK: APPROVED:

SHEET TITLE: NOTES, SYMBOLS &

ABBREVIATIONS

DRAWING NUMBER:

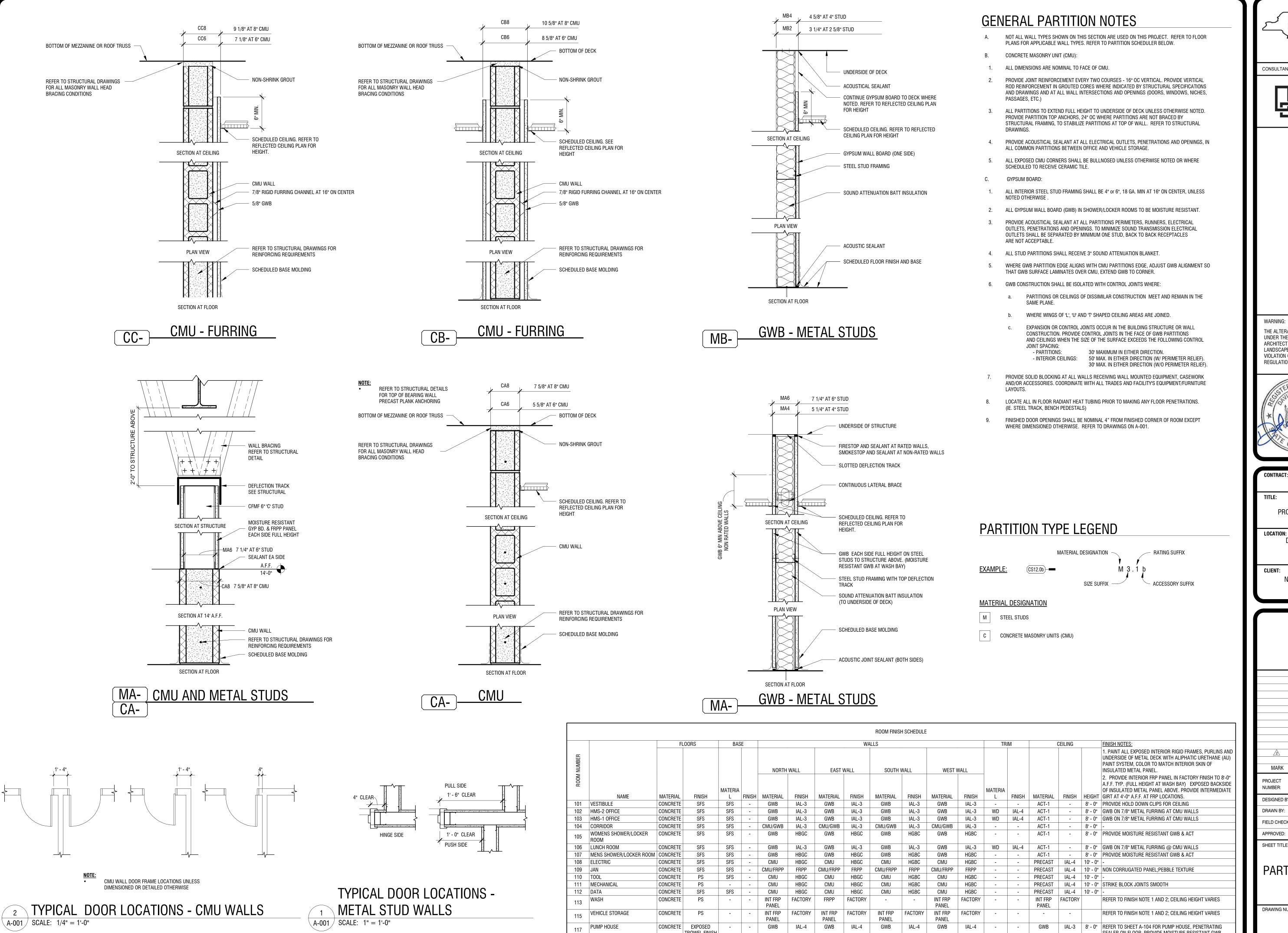
G-002

FTG:

FURN:

FOOTING, FITTING

FURNISH, FURNITURE



TROWFI FINISH

201 MEZZANINE

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CONSTRUCTION

PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

EAST FISHKILL, NEW YORK

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Revised **Drawing**

ADDENDUM #2 09/15/2021 REBID DATE DESCRIPTION

45552-**C**

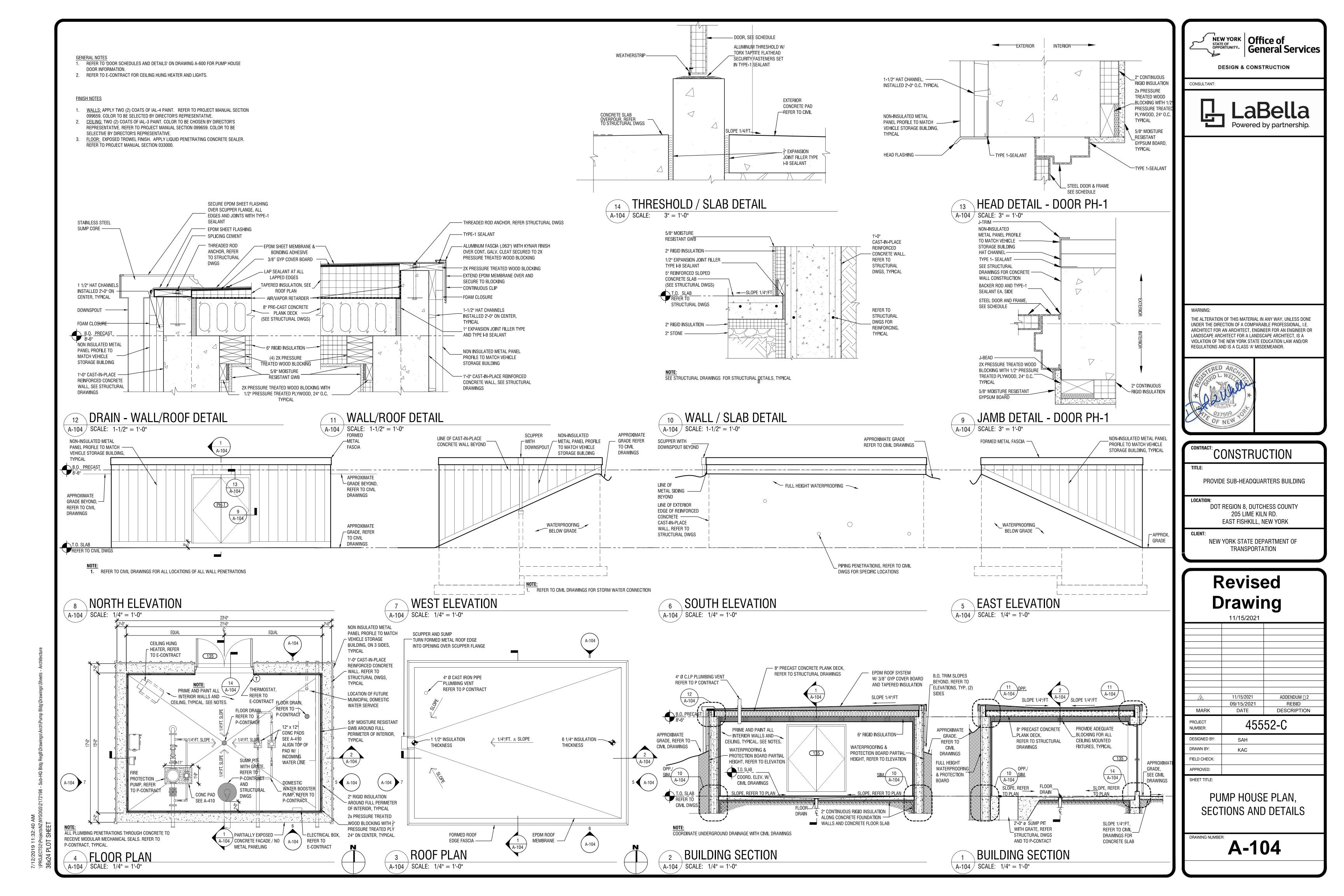
DESIGNED BY: DMD

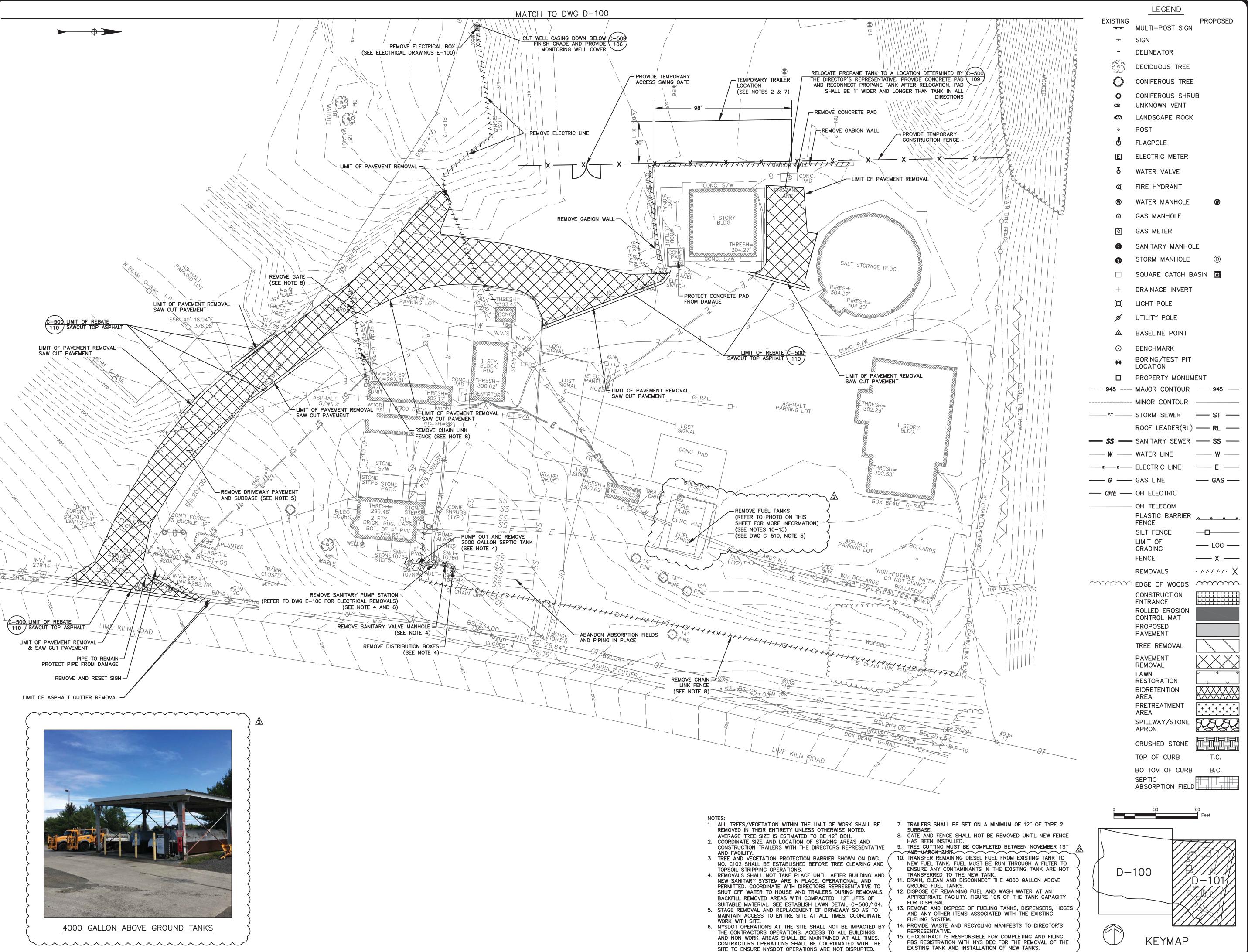
FIELD CHECK: APPROVED:

PARTITION TYPES AND ROOM

FINISH SCHEDULE

A-001





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CONSTRUCTION

PROVIDE SUB-HEADQUARTERS BUILDING

LOCATION:

DOT REGION 8, DUTCHESS COUNTY

205 LIME KILN RD.

EAST FISHKILL, NEW YORK

CLIENT:

NEW YORK STATE DEPARTMENT OF

TRANSPORTATION

Revised Drawing

11/15/2021

2	11/15/2021	ADDENDUM #2			
1	09/15/2021	REBID			
К	DATE	DESCRIPTION			
JECT	45552-C				

PROJECT NUMBER: 45552-C

DESIGNED BY: EFN

DRAWN BY: AWR

DRAWN BY: AWR

FIELD CHECK:

APPROVED: JMC

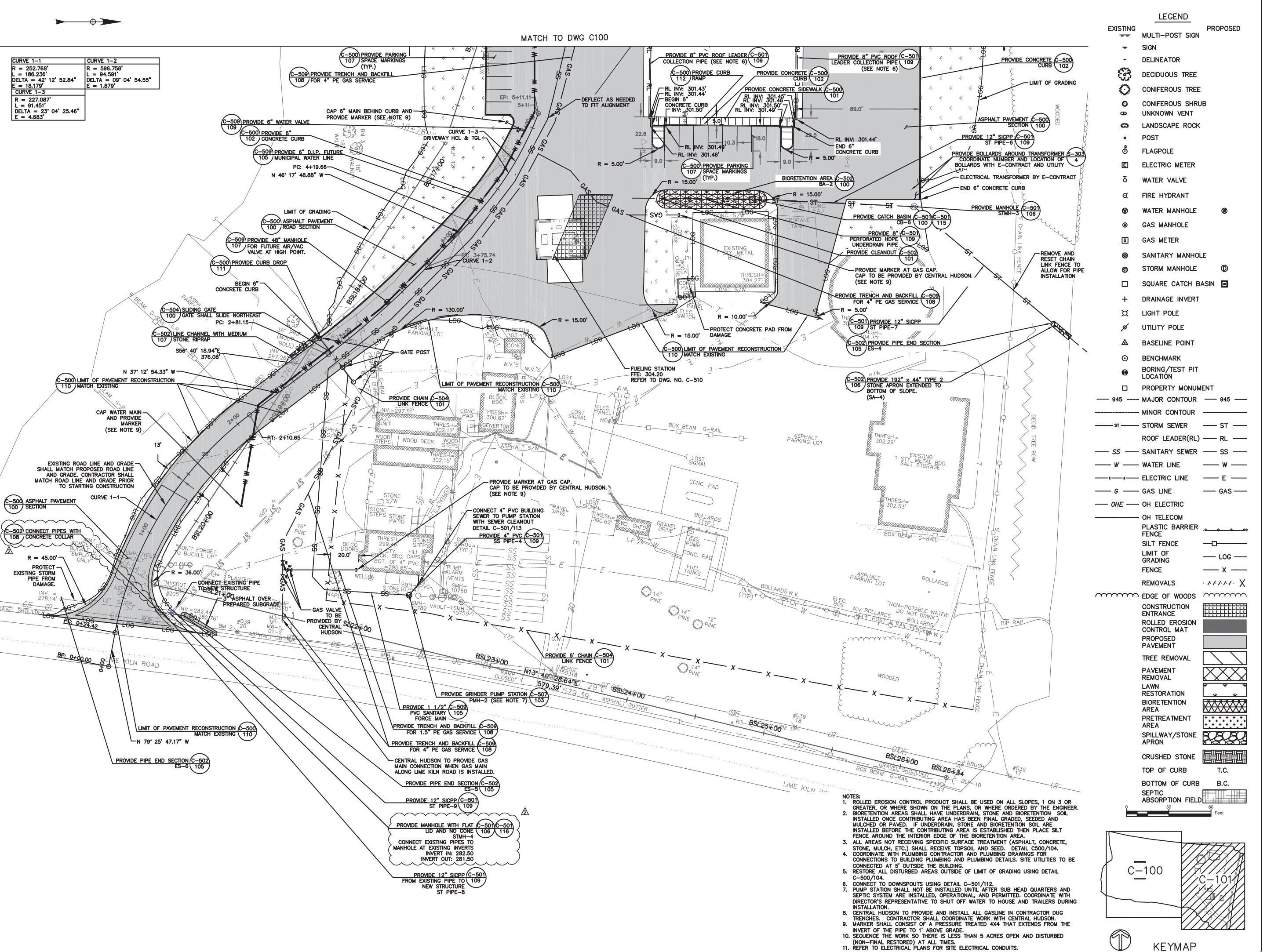
REMOVAL

DRAWING NUMBER:

SHEET TITLE:

D-101

PLANS



Office of General Services

DESIGN & CONSTRUCTION

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CONSTRUCTION

PROVIDE SUB-HEADQUARTERS BUILDING

LOCATION: DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

EAST FISHKILL, NEW YORK CLIENT: NEW YORK STATE DEPARTMENT OF

TRANSPORTATION

Revised

Drawing 11/15/2021 11/15/2021 ADDENDUM #2 09/15/2021 REBID DATE DESCRIPTION 45552-C PROJECT

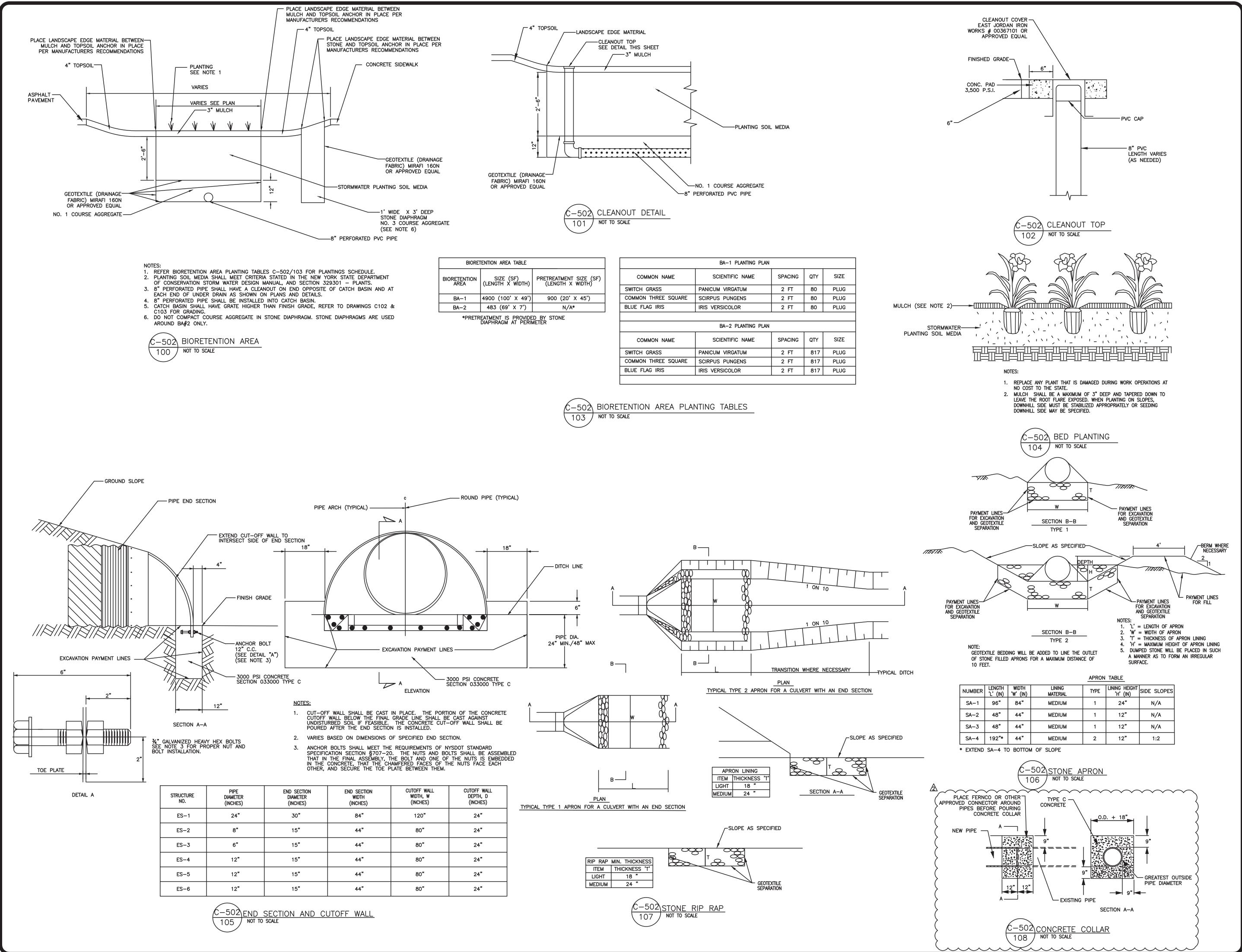
NUMBER: DESIGNED BY: EFN DRAWN BY: AWR FIELD CHECK:

APPROVED: SHEET TITLE:

MARK

SITE LAYOUT /SITE PLANS/UTILITY **PLANS**

C-101



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CLIENT:

MARK

PROJECT NUMBER:

SHEET TITLE:

CONSTRUCTION

PROVIDE SUB-HEADQUARTERS BUILDING

LOCATION: DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

> NEW YORK STATE DEPARTMENT OF TRANSPORTATION

EAST FISHKILL, NEW YORK

Revised Drawing

2	11/15/2021	ADDENDUM #2
1	09/15/2021	REBID
·	DATE	DESCRIPTION

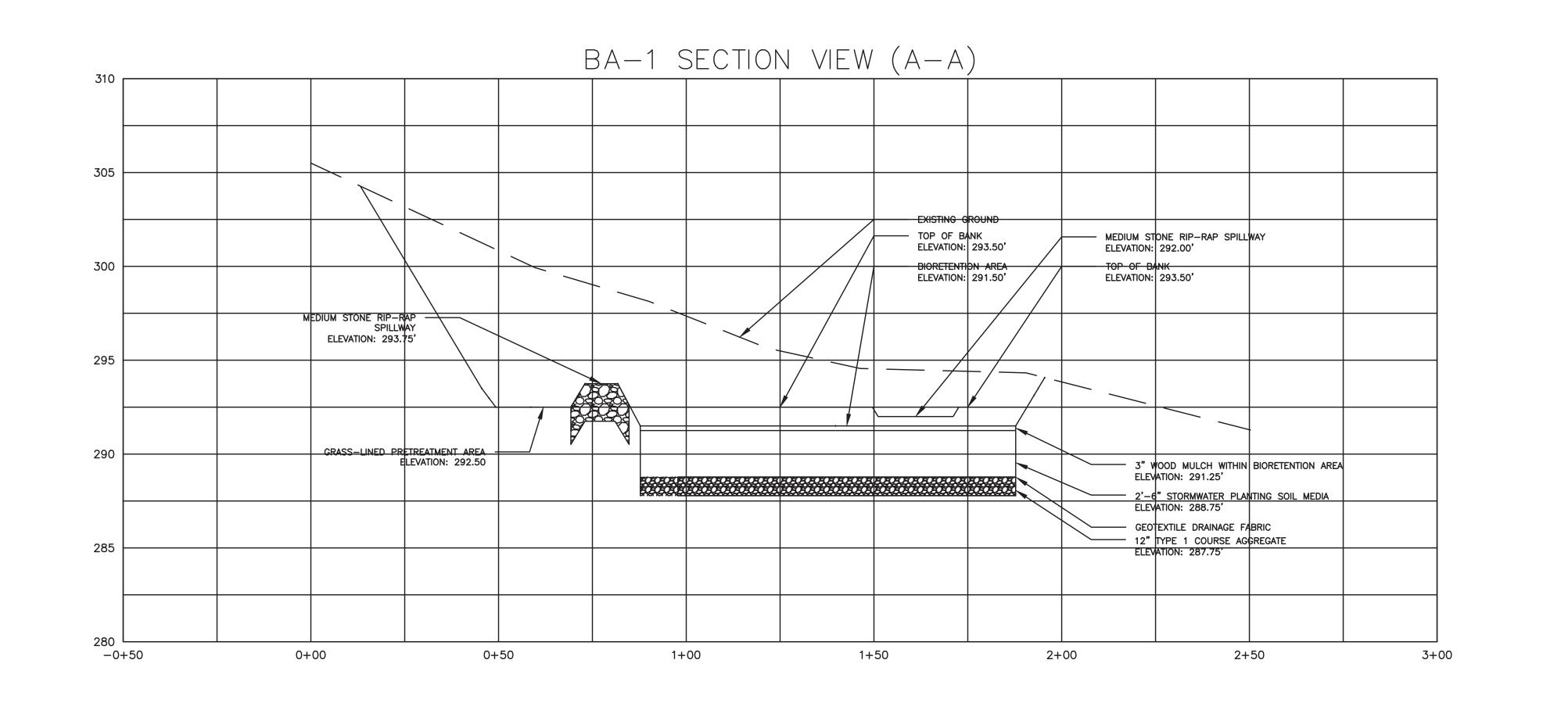
45552-C DESIGNED BY:

DRAWN BY: AWR FIELD CHECK:

APPROVED:

STORMWATER **MANAGEMENT DETAILS**

DRAWING NUMBER: C-502





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CONSTRUCTION

TLE:

PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY

205 LIME KILN RD.

EAST FISHKILL, NEW YORK

: NEW YORK STATE DEPARTMENT OF

TRANSPORTATION

Revised Drawing

11/15/2021

11/15/2021	ADDENDUM #2
09/15/2021	REBID

PROJECT NUMBER: 4552-C

DESIGNED BY: EFN

DRAWN BY: AWR

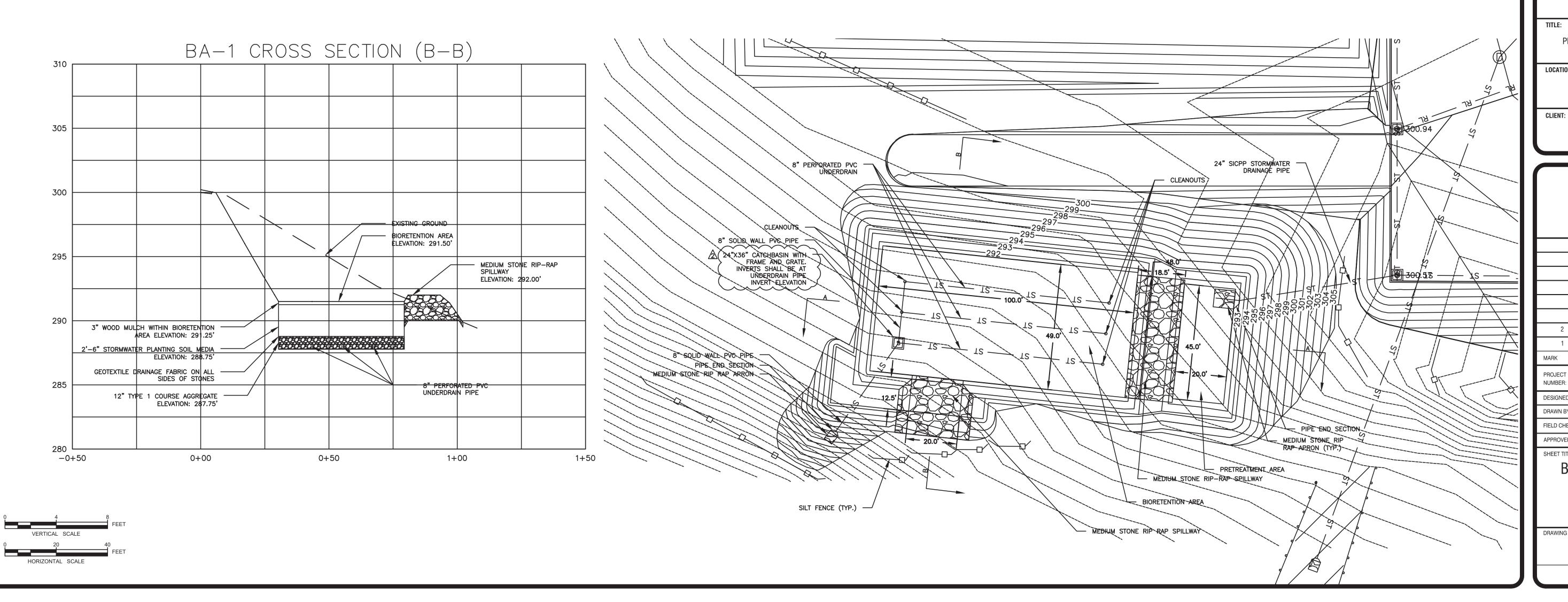
FIELD CHECK:

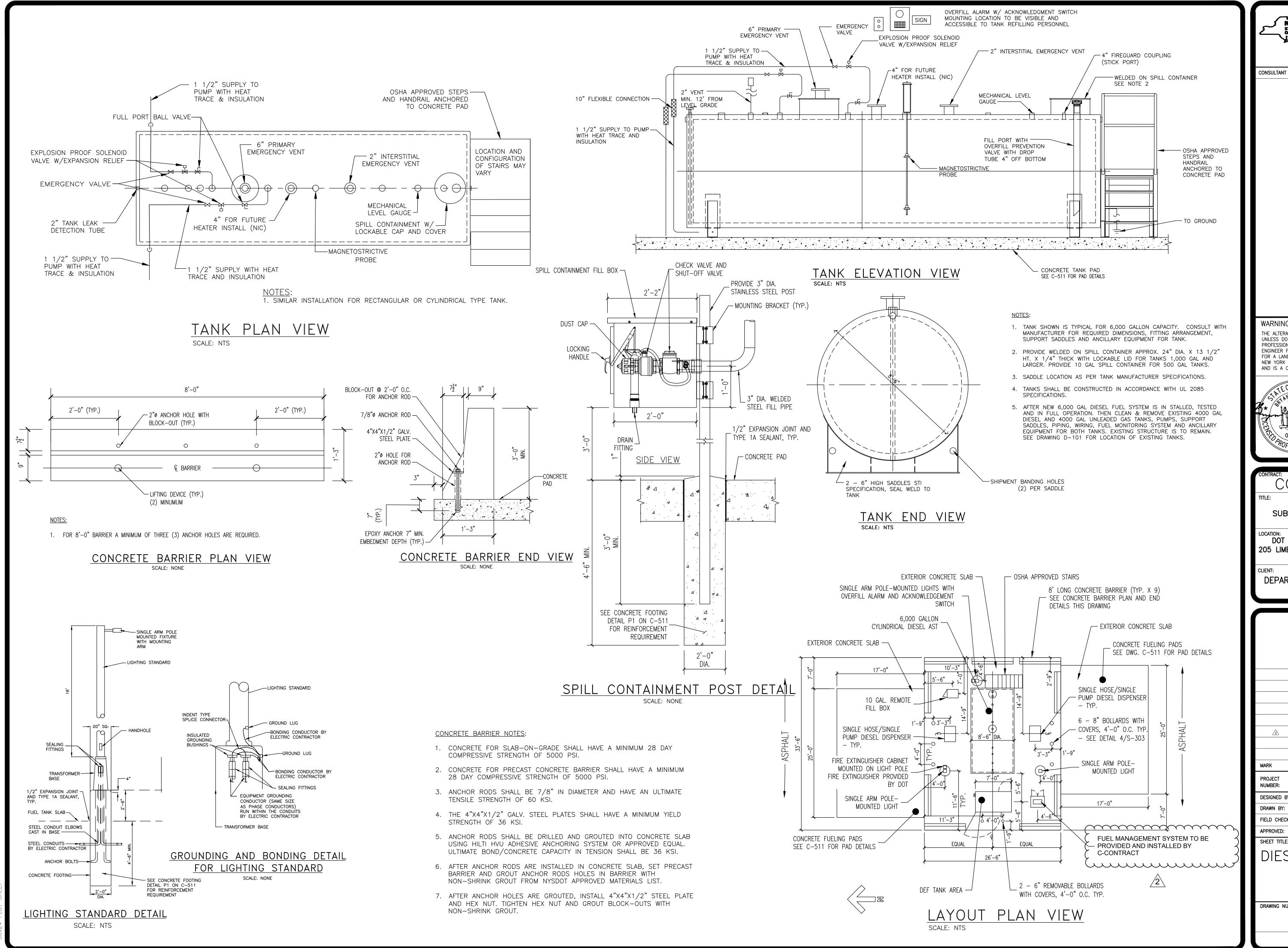
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BIORETENTION AREA 1 SECTION

DETAILS

C-506





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CONSTRUCTION

PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN ROAD, (OFF I-84 EXIT 15) EAST FISHKILL, NY 12533

DEPARTMENT OF TRANSPORTATION

Revised Drawing

11/15/2021 ADDENDUM #2 RE-BID DOCUMENTS 09/15/2021 10/17/2019 BID DOCUMENTS DATE DESCRIPTION **45552** – C B. JONES

DESIGNED BY: DRAWN BY: M. MCCULLEN FIELD CHECK:

APPROVED: SHEET TITLE:

DIESEL FUEL TANK PLAN AND SECTION

DRAWING NUMBER:

C - 510

	Е	ELEC	CTRI	C UN	IT HEA	TER S	CHE	DULE						
TAG	SERVICE	CFM	KW	TEMP RISE	NO. OF ELEMENTS	FAN HP	٧	PHASE	BASIS OF DESIGN					
UH-13	MER	80	5.0	42°F	1	1/40	208	1 Ø	MODINE HER 50					
UH-14	UH-14 PUMP HOUSE 80 5.0 42°F 1 1/40 208 1 Ø MODINE HER 50													
NOTES	}:													

NOTES:

1 PROVIDE REMOTE LINE VOI TAGE WALL MOUNTED THERMOSTAT AND UNIT MOUNTED DISCONNECT SWITCH.

1.	PROVIDE REMOTE LINE VOLTAGE WALL MOUNTED THERMOSTAT AND UNI
2.	SUPPORT FROM STRUCTURE ABOVE.

		HOT WA	TER C	ABIN	NET U	JNIT	HEA	TER	SCHE	DUL	E	
TAG	LOCATION	ARRANGEMENT	CFM	MBH	GPM	E.W.T. (°F)	L.W.T. (°F)	W.P.D. (FT)	FAN HP	MOTOR D	PHASE	BASIS OF DESIGN
<u>CUH-1</u>	CORRIDOR	VERTICAL CABINET	250 CFM	9.17	0.46	180	140	0.1	0.03	115	1	MODINE FC00200ABB
NOTES:												

. PROVIDE UNIT MOUNTED DISCONNECT AND THERMOSTAT.

HOT WA	TER	PRO	OPELL	ER T	YPE	UNIT	HEA	TER	SCH	HED	ULE	
TYPE	MBH	CFM	THROW (FT)	GPM	HOT WAT E.W.T. (F°)	ER DATA L.W.T. (F°)	W.P.D. (FT)	E.A.T. (F°)	V/PH	HP	MOUNTING HEIGHT (FT)	BASIS OF DESIGN
HORIZONTAL	100	2,900	41	6.3	180	140	0.3	60	115/1	1/3	16	MODINE HC 193
	TYPE	TYPE MBH	TYPE MBH CFM	TYPE MBH CFM THROW (FT)	TYPE MBH CFM THROW (FT) GPM	TYPE MBH CFM THROW (FT) GPM E.W.T. (F°)	TYPE MBH CFM THROW (FT) GPM E.W.T. L.W.T. (F°) (F°)	TYPE MBH CFM THROW (FT) GPM E.W.T. L.W.T. W.P.D. (F°) (FT)	TYPE MBH CFM THROW (FT) GPM E.W.T. L.W.T. W.P.D. (F°) (F°)	TYPE MBH CFM THROW (FT) HOT WATER DATA E.A.T. (F°) (F°) (FT) V/PH	TYPE MBH CFM THROW (FT) HOT WATER DATA GPM E.W.T. L.W.T. W.P.D. (F°) (F°) (F°) (F°)	TYPE MBH CFM THROW (FT) GPM E.W.T. L.W.T. W.P.D. (F°) V/PH HP MOUNTING HEIGHT (FT)

NOTES:
1. RATINGS BASED ON 60° E.A.T.

PROVIDE REMOTE WALL MOUNTED 115V THERMOSTAT, REFER TO PLANS FOR COUNT AND LOCATION.

3. PROVIDE EACH UNIT HEATER WITH A UNIT MOUNTED DISCONNECT SWITCH.

					G	AS F	FIRE	D BO	ILER	SCH	EDUL	.E		
			NA	TURAL	GAS			WATER		Е	LECTRICA	۸L	VENT	
TAG	LOCATION		INPUT		OU	TPUT	E.W.T.	L.W.T.	ΔP	AMP	VOLTS	PHASE	CATEGORY	BASIS OF DESIGN
		MBH	CFH	WC	MBH	EFF	°F	°F	FT.	AIVIP	VOLIS	PHASE		
B-1 - B-4	B-1 - B-4 MECHANICAL ROOM 800 800 4"-14" 752 94% 140 180 12 2.7 115 1 IV LOCHINVAR KNIGHT KB-801													

REQUIRED GAS PRESSURE MAY VARY WITH BOILER MANUFACTURER. (MIN 4", MAX 14" WC).

PROVIDE CPVC OR POLYPROPYLENE 4" COMBUSTION AIR AND 6" VENT PIPE WITH SIDEWALL TERMINATION KIT. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR EXACT SIZES AND INSTALLATION REQUIREMENTS.

PROVIDE CONDENSATE NEUTRALIZATION KIT.

PROVIDE 30PSI ASME RELIEF VALVE.

SELECTION MADE ON THE PREMISE THAT THE BOILERS WILL OPERATE AS LEAD/LAG. PROVIDE CONTROLLER BY BOILER MANUFACTURER THAT IS CAPABLE OF LEAD/LAG CONTROL, BOILER PUMP CONTROL, AND OUTDOOR AIR RESET.

			EXHAUS ⁻	Γ/RETI	JRN FAI	N SCH	HEDU	JLE				
					ESP		FAN	MOTOR	DATA			
TAG	LOCATION	SERVICE	TYPE	CFM	(IN W.G.)	RPM	BHP	HP	VOLT	Ø	BASIS OF DESIGN	NOTES
<u>EF-1 - EF-8</u>	GARAGE	VENTILATION	WALL CENTRIFUGAL	7,125	0.375	1088	2.07	3	208	3	COOK ACW-HP	1,2,4,5,6
<u>EF-9</u>	OFFICE ROOF	LOCKER ROOMS	ROOF CENTRIGFUGAL	810	0.5	1141	0.106	<1	115	1	COOK ACE-D-HP	1,4,5,7
<u>EF-10</u>	GARAGE	DIESEL EXHAUST	-	1,200	3.0			1	208	3	VENTAIRE UVS122/1/3	9,10
<u>EF-11</u>	GARAGE	VENTILATION	WALL PROPELLER	800	0.15	1550	-	1/8	115	1	COOK XWD	3,4,5,11
<u>RF-1</u>	MEZZANINE	AHU RETURN	IN-LINE CENTRIFUGAL	2,370	0.75	1136	0.65	<1	208	3	COOK SQN-B	1,5,8

NOTES: 1. BELT DRIVE FAN.

2. HAND, OFF, AUTO SWITCH WITH 0-2 HOUR TIMER.

PROVIDE BACKDRAFT DAMPER. 4. PROVIDE ALUMINUM BIRDSCREEN.

PROVIDE FACTORY MOUNT DISCONNECT SWITCH.

PROVIDE MOTORIZED DAMPER TIED TO FAN OPERATION.

DIRECT DRIVE FAN. PROVIDE FAN MOUNTED SPEED CONTROL FOR BALANCING.

PROVIDE COMBINATION SPRING AND NEOPRENE VIBRATION ISOLATION SUPPORTS. SIZE FOR THE ACTUAL EQUIPMENT CORNER WEIGHTS. 9. PROVIDE RUBBER IN SHEAR VIBRATION ISOLATION SUPPORTS.

1. PROVIDE COMBINATION SPRING AND NEOPRENE VIBRATION ISOLATION SUPPORTS SELECTED FOR THE FINAL CORNER WEIGHTS.

10. PROVIDE 25' OF 6"Ø HIGH TEMP HOSE WITH A LIFTING SADDLE, TAILPIPE ADAPTER WITH VISE GRIP, AND SPRING POWERED CABLE REEL BALANCER WITH PULL DOWN.

11. PROVIDE OSHA WIRE GUARD AND WALL COLLAR.

					,	AIR HA	NDLIN	IG UI	VIT	SCHE	DULE					
TAG	LOCATION	CONFIGURATION	CFM	OA CFM	STATIC P EXTERNAL (IN. W.G.)	RESSURE TOTAL (IN. W.G.)	TYPE R	SUPPLY PM BHP		V/PH/Hz	HEATING COIL TAG	COOLING COIL TAG	MOTOR CONTROLLER TYPE	MCA	MOCP	BASIS OF DESIGN
AHU-1	MEZZANINE	HORIZONTAL	3,220	900	0.75	1.74	PLENUM 21	190 1.62	1.34	208/3/60	HC-1	CC-1	B-COM	7	15	AAON H3-CRB-8-0-162C-12L
NOTES:																

	AIR COOLED CONDENSING UNIT SCHEDULE													
T. 0	ARI ELECTRICAL DIMENSIONS BASIS OF													
TAG	LOCATION	SERVICE			EER	TEMP	TEMP		COMP. CAPACITY STEPS %	MINIMUM CIRCUIT AMPACITY	MINIMUM FUSE SIZE	L x W x H (IN)	WEIGHT (LBS)	DESIGN
ACCU-1	CCU-1 GROUND AHU-1 R-410A 156.0 12.2 95 43 208/3/60 VARIABLE 62 80 94 x 47 x 57 1141 AAON CFA-013-B-A-8-DC00K													
NOTEO														

NOTES:

1. PROVIDE TWO REFRIGERANT LINESETS. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR FINAL SIZES.

PROVIDE FACTORY MOUNT DISCONNECT.

RAD	IANT F	LOOR F	HOSE S	CHEDUL	_E		
 SE MAX. CIRCUIT LENGTH (FT)	SQUARE FOOTAGE	FLOWRATE (GPM)	PRESSURE DROP (FT)	NUMBER OF CIRCUITS	ZONE CAPACITY, TOTAL (MBH)	TOTAL HEAT INTENSITY *** (BTU/ SQ. FT.)	DESIG WATER T

ZONE#	SERVING	DIA. (IN)	HEATING HO PRIMARY SPACING (IN)	OSE MAX. CIRCUIT LENGTH (FT)	SQUARE FOOTAGE	FLOWRATE (GPM)	PRESSURE DROP (FT)	NUMBER OF CIRCUITS	ZONE CAPACITY, TOTAL (MBH)	TOTAL HEAT INTENSITY *** (BTU/ SQ. FT.)	DESIGN SUPPLY WATER TEMPERATURE (°F)
1	ADMIN AREA MANIFOLD 1A & 1B	5/8	12	300	3,000	20.5	15.4	11	102.6	34.0	125
2	REPAIR GARAGE MANIFOLD 2A & 2B	5/8	12	300	2,850	17.3	10.1	12	86.4	30.0	125
3	REPAIR GARAGE MANIFOLD 3A & 3B	5/8	12	300	3,600	21.4	10.5	17	106.3	30.0	125
4	MECHANIC'S BAY MANIFOLD 4	5/8	12	300	2,075	13.0	9.5	9	65.3	31.0	125
5	REPAIR GARAGE MANIFOLD 5A & 5B	5/8	12	300	3,600	22.2	9.2	16	110.6	31.0	125
6	REPAIR GARAGE MANIFOLD 6A & 6B	5/8	12	300	2,850	18.0	11.3	12	89.4	31.0	125

NOTES:

1. HEAT INTENSITY IS BASED UPON DESIGN SUPPLY WATER TEMPERATURE AND 10°F TEMPERATURE DROP AVERAGED OVER ENTIRE AREA. MAXIMUM HEAT INTENSITY FOR RADIANT HEAT ZONES IS 40 BTU/SQ. FT. WITH 130°F SUPPLY WATER TEMPERATURE AND 10°F TEMPERATURE DROP.

PROVIDE 1-1/2" STAINLESS STEEL MANIFOLD. PRESSURE DROP LISTED ACCOUNTS FOR PRESSURE DROP THROUGH THE RADIANT LOOP AND MANIFOLD.

3. 100% WATER, NO GLYCOL IN THE SYSTEM.

			PUN	ЛР SC	HED	ULE								
UNIT #	SYSTEM APPLICATION	CAPACITY	SPEED	MOTOR	HEAD	ELECT	RICAL	REMARKS	BASIS OF DESIGN	NOTES				
GPM GPM HP (F1.) VOLTS PHASE														
P-1&2 PRIMARY HWS 110 3160 2.49 50 460 3 IN-LINE CENTRIFUGAL B&G ECOCIRC XL 110 P-3 RADIANT ZONE #1 20.5 3250 2/5 35 115 1 IN-LINE CENTRIFUGAL B&G PL-55														
<u>P-3</u>	RADIANT ZONE #1	B&G PL-55	-											
<u>P-4</u>	RADIANT ZONE #2	17.3	3250	2/5	28	115	1	IN-LINE CENTRIFUGAL	B&G PL-55	-				
<u>P-5</u>	RADIANT ZONE #3	21.4	3250	2/5	28	115	1	IN-LINE CENTRIFUGAL	B&G PL-55	-				
<u>P-6</u>	RADIANT ZONE #4	13.0	3250	2/5	27	115	1	IN-LINE CENTRIFUGAL	B&G PL-55	-				
<u>P-7</u>	RADIANT ZONE #5	22.2	3250	2/5	27	115	1	IN-LINE CENTRIFUGAL	B&G PL-55	-				
<u>P-8</u>	RADIANT ZONE #6	18.0	3250	2/5	29	115	1	IN-LINE CENTRIFUGAL	B&G PL-55	-				
<u>P-9 - P-12</u>	BOILER PUMPS	37.5	2265	0.48	25	208/230	1	IN-LINE CENTRIFUGAL	B&G ECOCIRC XL 65-130	2				

1. ONE PUMP, EITHER P-1 OR P-2, SHALL BE THE PRIMARY PUMP AND THE REMAINING WILL BE STANDBY. 2. PROVIDE INTEGRAL VFD WITH CONTROLS CAPABLE OF MODULATING PUMP SPEED BASED ON SYSTEM PRESSURE.

	AIR DIS	TRIBUTI	ON DE	EVICE	S SCHE	DUL	.E	
SYMBOL	TYPE	CFM	FACE	SIZE	NECK SIZE	PD	BASIS OF DESIGN	NOTES
STIVIDOL	ITFE	RANGE	WIDTH	LENGTH	NECK SIZE	רט	BASIS OF DESIGN	NOTES
		0-100	24"	24"	6" Ø	0.02		
S-1	CEILING PLAQUE DIFFUSER	101-175	24"	24"	8" Ø	0.02	TITUS OMNI	3,4,6
3-1	CEILING I LAGGE BII I GGER	176-275	24"	24"	10" Ø	0.02	TITOS OMINI	0,4,0
		276-400	24"	24"	12" Ø	0.02		
		0-200	14"	8"	12" x 6"	0.02		
S-2, R-2	LINEAR BAR REGISTER	201-280	14"	10"	12" x 8"	0.02	2 TITUS 350RL	1,4,5
		281-440	14"	14"	12" x 12"	0.02		
		0-100	24"	24"	6" Ø	0.02		
		101-175	24"	24"	8" Ø	0.02		
R-1, E-1	CEILING PERFORATED REGISTER	176-275	24"	24"	10" Ø	0.02	TITUS PAR-AA	3,4,6
		276-400	24"	24"	12" Ø	0.02		
		401-600	24"	24"	14" Ø	0.02		
E-2	LINEAR BASE REGISTER	0-100	8"	8"	6" x 6"	0.02	TITUS 350FL	2,4,5

NOTES:

1. STEEL CONSTRUCTION.

ALUMINUM CONSTRUCTION.

ALUMINUM CONSTRUCTION IN RESTROOMS AND SHOWER AREAS. STEEL CONSTRUCTION IN ALL OTHER LOCATIONS.

4. INTEGRAL OPPOSED BLADE OR BUTTERFLY BALANCE DAMPER.

5. SURFACE MOUNT. LOUVERED BLADES AT 35° DEFLECTION AND SPACED EVERY ¾". BLADES PARALLEL TO LONG DIMENSION. 6. LAY-IN, REFER TO ARCHITECTURAL REFLECTED CEILING PLAN.

			HEAT	ING (COIL	SCHE	DULE				
			MAXIMUM				FLUID SIDE			AIR	SIDE
MARK	CFM	TYPE	FACE VELOCITY	MBH	E.W.T.	L.W.T.	GPM	MAX. WPD (FT.)	ROWS	E.A.T.	L.A.T.
HC-1	3,220	WATER	500	247	180	150	17	5.2	2	55	124

				COO	LING CO	IL SCI	HEDU	ILE			
		MAX. FACE	TOTAL	SENS		FLU	ID SIDE			AIR	SIDE
MARK	TYPE	VELOCITY (FPM)	(MBH)	(MBH)	REFRIGERANT	SUCTION	AREA (SQFT)	# OF CIRCUITS	ROWS	E.A.T. (DB/WB)	L.A.T. (DB/WB)
CC-1	DX	500	140.94	93.3	R-410A	43°F	7.2	2	6	81/68	54.9/53.7

DESIGN & CONSTRUCTION

CONSULTANT:





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PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

EAST FISHKILL, NEW YORK 12533

CLIENT:

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Revised Drawing

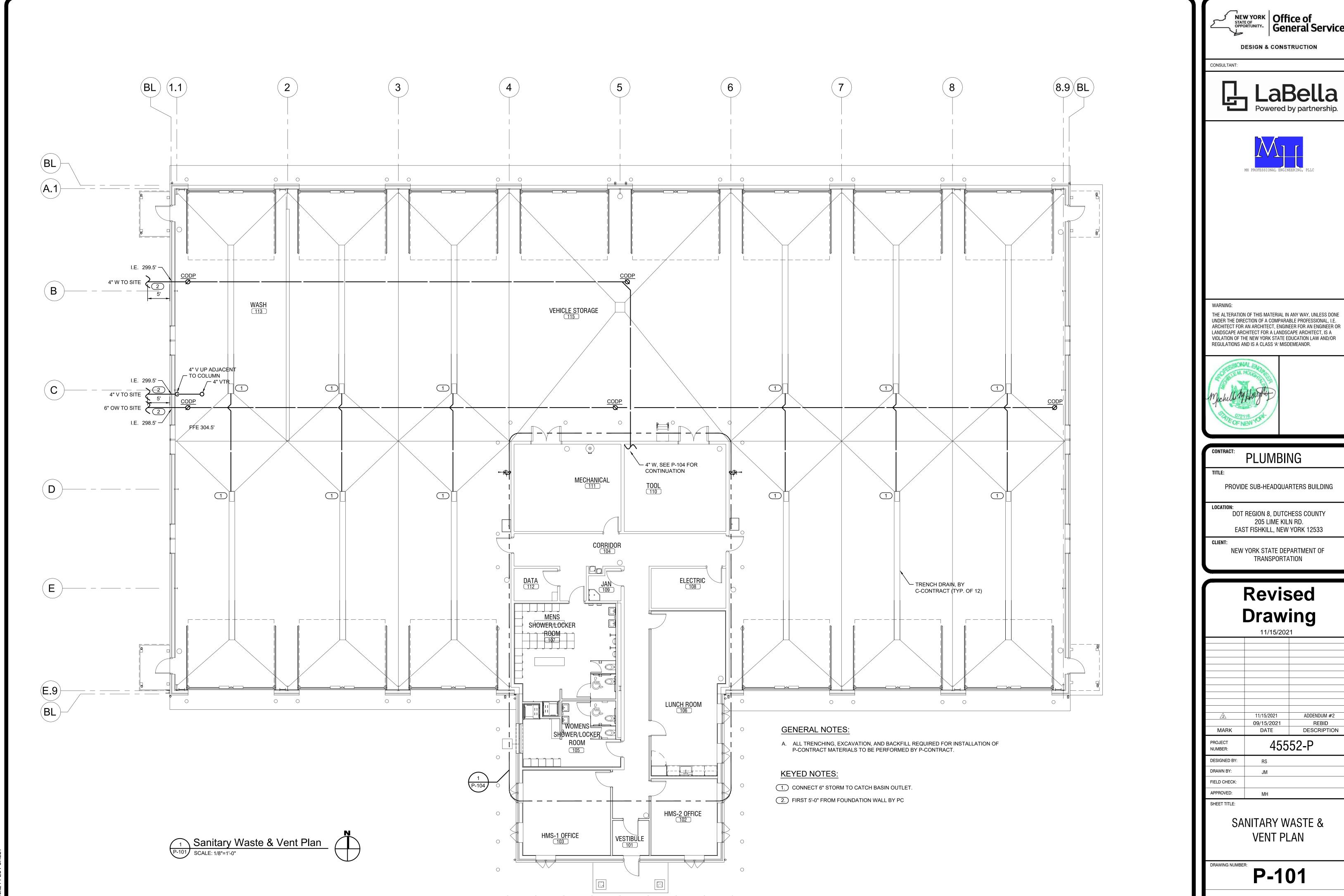
ADDENDUM #2 09/15/2021 REBID DATE DESCRIPTION MARK PROJECT 45552-H NUMBER: DESIGNED BY:

DRAWN BY: FIELD CHECK: APPROVED:

SHEET TITLE:

SCHEDULES

M-301



NEW YORK STATE OF OPPORTUNITY General Services

DEVICES

RECEPTACLES

G DUPLEX RECEPTACLE, 20A, 120V -"G" INDICATES GROUND FAULT INTERRUPTER -"WP" INDICATES WEATHER RESISTANT OUTDOOR COVER -DOT INDICATES 6" ABOVE BACKSPLASH OF COUNTER/OR SINK (VERTICALLY) (OR 6" ABOVE COUNTER/OR SINK WHEN NO BACKSPLASH EXISTS)

G QUAD RECEPTACLE, 20A, 120V -"G" INDICATES GROUND FAULT INTERRUPTER -DOT INDICATES 6" ABOVE BACKSPLASH OF COUNTER/OR SINK (VERTICALLY) (OR 6" ABOVE COUNTER/OR SINK WHEN NO BACKSPLASH EXISTS)

DUPLEX RECEPTACLE, 20A, 120V ON EMERGENCY CIRCUIT -DEVICE TO BE RED -COVER TO BE ENGRAVED (IN RED) WITH PANEL AND CIRCUIT NUMBER -"G" INDICATES GROUND FAULT INTERRUPTER -"WP" INDICATES WEATHER RESISTANT OUTDOOR COVER -DOT INDICATES 6" ABOVE BACKSPLASH OF COUNTER/OR SINK (VERTICALLY) (OR 6" ABOVE COUNTER/OR SINK WHEN NO BACKSPLASH EXISTS)

QUAD RECEPTACLE, 20A, 120V ON EMERGENCY CIRCUIT -DEVICE TO BE RED -COVER TO BE ENGRAVED (IN RED) WITH PANEL AND CIRCUIT NUMBER -"G" INDICATES GROUND FAULT INTERRUPTER -"WP" INDICATES WEATHER RESISTANT OUTDOOR COVER -DOT INDICATES 6" ABOVE BACKSPLASH OF COUNTER/OR SINK (VERTICALLY) (OR 6" ABOVE COUNTER/OR SINK WHEN NO BACKSPLASH EXISTS)

SPECIAL PURPOSE RECEPTACLE -NEMA CONFIGURATION INDICATED

OVERHEAD CORD/REEL AND RECEPTACLE - DOT FURNISHED, CONTRACTOR INSTALLED

-NEMA CONFIGURATION INDICATED

FLOOR MOUNTED DUPLEX RECEPTACLE, 20A, 120V

WELDING RECEPTACLE, ON EMERGENCY CIRCUIT

<u>SWITCHES</u>

SINGLE POLE SINGLE THROW (SpSt) SWITCH, 20A, 120/277V -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

3-WAY SWITCH, 20A, 120/277V -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

4-WAY SWITCH, 20A, 120/277V -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

DIMMER SWITCH -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

SpSt SWITCH WITH WEATHER-PROOF COVER, 20A, 120/277V

SINGLE POLE SINGLE THROW (SpSt) SWITCH, 20A, 120/277V ON EMERGENCY CIRCUIT. -TOGGLE TO BE RED -COVERPLATE TO BE ENGRAVED IN BLACK WITH PANEL &

MOTOR RATED SWITCH, 20A, 120/277V

CIRCUIT NUMBER

CEILING MOUNTED OCCUPANCY SENSOR -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

PP OCCUPANCY SENSOR POWER RELAY PACK

OS WALL MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR TYPE 1, UNLESS OTHERWISE SPECIFICALLY NOTED ·LOWER CASE LETTER(S) INDICATE LAMP CONTROL

WSI WALL MOUNTED PASSIVE INFRARED VACANCY SENSOR -TYPE 1, UNLESS OTHERWISE SPECIFICALLY NOTED -LOWER CASE LETTER(S) INDICATE LAMP CONTROL

(P) PHOTOCELL

GENERAL NOTE (ALL DRAWINGS):

1. THE BUILDING HAS A SEISMIC DESIGN CATEGORY OF A, IS SITE CLASS B, AND HAS AN IMPORTANCE FACTOR OF 1.0. REFER TO DRAWING S-001 FOR SPECIFIC SEISMIC LOADS PROVIDE SEISMIC BRACING / SUPPORTS AS REQUIRED BY ASCE 7 FOR ALL CONDUIT

2. PROVIDE COPPER CONDUCTORS UNLESS OTHERWISE SPECIFICALLY NOTED.

3. ALL CIRCUITS ARE 2 #12, 1 #12 GND IN 3/4" CONDUIT UNLESS OTHERWISE NOTED, WHERE THESE CIRCUITS ARE LONGER THAN 75' UPSIZE CONDUCTORS TO 2 #10, 1 #10 GND.

4. FIELD COORDINATE ALL CONDUIT RUNS BEFORE FABRICATION AND INSTALLATION. NO EXTRAS SHALL BE PERMITTED FOR REROUTING, REFABRICATION, RESTOCKING OR REMOVAL OF INSTALLED WORK DUE TO COORDINATION WITH BUILDING STRUCTURE, WORK OF OTHER TRADES OR EXISTING BUILDING COMPONENTS. DRAWINGS ARE SCHEMATIC AND, CONDUIT RUNS DO NOT SHOW ALL NECESSARY CHANGES IN ELEVATION OR OFFSETS REQUIRED FOR A COMPLETE INSTALLATION. PROVIDE ALL CONDUIT OFFSETS AS REQUIRED FOR THE INSTALLATION OF THE CONDUIT SHOWN ON

IECC C103.2.2 (NYS 2016 SUPPLEMENT): TO THE BEST OF MY KNOWLEDGE, BELIEF, AND PROFESSIONAL JUDGEMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 IECC COMMERCIAL PROVISIONS (AS AMENDED BY THE NYS 2016 SUPPLEMENT).

THE UNIFORM FIRE PREVENTION AND BUILDING CODE-2017

INTERNATIONAL BUILDING CODE 2015 AS REFERENCED IN THE 2017 UNIFORM CODE SUPPLEMENT

• INTERNATIONAL EXISTING BUILDING CODE 2015 AS REFERENCED IN THE 2017 UNIFORM CODE SUPPLEMENT INTERNATIONAL ENERGY CONSERVATION CODE 2015 IN CONJUNCTION WITH THE 2016 SUPPLEMENT TO THE NEW

YORK STATE ENERGY CONSERVATION CODE INTERNATIONAL FIRE CODE 2015 AS REFERENCED IN THE 2017 UNIFORM CODE SUPPLEMENT NEW YORK STATE LABOR DEPARTMENT INDUSTRIAL CODE FOR ITEMS RELATING TO PEOPLE WHO WORK IN THE

BUILDING SUCH AS SAFETY GLASS, ASBESTOS ABATEMENT ETC. ADA: ICC/ANSI A117.1 (STANDARD ON ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES), AS REFERENCED IN

NATIONAL ELECTRIC CODE NFPA 70, AS REFERENCED IN THE CODES ABOVE

TELEPHONE/DATA/CABLE TELEVISION

W TELEPHONE AND/OR DATA WALL OUTLET -PROVIDE 4" SQ. BOX WITH 1-GANG PLASTER RING PROVIDE 1"C W/PULLSTRING TO ABOVE ACCESSIBLE CEILING -"W" INDICATES WALL MOUNTED AT 48"AFF

TELEPHONE AND/OR DATA WALL OUTLET -PROVIDE 4" SQ. BOX WITH 1-GANG PLASTER RING PROVIDE 1"C W/PULLSTRING TO ABOVE ACCESSIBLE CEILING -DOT INDICATES 6" ABOVE BACKSPLASH OF COUNTER/OR SINK (VERTICALLY) (OR 6" ABOVE COUNTER/OR SINK WHEN NO BACKSPLASH EXISTS) REFER TO DETAIL #5/E-402.

(TV) (CABLE TV (WALL MOUNTED OR CEILING MOUNTED AS INDICATED) -FIELD VERIFY EXACT LOCATION WITH DIRECTOR'S REPRESENTATIVE, PRIOR TO ROUGH-IN -OUTLET BOX TO BE ADJACENT TO TV BRACKET -PROVIDE 2-GANG BOX WITH DIVIDER -PROVIDE DUPLEX RECEPTACLE IN 1ST GANG -PROVIDE 1"C W/PULLSTRING TO ABOVE ACCESSIBLE CEILING IN 2ND GANG -PROVIDE DOUBLE DUPLEX COVERPLATE

SWITCHGEAR & MISC.

BRANCH CIRCUIT PANELBOARD - SURFACE MOUNTED BRANCH CIRCUIT PANELBOARD - FLUSH MOUNTED

JUNCTION BOX -WALL OR CEILING MOUNTED, AS INDICATED -SIZE JUNCTION BOX PER NEC ARTILCE 314 AND NUMBER OF

-DE-RATE THE CONDUCTORS AS REQUIRED BY THE NEC ARTICLE 310.

MOTOR STARTER

COMBINATION MOTOR STARTER / DISCONNECT SWITCH

DISCONNECT SWITCH - FUSED

DISCONNECT SWITCH - NON-FUSED

MOTOR OR HVAC UNIT - BY OTHERS

PULLBOX

VARIABLE FREQUENCY DRIVE -FURNISHED BY MC & INSTALLED BY EC -NOTE TO EC: THE LINE & LOAD CONDUCTORS ENTERING / LEAVING THE VFD SHALL BE KEPT ENTIRELY INDEPENDENT FROM ONE ANOTHER. LINE & LOAD CONDUCTORS ARE NOT PERMITTED

TO OCCUPY THE SAME RACEWAY, TROUGH, ELECTRICAL BOX, ETC..

OVERHEAD DOOR PUSH BUTTON STATION

LINE VOLTAGE THERMOSTAT; FURNISHED BY HC, INSTALLED BY EC

GENERATOR REMOTE ANNUNCIATOR PANEL

SEAL TIGHT FITTINGS

■E EMERGENCY FUEL ISLAND SHUT-OFF SWITCH

CONDUIT OR CABLE

NOTE: LINES MAY BE CURVED OR STRAIGHT

NORMAL POWER CIRCUIT OR FEEDER UNDERGROUND POWER CIRCUIT OR FEEDER UNDERGROUND CONDUIT FOR TELECOM

NORMAL POWER HOMERUN TO PANEL

SURFACE METAL RACEWAY

UNDERGROUND ELECTRIC POWER HOMERUN TO PANEL

OVERHEAD ELECTRIC

OVERHEAD TELEPHONE

EXISTING OVERHEAD ELECTRIC

EXISTING UNDERGROUND ELECTRIC

EXISTING UNDERGROUND TELEPHONE

LIGHTING

FIXTURES

NOTE: REFER TO LIGHT FIXTURE SCHEDULE FOR FIXTURE DESIGNATIONS, DESCRIPTIONS AND MANUFACTURERS

ROADWAY POLE \bigcirc

INDUSTRIAL STRIP FIXTURE. LENGTH AS INDICATED

RECESSED DOWNLIGHT -SHADING INDICATES EMERGENCY CIRCUIT TO FEED FIXTURE

WALLPACK

1' X 4' SURFACE OR RECESSED FIXTURE -SHADING INDICATES EMERGENCY CIRCUIT TO FEED FIXTURE

2' X 4' SURFACE OR RECESSED FIXTURE -SHADING INDICATES EMERGENCY CIRCUIT TO FEED FIXTURE

SINGLE FACE EXIT LIGHT FED FROM EMERGENCY CIRCUIT -ARROW DIRECTION INDICATED -WALL OR CEILING MOUNTED

DOUBLE FACE EXIT LIGHT FED FROM EMERGENCY CIRCUIT -ARROW DIRECTION INDICATED -WALL OR CEILING MOUNTED

GENERATOR TRANSFER DEVICE; UL 924 -REFER TO DETAIL #4/E-403

CEILING MOUNTED DAYLIGHT SENSOR

SECURITY SYSTEM

SURFACE MOUNTED CLOSED CIRCUIT TELEVISION (BY OWNER) -CAMERA, CAMERA BRACKET AND LOW VOLTAGE WIRING BY OWNER -FIELD VERIFY EXACT LOCATION WITH OWNER, PRIOR TO ROUGH-IN -PROVIDE 4"x4"x3" BACKBOX WITH 1" CONDUIT WITH PULLSTRING BACK TO A 12"x12"x4" JUNCTION BOX MOUNTED ABOVE CEILING IN OFFICE 102.

GROUNDING

BONDING POINT

(•) GROUND ROD

/ GROUND WIRE/LOOP

FIRE ALARM

FACP FIRE ALARM CONTROL PANEL

RAP REMOTE ANNUNCIATOR PANEL WITH SILENCER

F PULL STATION

AUDIO DEVICE

AUDIO / VISUAL DEVICE -15CD UON

> VISUAL DEVICE -15CD UON -"A" INDICATES AMBER COLORED LENS FOR CO NOTIFICATION

SMOKE DETECTOR

CO CARBON MONOXIDE SENSOR

FLOW SWITCH -PROVIDED BY PC

> -(1) MONITOR MODULE AND (1) CONTROL MODULE REQUIRED -COORDINATE EXACT LOCATION WITH PC, PRIOR TO ROUGH-IN

TAMPER SWITCH -PROVIDED BY PC -WIRED BY EC -(1) MONITOR MODULE

-COORDINATE EXACT LOCATION WITH PC, PRIOR TO ROUGH-IN

DUCT SMOKE DETECTOR -COORDINATE EXACT LOCATION WITH MC. PRIOR TO INSTALLATION

ABBREVIATIONS

PHASE

ABOVE FINISHED FLOOR

ABOVE FINISHED GRADE

BELOW FINISHED CEILING

CONDUIT CONSTRUCTION CONTRACTOR

CIRCUIT

CEILING

DATA TERMINAL BOARD DTB

DRAWING

EMERGENCY BYPASS SWITCH

ELECTRICAL CONTRACTOR

ELECTRICAL METAL TUBING

EX'G EXISTING FACP FIRE ALARM CONTROL PANEL

GROUND FAULT INTERRUPTER

G,GND GROUND

GENERATOR TRANSFER DEVICE

HORSEPOWER

KILOVOLT AMPS

L, LTG LIGHTING

LTFMC LIQUID TIGHT FLEXIBLE METAL CONDUIT

HVAC CONTRACTOR

MAIN DISTRIBUTION PANEL

NIGHT LIGHT

NO, # NUMBER

PLUMBING CONTRACTOR

R, RCPT RECEPTACLE

TELEPHONE BACKBOARD

TYPICAL

UNDER COUNTER

RIGID GALVANIZED STEEL

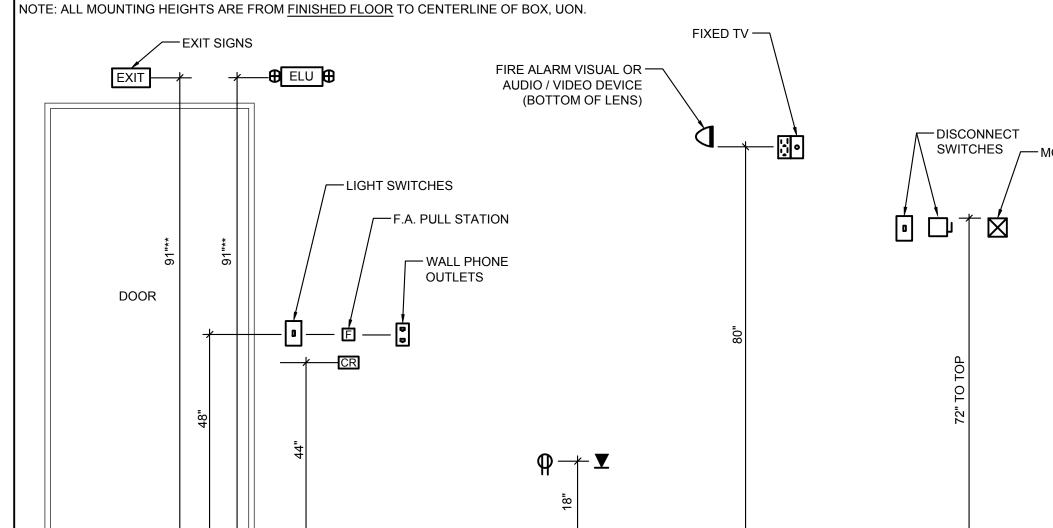
UNLESS OTHERWISE NOTED

* NOT ALL DEVICES ARE NECESSARILY

VOLT(S)

WEATHER PROOF

CEILING ** EXIT AND EMERGENCY LIGHTS TO BE MOUNTED AT 2" FROM FINISHED CEILING TO TOP OF FIXTURE(S) IN AREAS CONTAINING CEILINGS LESS THAN 95".



/-- MOTOR STARTER

WINDOW OR OBSTRUCTION

Drawing

NEW YORK Office of

CONSULTANT

DESIGN & CONSTRUCTION

THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE

ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR

PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY

205 LIME KILN RD.

EAST FISHKILL. NEW YORK 12533

NEW YORK STATE DEPARTMENT OF

TRANSPORTATION

Revised

UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, I.E.

LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A

REGULATIONS AND IS A CLASS 'A' MISDEMEANOR.

VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR

STATE OF OPPORTUNITY. General Services

Powered by partnership

11/15/2021 ADDENDUM #2 09/15/2021 REBID DATE DESCRIPTION

45552-E NUMBER: DESIGNED BY: DRAWN BY: FIELD CHECK:

SYMBOLS, NOTES,

E-001

MOUNTING HEIGHT NOTES: 1. THE ABOVE MOUNTING HEIGHTS SHALL APPLY TO ALL DEVICES UNLESS NOTED OTHERWISE ON THE PLANS, ALL NOTED DIMENSIONS ARE TO THE CENTERLINE OF THE DEVICE FROM THE FINISHED FLOOR UNLESS OTHERWISE INDICATED.

2. ELECTRICAL ROUGH-IN IN OCCUPIED SPACES SHALL CONFORM TO THE FOLLOWING GUIDELINES. CONVENIENT LOCATION OF JUNCTION BOXES AT RANDOM STUD LOCATIONS SHALL NOT BE ACCEPTABLE, UNLESS APPROVED BY THE DIRECTOR'S REPRESENTATIVE.

3. WHERE EXISTING OR SPECIAL CONDITIONS PREVENT THE INSTALLATION OF DEVICES AT THE ABOVE HEIGHTS, THE EC SHALL VERIFY HEIGHTS ON SITE WITH THE DIRECTOR'S REPRESENTATIVE. EC SHALL VERIFY FINAL WORKBENCH, COUNTER, CABINET OR VANITY HEIGHTS INCLUDING BACKSPLASH, ON SITE WITH THE CC PRIOR TO INSTALLATION OF BOXES.

WHERE SWITCHES, RECEPTACLES, THERMOSTATS, ETC. ARE INDICATED ON WALLS IN PROXIMITY TO ONE ANOTHER, ALIGN THEM VERTICALLY UNLESS OTHERWISE NOTED WHERE SWITCHES, RECEPTACLES, THERMOSTATS, ETC. ARE LOCATED ADJACENT TO DOOR FRAMES, LOCATE THE NEAR FACE OF THE DEVICE BOX 6" FROM THE FINISH CASING OF THE DOOR FRAME.

WHERE RECEPTACLES AND TEL/DATA DEVICE BOXES ARE SHOWN TOGETHER, SET DEVICE BOXES ALIGNED HORIZONTALLY AND 6" APART. . WHERE RECEPTACLE ARE SHOWN ADJACENT TO ROOM CORNERS, LOCATE AT APPROPRIATE HEIGHT, 2' - 0 " FROM CORNER.

9. WHERE RECEPTACLES ARE SHOWN NEAR WALL CENTER, LOCATE AT APPROPRIATE HEIGHT, AT CENTER OF WALL. 10. ALL ELECTRICAL ROUGH-IN LOCATIONS IN OCCUPIED SPACES SHALL BE REVIEWED IN THE FIELD BY THE DIRECTOR'S REPRESENTATIVE PRIOR TO WIRING INSTALLATION. 11. PROVIDE PANELBOARDS SUCH THAT HIGHEST CIRCUIT BREAKER IS NO HIGHER THAT 6' - 0" AFF. TOP OF ADJACENT PANELS TO BE AT SAME HEIGHT AFF.

Typical Device Mounting Heights Elevation E-001 SCALE: NTS

NOTE: ALL MOUNTING HEIGHTS ARE FROM FINISHED FLOOR TO CENTERLINE OF BOX, UON.

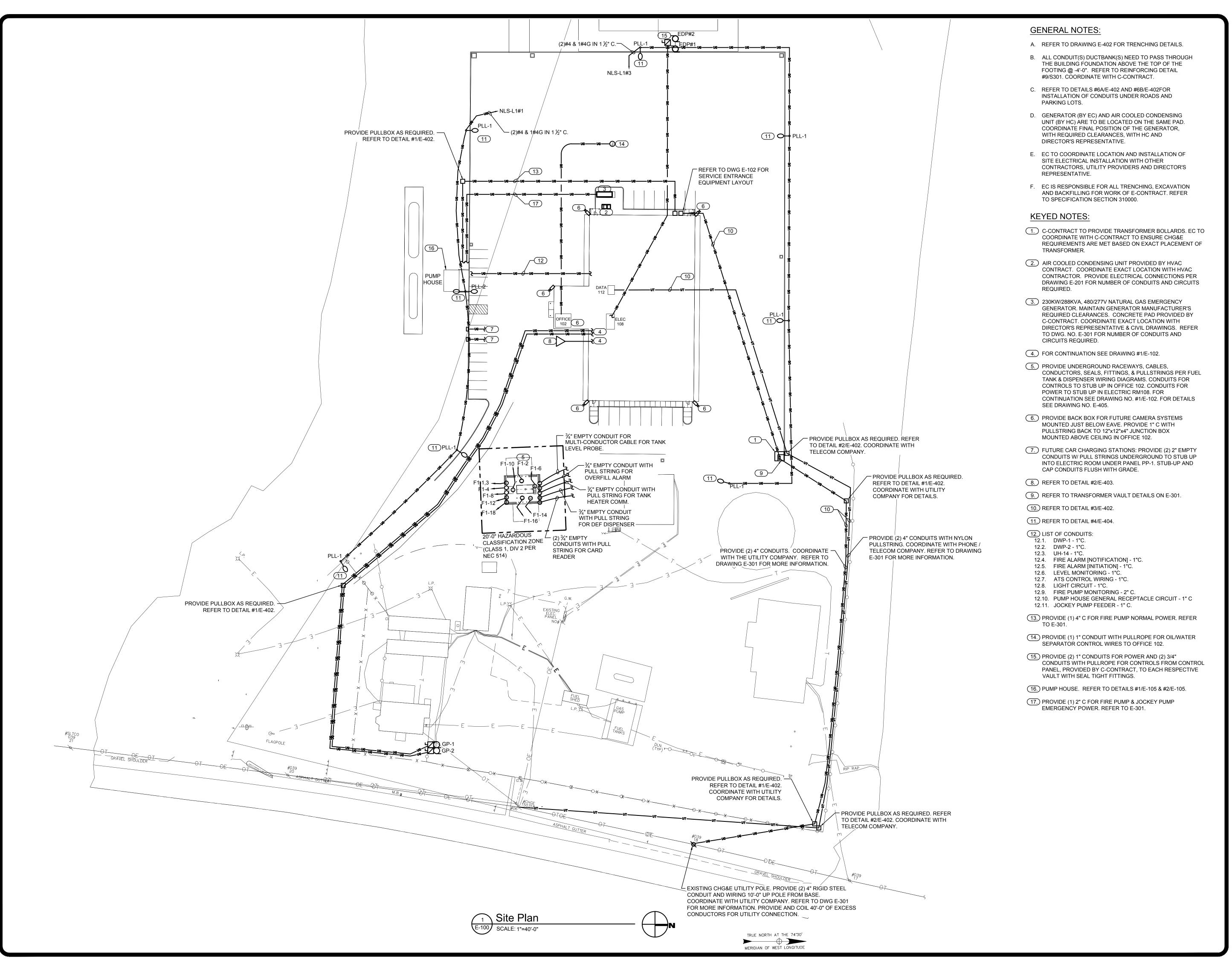
APPROVED:

LOCATION:

CLIENT:

AND ABBREVIATIONS

APPLICABLE CODES:





NEW YORK STATE OF OPPORTUNITY General Services

DESIGN & CONSTRUCTION

CONSULTANT:





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FI FCTRICA

TITLE:

CLIENT:

PROVIDE SUB-HEADQUARTERS BUILDING

TION:
DOT REGION 8, DUTCHESS COUNTY
205 LIME KILN RD.

205 LIME KILN RD. EAST FISHKILL, NEW YORK 12533

NEW YORK STATE DEPARTMENT OF
TRANSPORTATION

Revised Drawing

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	11/15/202	21
<u>^2</u>	11/15/2021	ADDENDUM #2
	09/15/2021	REBID
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	455	52-E
DESIGNED BY:	АН	

DESIGNED BY: AH

DRAWN BY: JM

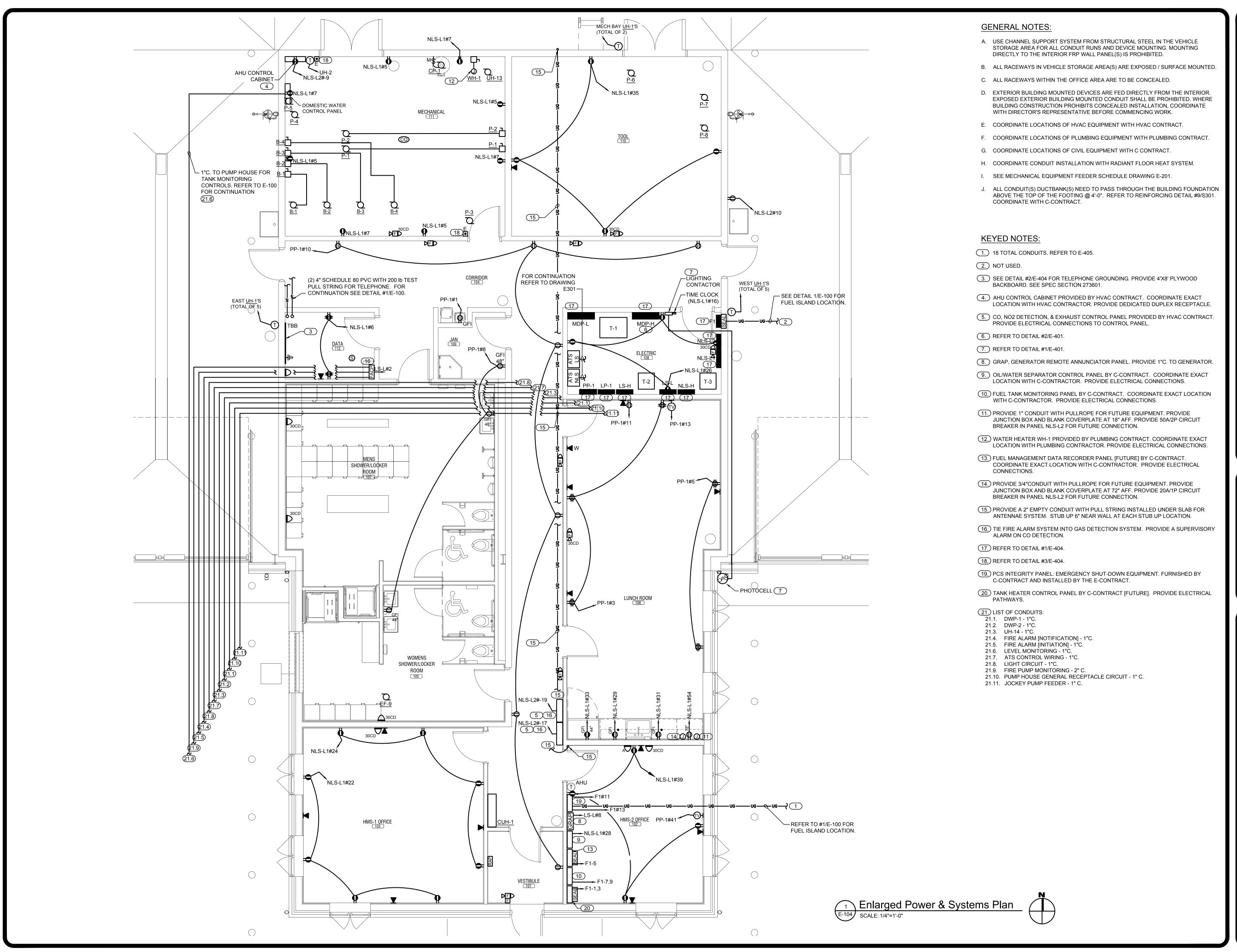
FIELD CHECK:

APPROVED: MH

SHEET TITLE:

SITE PLAN

DRAWING NUMBER



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CLIENT:

PROVIDE SUB-HEADQUARTERS BUILDING

LOCATION: DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD.

NEW YORK STATE DEPARTMENT OF

EAST FISHKILL, NEW YORK 12533

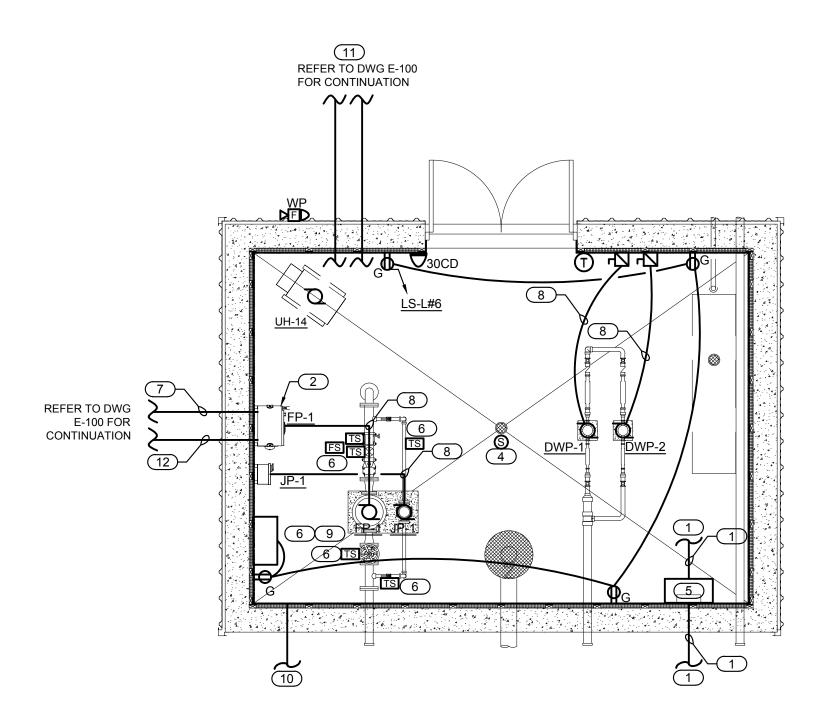
TRANSPORTATION

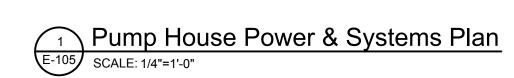
Revised **Drawing**

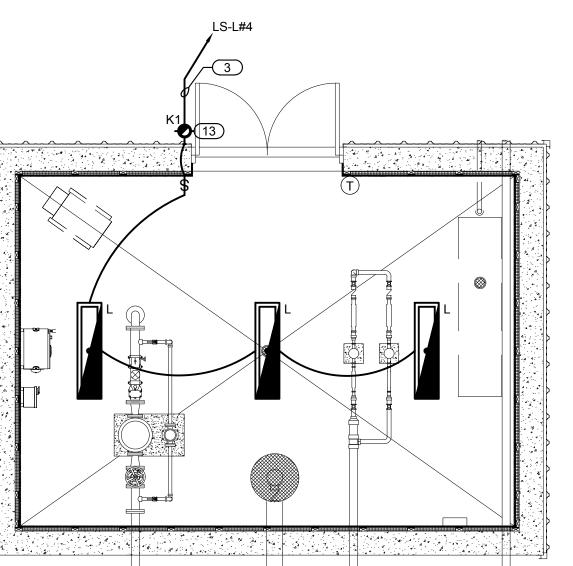
2	11/15/2021	ADDENDUM #2
	09/15/2021	REBID
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	455	52-E
DESIGNED BY:	АН	
DRAWN BY:	JM	
FIELD CHECK:		
APPROVED:	MH	

SHEET TITLE: **ELECTRICAL**

ENLARGED PLANS







Pump House Lighting Plan
SCALE: 1/4"=1'-0"

GENERAL NOTES:

- A. COORDINATE LOCATIONS OF HVAC EQUIPMENT WITH HVAC CONTRACT.
- B. COORDINATE LOCATIONS OF PLUMBING EQUIPMENT WITH PLUMBING CONTRACT.
- C. COORDINATE LOCATIONS OF CIVIL EQUIPMENT WITH C CONTRACT.
- D. SEE MECHANICAL EQUIPMENT FEEDER SCHEDULE TO COORDINATE RESPONSIBILITIES BETWEEN EC, MC & PC.
- E. REFER TO E-100 FOR ROUTING OF CONDUITS.
- F. REFER TO KEYED NOTE #12 ON E-100 FOR NUMBER AND SIZE OF CONDUITS BETWEEN PUMP HOUSE AND MAIN BUILDING.

KEYED NOTES:

- 1. PROVIDE 1" CONDUIT WITH PULLROPE FROM TANK TO VENT FILTER. PROVIDE 1" CONDUIT FROM VENT FILTER TO LEVEL MONITORING INSIDE MECHANICAL ROOM-111. COORDINATE FINAL LOCATIONS OF EQUIPMENT WITH PC.
- 2. PROVIDE 1" CONDUIT FROM FP-1 CONTROLLER TO MAIN ELECTRICAL
- 3. PROVIDE (2)#10, (1)#10G. IN 1" CONDUIT.
- 4. TIE DEVICE INTO FIRE ALARM INITIATION CONDUIT.
- 5. PROVIDE NEMA 3R ENCLOSURE FOR VENT FILTER. COORDINATE EXACT SIZE REQUIREMENTS WITH PC. COORDINATE EXACT MOUNTING LOCATION WITH PC.
- 6. TIE IN FIRE WATER TANK LOW/HIGH WATER LEVEL ALARM, TAMPER SWITCHES, FLOW SWITCHES, ETC. INTO FIRE ALARM NOTIFICATION
- 7. PROVIDE (3)#1/0, (1)#6G. IN 2" CONDUIT. [EMERGENCY FEED-FROM GENERATOR]
- 8. PROVIDE (3)#10, (1)#10G. IN 1" CONDUIT.
- 9. PROVIDE NEMA 3R ENCLOSURE FOR FIRE WATER TANK LOW/HIGH WATER LEVEL ALARM. COORDINATE EXACT SIZE REQUIREMENTS AND MOUNTING LOCATION WITH PC.
- 10. PROVIDE 1" CONDUIT W / PULLROPE TO FIRE PROTECTION WATER
- 11.) LIST OF CONDUITS:
 - 11.1. DWP-1 1"C.
 - 11.2. DWP-2 1"C. 11.3. UH-14 - 1"C.
 - 11.4. FIRE ALARM [NOTIFICATION] 1"C.
 - 11.5. FIRE ALARM [INITIATION] 1"C. 11.6. LEVEL MONITORING - 1"C.
 - 11.7. ATS CONTROL WIRING 1"C. 11.8. LIGHT CIRCUIT - 1"C.
 - 11.9. FIRE PUMP MONITORING 2"C.

11.11. JOCKEY PUMP FEEDER - 1" C.

- 11.10. PUMP HOUSE GENERAL RECEPTACLE CIRCUIT 1" C.
- 12.) PROVIDE (3)#500 KCMIL & (1)#2G. IN 4"C. [NORMAL FEED-FROM MAIN BUILDING SERVICE]
- (13.) LIGHT FIXTURE IS CIRCUITED AHEAD OF ALL SWITCHING. CONTROLLED VIA INTEGRAL PHOTOCELL.





DESIGN & CONSTRUCTION

CONSULTANT:





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DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD. EAST FISHKILL, NEW YORK 12533

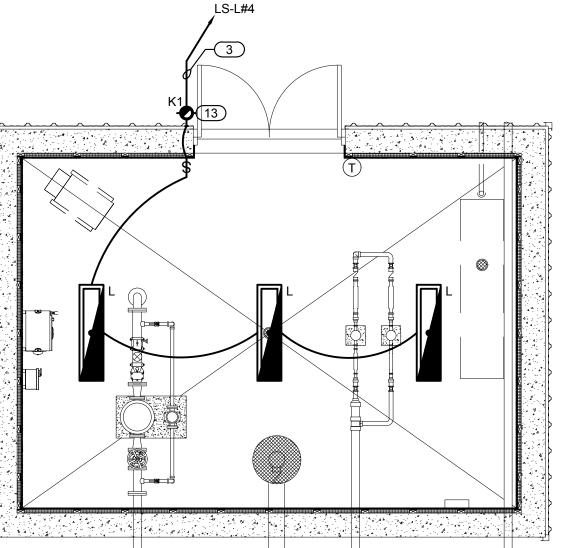
NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Revised **Drawing**

	11/15/202	. 1
<u>^2</u>	11/15/2021	ADDENDUM #2
	09/15/2021	REBID
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	455	52-E
DESIGNED BY:	АН	

APPROVED:

ELECTRICAL PUMP HOUSE **PLANS**



						MEC	HANICAL I	EQUIPM	ENT FEEDER SCHEDULE	
EQUIPMENT	EQUIPMENT		LO	AD		CONDUIT & CONDUCTORS	PANEL & CIRCUIT	CIRCUIT	DISCONNECTING MEANS	NOTES
SERVED	TAG	AMPS	HP/KW	PHASE	VOLTS	NUMBER & SIZE	NUMBER	BREAKER	(PROVIDED BY EC UON)	NOTES
AIR COMPRESSOR		32.2	10 HP	3	200	1" WITH 3#6, 1#8	PP-1#26,28,30	60A/3P	PROVIDE 60-AMP, 3-POLE, 240V FUSED @ 60A, NEMA 1, DISCONNECT SWITCH	
AIR COOLED CONDENSING UNIT	ACCU-1	62	-	3		1 1/4" WITH 3#4, 1#8	PP-1#15,17,19	80A/3P	PROVIDED BY MC.	
AIR HANDLING UNIT	AHU-1	7	1.34HP	3		3/4" WITH 3#12, 1#12		15A/3P	PROVIDE 30-AMP, 3-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	NOTE #2
BOILER NO. 1	B-1	2.7	-	1		3/4" WITH 2#12, 1#12	NLS-L1#61	15A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
BOILER NO. 2 BOILER NO. 3	B-2 B-3	2.7	-	1		3/4" WITH 2#12, 1#12 3/4" WITH 2#12, 1#12	NLS-L1#63 NLS-L1#65	15A/1P 15A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
BOILER NO. 3	B-3 B-4	2.7	-	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
DHW RECIRC PUMP	Б-4 СР-1	2.1	125 W	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
CABINET UNIT HEATER	CUH-1	0.2	0.03 HP	1		3/4" WITH 2#12, 1#12	NLS-L1#2	15A/1P	PROVIDED BY MC.	
EXHAUST FAN NO. 1	EF-1	9.6	3 HP	3		3/4" WITH 3#12, 1#12		20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 2	EF-2	9.6	3 HP	3		3/4" WITH 3#12, 1#12		20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 3	EF-3	9.6	3 HP	3		3/4" WITH 3#12, 1#12		20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 4	EF-4	9.6	3 HP	3		3/4" WITH 3#12, 1#12		20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 5	EF-5	9.6	3 HP	3	200	3/4" WITH 3#12, 1#12	NLS-L2#30,32,34	20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 6	EF-6	9.6	3 HP	3	200	3/4" WITH 3#12, 1#12	NLS-L2#36,38,40	20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 7	EF-7	9.6	3 HP	3		3/4" WITH 3#12, 1#12		20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 8	EF-8	9.6	3 HP	3		3/4" WITH 3#12, 1#12	1	20A/3P	PROVIDED BY MC	NOTE #2
EXHAUST FAN NO. 9	EF-9	2.2	1/8 HP	1		3/4" WITH 2#12, 1#12	NLS-L1#4	15A/3P	PROVIDED BY MC	
EXHAUST FAN NO. 10	EF-10	4.2	1 HP	3		3/4" WITH 3#12, 1#12		15A/3P	PROVIDE 30-AMP, 3-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
EXHAUST FAN NO. 11	EF-11	3.7	1/8 HP	1		3/4" WITH 2#12, 1#12	NLS-L2#47	15A/1P	PROVIDED BY MC	
OVERHEAD DOOR NO. 1	OHD#1	9.8	1/2 HP	1 1		3/4" WITH 3#12, 1#12	NLS-L1#8	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 2	OHD#2	9.8	1/2 HP	1 1		3/4" WITH 3#12, 1#12	NLS-L1#9	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 3	OHD#3	9.8	1/2 HP	1 1		3/4" WITH 3#12, 1#12 3/4" WITH 3#12, 1#12	NLS-L1#10	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 4 OVERHEAD DOOR NO. 5	OHD#4 OHD#5	9.8	1/2 HP 1/2 HP	1 1		3/4" WITH 3#12, 1#12 3/4" WITH 3#12, 1#12	NLS-L1#11 NLS-L1#12	20A/1P 20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 5 OVERHEAD DOOR NO. 6	ОНD#5 ОНD#6	9.8 9.8	1/2 HP	1		3/4" WITH 3#12, 1#12	NLS-L1#12 NLS-L1#13	20A/1P 20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 7	OHD#6 OHD#7	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12	NLS-L1#13 NLS-L1#14	20A/1P 20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	1
OVERHEAD DOOR NO. 8	OHD#8	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12	NLS-L1#15	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 9	OHD#9	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12		20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 10	OHD#10	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12		20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 11	OHD#11	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12		20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 12	OHD#12	9.8	1/2 HP	1		3/4" WITH 3#12, 1#12	1	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 13	OHD#13	9.8	1/2 HP	1	115	3/4" WITH 3#12, 1#12	NLS-L1#25	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
OVERHEAD DOOR NO. 14	OHD#14	9.8	1/2 HP	1	115	3/4" WITH 3#12, 1#12		20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
PRIMARY HWS PUMP	P-1	4.1	2.49HP	3		3/4" WITH 3#12, 1#12	II.	15A/3P	INTEGRAL VFD & DISCONNECT PROVIDED BY MC	
PRIMARY HWS PUMP	P-2	4.1	2.49HP	3		3/4" WITH 3#12, 1#12		15A/3P	INTEGRAL VFD & DISCONNECT PROVIDED BY MC	
RADIANT ZONE 1	P-3	8.5	2/5HP	1		3/4" WITH 2#12, 1#12		20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
RADIANT ZONE 2	P-4	8.5	2/5HP	1		3/4" WITH 2#10, 1#10	NLS-L1#44	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
RADIANT ZONE 3	P-5	8.5	2/5HP	1		3/4" WITH 2#10, 1#10	NLS-L1#46	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
RADIANT ZONE 4	P-6	8.5	2/5HP	1		3/4" WITH 2#12, 1#12	NLS-L1#48	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
RADIANT ZONE 5	P-7	8.5	2/5HP	1		3/4" WITH 2#12, 1#12	1	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH PROVIDE 30-AMP, 1-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	
RADIANT ZONE 6 BOILER PUMPS	P-8 P-9	8.5 5.7	2/5HP 0.48 HP	1		3/4" WITH 2#12, 1#12 3/4" WITH 2#12, 1#12	II.	20A/1P 15A/2P	INTEGRAL VFD PROVIDED BY MC. PROVIDE 30-AMP, 2-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	NOTE #4
BOILER PUMPS	P-10	5.7	0.48 HP	1		3/4" WITH 2#12, 1#12	· · · · · · · · · · · · · · · · · · ·	15A/2P	INTEGRAL VFD PROVIDED BY MC. PROVIDE 30-AMP, 2-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	NOTE #4
BOILER PUMPS	P-11	5.7	0.48 HP	1		3/4" WITH 2#12, 1#12	NLS-L2#57,59	15A/2P	INTEGRAL VFD PROVIDED BY MC. PROVIDE 30-AMP, 2-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	NOTE #4
BOILER PUMPS	P-12	5.7	0.48 HP	1		3/4" WITH 2#12, 1#12		15A/2P	INTEGRAL VFD PROVIDED BY MC. PROVIDE 30-AMP, 2-POLE, 240V NON-FUSED, NEMA 1, DISCONNECT SWITCH	NOTE #4
AHU RETURN FAN NO. 1	RF-1	4.6	<1 HP	3		3/4" WITH 3#12, 1#12		15A/2F 15A/3P	PROVIDED BY MC	NOTES #2 & #3
UNIT HEATER NO. 1	UH-1	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12	l .	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 2	UH-2	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 3	UH-3	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 4	UH-4	7.2	1/3 HP	1	115	3/4" WITH 2#12, 1#12	NLS-L1#51	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 5	UH-5	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12	NLS-L1#41	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 6	UH-6	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12	NLS-L1#53	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 7	UH-7	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 8	UH-8	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12		15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 9	UH-9	7.2	1/3 HP	1		3/4" WITH 2#12, 1#12	l .	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 10	UH-10	7.2	1/3 HP	1 1		3/4" WITH 2#12, 1#12	l .	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 11	UH-11	7.2	1/3 HP	1 1		3/4" WITH 2#12, 1#12	NLS-L1#58	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 12	UH-12	7.2	1/3 HP	1 1		3/4" WITH 2#12, 1#12	NLS-L1#56	15A/1P	PROVIDED BY MC	NOTE #1
UNIT HEATER NO. 13 UNIT HEATER NO. 14	UH-13 UH-14		5KW-1/40HF 5KW-1/40HF			3/4" WITH 2#10, 1#10 1" WITH 2#6, 1#6	NLS-L1#62,64 NLS-L1#66,68	30A/2P 30A/2P	PROVIDED BY MC PROVIDED BY MC	NOTE #1 NOTE #1
WATER HEATER	WH-14	<u> </u>	UINVV- 1/4UMF	1		3/4" WITH 2#12, 1#12	·	30A/2P 10A/1P	PROVIDED BY MC PROVIDE 30-AMP, 1-POLE, 240V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	INOTE#1
TANKLESS HW HEATER	WH-2	4	<u>-</u>	1		3/4" WITH 2#12, 1#12		10A/1P 10A/1P	PROVIDE 30-AMP, 1-POLE, 240V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	1
TANKLESS HW HEATER TANKLESS HW HEATER	WH-3	4	<u>-</u>	1		3/4" WITH 2#12, 1#12		10A/1P	PROVIDE 30-AMP, 1-POLE, 240V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	1
THREE COLLAND	VVI I-O	-	<u>-</u>	 '	120	- · · · · · · · · · · · · · · · · · · ·	INLO-LZ##1	10/7/15		1
FIRE PUMP	FP-1	27	20 HP	3	460	SEE DWG E-301	SERVICE & GEN	90A/3P IN GFN	1 -	NOTE #7
JOCKEY PUMP	JP-1	1.6	3/4 HP	3	460	SEE DWG E-301	LS-H#7,9,11	15A/3P	- -	NOTE #6
	J. 1		S. 1 1 II		1.55		,0,,,,	. 3, 501		
DOMESTIC WATER PUMP	DWP-1	2.8	3 HP	3	460	1" WITH 3#10, 1#10	NLS-H#7,9,11	15A/3P	PROVIDE 30-AMP, 3-POLE, 480V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	
DOMESTIC WATER PUMP	DWP-2	2.8	3 HP	3		1" WITH 3#10, 1#10	NLS-H#13,15,17	15A/3P	PROVIDE 30-AMP, 3-POLE, 480V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	
	GP-1	2.8	3 HP	3	460	1" WITH 3#10, 1#10	NLS-H#19,21,23	15A/3P	PROVIDE 30-AMP, 3-POLE, 480V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	
GRINDER PUMP		_		+		1" WITH 3#10, 1#10		15A/3P	PROVIDE 30-AMP, 3-POLE, 480V FUSED @ 10A, NEMA 1, DISCONNECT SWITCH	
GRINDER PUMP	GP-2	2.8	3 HP	3	460	1 VVIII 3#10, 1#10	1120 1 11/20,27 ,20	13/1/31	1110 VIDE 30 74VII , 31 OLE, 400 V 1 OCED @ 1071, 14EIVIT 1, DIOCOTAL	
	GP-2 EDP-1 EDP-2	2.8 9.8	3 HP 1/2 HP 1/2 HP	1	115 115	1" WITH 2#10, 1#10	NLS-L1#69	20A/1P	PROVIDE 30-AMP, 1-POLE, 240V FUSED @ 10A, NEMA 3R, DISCONNECT SWITCH	NOTE #5

EQUIPMENT SCHEDULE NOTES:

- 1. LINE VOLTAGE THERMOSTAT FURNISHED BY HC. EC SHALL INSTALL AND PROVIDE CONDUIT AND WIRE.
- 2. ON SIGNAL FROM BUILDING FIRE ALARM SYSTEM, UNIT SHALL STOP. THE UNIT SHALL AUTOMATICALLY RESTART WHEN THE FIRE ALARM SIGNAL IS CLEARED.
- 4. MC TO FURNISH. EC TO INSTALL.
- 5. PUMPS SHALL OPERATE LEAD/LAG.
- JOCKEY PUMP CONTROLLER BY P-CONTRACT. SERVICE ENTRACE RATED & 65KAIC RATING.
 FIRE PUMP CONTROLLER BY P-CONTRACT. SERVICE ENTRANCE RATED, ATS & 100KAIC RATING.

NEW YORK OFFICE OF General Services

DESIGN & CONSTRUCTION





THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, I.E. ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS 'A' MISDEMEANOR.



PROVIDE SUB-HEADQUARTERS BUILDING

DOT REGION 8, DUTCHESS COUNTY 205 LIME KILN RD. EAST FISHKILL, NEW YORK 12533

CLIENT: NEW YORK STATE DEPARTMENT OF

TRANSPORTATION

Revised Drawing

ADDENDUM #2 09/15/2021 REBID

MARK DATE DESCRIPTION 45552-E

DESIGNED BY: DRAWN BY: FIELD CHECK: APPROVED:

SHEET TITLE:

PROJECT NUMBER:

> **EQUIPMENT** SCHEDULE

-	ANTIDOADD CO	UEDIII	•			NOTES: P	ANEL SHA	LL BE FUL	LY RATED.					
P	ANELBOARD SC	HEDULI												-
	PANEL	SOURCE		RATINGS	(AMPS)		PHASE	/ WIRE	VOLT	AGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEM TYP
	NLS-L1	NLS-H 75KVA		ICB 50A	MI		ЗРН	1 4W	208/	120	SURFACE	22 KAIC	NQ472L4C	1
CKT	DESCRIPTION	BREAKER		VA L					.OAD		BREAKER	DESCR	IPTION	CKT
NO. 1	SITE LIGHT POLES	20A/1P	510.0	RCPT	MOTOR	HTG	нтG 23.0	MOTOR	RCPT	MISC	15A/1P	CUIU-1 [0.03 HP1	NO.
3	SITE LIGHT POLES	20A/1P 20A/1P	408.0				23.0	253.0			15A/1P		-9	4
5	111-RCPTS	20A/1P	400.0	720.0				255.0	720.0		20A/1P		RCPTS	6
7	DOMESTIC WATER CONTROL PANEL, RCPTS MECH RM-111	20A/1P		720.0				1127.0			20A/1P		D DOOR#1 HP]	8
9	OVERHEAD DOOR#2 [1/2 HP]	20A/1P			1127.0			1127.0			20A/1P		D DOOR#3 HP]	10
11	OVERHEAD DOOR#4 [1/2 HP]	20A/1P			1127.0			1127.0			20A/1P		D DOOR#5 HP]	12
13	OVERHEAD DOOR#6 [1/2 HP]	20A/1P			1127.0			1127.0			20A/1P		D DOOR#7 HP]	14
15	OVERHEAD DOOR#8 [1/2 HP]	20A/1P			1127.0					1920.0	20A/1P	LIGHTING	TIME CLOCK	16
17	OVERHEAD DOOR#9 [1/2 HP]	20A/1P			1127.0				8320.0		EOA /2D	WELDE	R RCPT	18
19	OVERHEAD DOOR#10 [1/2 HP]	20A/1P			1127.0				6320.0		50A/2P	[SW OFFI	CE WALL]	20
21	OVERHEAD DOOR#11 [1/2 HP]	20A/1P			1127.0				720.0		20A/1P	103-8	RCPTS	22
23	OVERHEAD DOOR#12 [1/2 HP]	20A/1P			1127.0				720.0		20A/1P	103-1	RCPTS	24
25	OVERHEAD DOOR#13 [1/2 HP]	20A/1P			1127.0				720.0		20A/1P	108-RCPTS		26
27	OVERHEAD DOOR#14 [1/2 HP]	20A/1P			1127.0					250.0	20A/1P	OIL/WATER SPRTOR PNL		28
29	106-COUNTER RCPT	20A/1P		1500.0								EF	-10	30
31	106-COUNTER RCPT	20A/1P		1500.0				1454.9			15A/3P	VEHICLE EXH	AUST SYSTEM	32
33	106-REFIDGERATOR 110-RCPTS	20A/1P		800.0 720.0										34 36
35 37	CP-1 RECIRC PUMP	20A/1P 15A/1P		720.0	125.0						15A/3P	SP	ARE	38
39	102-RCPTS	20A/1P		720.0	123.0						13/1/31	317	AIL .	40
41	UH-5	15A/1P		7 2010	828.0		977.5				20A/1P	Р	-3	42
43	UH-3	15A/1P			828.0		977.5				20A/1P	Р	-4	44
45	UH-1	15A/1P			828.0		977.5				20A/1P	Р	-5	46
47	EF-11 [1/8 HP]	15A/1P			253.0		977.5				20A/1P	P	-6	48
49	UH-2	15A/1P			828.0		977.5				20A/1P	Р	-7	50
51	UH-4	15A/1P			828.0		977.5				20A/1P	P	-8	52
53	UH-6	15A/1P			828.0				1800.0		20A/1P	106-MIC	ROWAVE	54
55	UH-7	15A/1P			828.0			828.0			15A/1P	UH	-12	56
57	UH-8	15A/1P			828.0			828.0			15A/1P		-11	58
59	UH-10	15A/1P			828.0			828.0			15A/1P	Ul	1-9	60
61	B-1	15A/1P				324.0	4992.0				30A/2P	110	-13	62
63	B-2	15A/1P				324.0	-332.0				JUN / ZF	Ul	13	64
65	B-3	15A/1P				324.0	4992.0				30A/2P	LIH	-14	66
67	B-4	15A/1P				324.0					,	31	- 01	68
69	SEPTIC EFFLUENT PUMPS [1/2 HP EACH]	20A/1P			1127.0				8320.0		50A/2P		R RCPT	70
71	RCPTS-WELDING BENCH	20A/1P		720.0								[TOOL ROOM WALL]		72
LEFT	SIDE SUB-TOTAL	918.0	7400.0	20227.0	1296.0	15872.0	8699.9	21320.0	2170.0	RIGHT SID	E SUB-TOTAL			
TOT	AL CONNECTED LOAD		3088.0		28926.9	17168.0			B PHASE		C PHASE			рилс
DEM	1AND FACTOR		1.0	10k,50%	0.7	0.7				Z CITIAGE		TOTAL CONNE	CILD LOAD PER	LITASI
ESTI	MATED DEMAND		3088.0	19360.0	20248.8	12017.6	NOTES: 1	PROVIE	DE FEED TH	RU LUGS	TO CONNECT	PANEL NLS-I	2. 2 COORI	DINA
	AL ESTIMATED DEMAND (VA)	V		5471	1 15		VALITILAND	CIL CONT	DACTOR	00 00 017	CIAUTILANAV	ALLOWED BY	CELECTED FO	IIIP

-	ANELDO ADD CC		-			NOTES: P	ANEL SHA	LL BE FUL	LY RATED.					
P	ANELBOARD SC	HEDUL	E											
	PANEL	SOURCE		RATINGS	(AMPS)		PHASE	/ WIRE	VOL	TAGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEM/
	NLS-L2	NLS-H 75KVA		CB OA	MI		3PH	1 4W	208,	/120	SURFACE	22 KAIC	NQ472L4C	1
CKT				VAL	OAD			VAL	OAD					CKT
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCR	RIPTION	NO.
1	SPARE	20A/1P												2
3	SPARE	20A/1P					2880.0	4160.0	0.0	8160.0	60A/3P	F1 SUE	PANEL	4
5	SE GARAGE RCPTS	20A/1P		540.0										6
7	NE GARAGE RCPT	20A/1P		540.0						985.6	20A/1P	EXTERIOR (GARAGE LTG	8
9	AHU CONTROL CABINET	20A/1P	500.0						1920.0		20A/1P	ICE MAI	KER RCPT	10
11	N GARAGE RCPTS	20A/1P		540.0						667.8	20A/1P	EXTERIOR GARAGE LTG		12
13	NW GARAGE RCPTS	20A/1P		360.0							20A/1P	SP	ARE	14
15	VENT CNTRL BOX	20A/1P	500.0								20A/1P	SP	ARE	16
17	GAS CONTROL PANEL	20A/1P	500.0											18
19	GAS CONTROL PANEL	20A/1P	500.0					3325.5			20A/3P	EF-2[3 HI	P], NOTE 1	20
21														22
23	EF-1 [3 HP], NOTE 1	20A/3P			3325.5									24
25								3325.5			20A/3P	EF-4[3 HI	P], NOTE 1	26
27														28
29	EF-3 [3 HP], NOTE 1	20A/3P			3325.5									30
31								3325.5			20A/3P	EF-5 [3 HI	P], NOTE 1	32
33	SW GARAGE RCPTS	20A/1P		540.0										34
35	EF-1-EF-4 DAMPERS	20A/1P	500.0									_	-	36
37	RECEPTACLES	20A/1P		900.0				3325.5			20A/3P	EF-6[3 H	P], NOTE 1	38
39	EF-5-EF-8 DAMPERS	20A/1P	500.0											40
41	MEZZANINE DAMPERS	20A/1P	500.0			10000000								42
43	WH-1	10A/1P				600.0		3325.5			20A/3P	EF-7[3 H	P], NOTE 1	44
45	WH-2	10A/1P				480.0								46
47	WH-3	10A/1P				480.0							-1	48
49	P-9	15A/2P			1140.0			3325.5			20A/3P	EF-8[3 HI	P], NOTE 1	50
51														52
53	P-10	15A/2P			1140.0		4160.0				50A/2P		E EQUIP	54
55								F00 0			204 /45		NCH RM	56
57	P-11	15A/2P			1140.0			500.0	1000.0		20A/1P		IIP LUNCH RM	
59 61									1800.0 1800.0		20A/1P 20A/1P		ATER RCPT	60 62
63	P-12	15A/2P			1140.0				1800.0		20A/1P 20A/1P		ATER RCPT	64
65	SPARE	20A/1P							1800.0		20A/1P 20A/1P	1711 1711 1711	ATER RCPT	66
67	SPARE	20A/1P 20A/1P							1800.0		20A/1P 20A/1P			68
69	SPARE	20A/1P 20A/1P							1000.0		20A/1P 20A/1P			70
71	SPARE	20A/1P									20A/1P 20A/1P		ARE	72
	SIDE SUB-TOTAL	ZUM/ IF	3500.0	3420.0	11211.1	1560.0	70/0 0	24613.2	10920.0	9813 /		E SUB-TOTAL		12
	L CONNECTED LOAD							1ASE		9813.4 HASE		L SUB-TUTAL	-	
	AND FACTOR			14340.0 10k,50%		8600.0 0.7	API	IASE	D PF	IMDE	C PHASE	TOTAL CONNE	CTED LOAD PER	PHASE
			1.0				NOTES: C	OOBDINA	TE VALLET	AECH CO	NTDACTOR	OD CD S17F \A/	THE NAME ALLO	N/ED
	MATED DEMAND 13313.4 14340.0 2 L ESTIMATED DEMAND (VA) 58750.					0020.0				ACTURER.		OR CD SIZE W	TITI IVIAN ALLU	VVED

						NOTES: P	ANEL SHA	LL BE FUL	LY RATED					
P	ANELBOARD SC	HEDULI	E											
	PANEL	SOURCE		RATINGS	(AMPS)		PHASE	/ WIRE	VOL	TAGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEMA TYPE
	F1	NLS-L2	M	1CB	M	ILO	3PH 4W		208/120		SURFACE	10 KAIC	NQ418L1C	-
	L1	NLS-LZ		-	10	00A	321	1 4VV	208	/120	SURFACE	TUKAIC	NQ418LIC	1
CKT	DESCRIPTION.	DDEAKED		VA L	OAD			VAL	OAD		DDEAKED	DESCRIPTION		CKT
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCR	TIPITON	NO.
1	TANK HEATER CONTROL	30A/2P								1000.0	20A/1P	DIESEL PU	IMP DISP#1	2
3	[FUTURE]	30A/2P						1000.0			20A/1P	DIESEL SUMP PUMP#1		4
	FUEL MANAGEMENT													
5	DATA RECORDER [FUTURE]	20A/1P	1000.0							500.0	20A/1P	LIGHTING		6
7	TANK MONITORING	451 (25	500.0							500.0	20A/1P	LEAK MO	NITORING	8
9	PANEL [INTERIOR]	15A/2P	500.0					2160.0			30A/1P	DEF DIS	SPENSER	10
11	PCS PANEL	30A/1P	2160.0				2880.0				30A/1P	HEAT	TRACE	12
13	HYDRO TANK CONTROL	20A/1P	500.0							500.0	20A/1P	CARD READ	ER [FUTURE]	14
15	SPARE	20A/1P								1000.0	20A/1P	DIESEL PU	IMP DISP#2	16
17	SPARE	20A/1P						1000.0			20A/1P	DIESEL SUI	MP PUMP#2	18
19	SPARE	20A/1P									20A/1P	SP	ARE	20
21	SPARE	20A/1P									20A/1P	SP.	ARE	22
23	SPARE	20A/1P									20A/1P	SP.	ARE	24
LEFT	SIDE SUB-TOTAL		4660.0	0.0	0.0	0.0	2880.0	4160.0	0.0	3500.0	RIGHT SID	E SUB-TOTAL	<u></u>	
TOTA	AL CONNECTED LOAD		8160.0	0.0	4160.0	2880.0	A PI	HASE	B PI	HASE	C PHASE			
DEM	MAND FACTOR		1.0	10k,50%	0.7	0.7						TOTAL CONNE	ECTED LOAD PER	PHASE
ESTII	MATED DEMAND		8160.0	0.0	2912.0	2016.0	NOTES:							
TOTA	AL ESTIMATED DEMAND (VA)		1308	8.00									
TOTA	AL AMPS			36.	33									

_			_			NOTES:	PANEL SHA	LL BE FUL	Y RATED					
P	ANELBOARD SC	HEDULI	E											
	PANEL	SOURCE		RATINGS	(AMPS)		PHASE	/ WIRE	VOI	.TAGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEMA TYPE
	LP-1	MDP-L		1CB DOA	MLO -		3PH 4W		208 / 120		SURFACE	10 KAIC	NQ430L1C	1
CKT				VA L	DAD			VAL					1	CKT
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCR	IPTION	NO.
1	GARAGE LIGHTS - a	20A/1P	1306.0							420.0	20A/1P	LTGS 105&1	.07-LOCKERS	2
3	GARAGE LIGHTS - b	20A/1P	1306.0							120.0	20A/1P	LTGS 108-ELE	C&111-MECH	4
5	GARAGE LIGHTS - c	20A/1P	1120.0							494.0	20A/1P	LTGS 102,	103 & 106	6
7	LTGS 104-CORR, 106-JAN	20A/1P	248.5							180.0	20A/1P	GARAGE SE W	ALL TASK LGTS	8
9	LTGS 112-DATA, 110-TOOL	20A/1P	150.0							180.0	20A/1P	GARAGE NE W	ALL TASK LGTS	10
11	GARAGE WALL TASK LGTS BY 111	20A/1P	90.0							180.0	20A/1P	GARAGE SW V	VALL TASK LGTS	12
13	SPARE	20A/1P								1188.0	20A/1P	WASHBAY W	ALL TASK LGTS	14
15	SPARE	20A/1P									20A/1P	SP	ARE	16
17	SPARE	20A/1P									20A/1P	SP	ARE	18
19	SPARE	20A/1P									20A/1P	SP	ARE	20
21	SPARE	20A/1P									20A/1P	SP	ARE	22
23	SPARE	20A/1P									20A/1P	SP	ARE	24
25	SPARE	20A/1P									20A/1P	SP	ARE	26
27	SPARE	20A/1P									20A/1P	SP	ARE	28
29	SPARE	20A/1P									20A/1P	SP	ARE	30
LEFT	SIDE SUB-TOTAL		4220.5	0.0	0.0	0.0	0.0	0.0	0.0	2762.0	RIGHTSID	E SUB-TOTAL		
TOT	AL CONNECTED LOAD		6982.5	0.0	0.0	0.0	A PI	HASE	ВР	HASE	C PHASE	TOTAL COMMI	CTED LOAD BED	DUACE
DEM	IAND FACTOR		1.0	10k,50%	0.7	0.8						TOTAL CONNI	ECTED LOAD PER	PHASE
ESTI	MATED DEMAND		6982.5	0.0	0.0	0.0	NOTES:							
TOT	AL ESTIMATED DEMAND (VA)			6982	.50									
TOT	AL AMPS			19.	38									

						NOTES:	PANEL SHA	LL BE FULI	Y RATED.					
PA	NELBOARD S	CHEDULE												
	PANEL	SOURCE		RATINGS	(AMPS)		PHASE	/ WIRE	VOL	TAGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	N EM/
	LS-H	MDP VIA ATS-LS	10.00	CB IOA	ML		3PF	14W	480	/277	SURFACE	65 KAIC	NF430L2C	1
CKT		VIA ATS ES		VAL				VAL	DΔD					CKT
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCR	RIPTION	NO.
1									Mar Misc					2
3	T-2 XFMR [30KVA]	50A/3P	19660.1	720.0	0.0	0.0					20A/3P	SP	ARE	4
5	LS-L		0.0000000000000000000000000000000000000											6
7	10.0757.070.00	OCKEY PUMP												8
9		15A/3P			1274.8						20A/3P	SPARE		10
11	[3/4 HP]	15A/3P												12
13														14
15	SPARE	60A/3P									20A/3P	SP	ARE	16
17														18
19														20
21	SPARE	20A/3P									20A/3P	SP	ARE	22
23														24
25														26
27	SPARE	15A/3P									30A/3P	SPD-	NOTE 1	28
29														30
	IDE SUB-TOTAL		19660.1	720.0	1274.8	0.0	0.0	0.0	0.0	0.0	RIGHT SID	E SUB-TOTAL	-	
	L CONNECTED LOAD		19660.1	720.0	1274.8	0.0	A PI	HASE	B PH	IASE	C PHASE	TOTAL CONNE	ECTED LOAD PER	PHASE
	MAND FACTOR		1.0	10k,50%	0.7	0.7								
	IATED DEMAND		19660.1	720.0	892.4	0.0	NOTE 1: 0	COORDINA	TE BREAK	CER SIZE V	NITH SPD SELE	CTED.		
TOTAL	L ESTIMATED DEMAND (V	(A)		2127	2.42									
TOTAL	LAMPS			59.	05									

D	ANELBOARD SC	UEDIII	_			NOTES:	PANEL SHA	ALL BE FUL	LY RATED.					
Ρ/	ANELDUARD 3C	HEDUL	C .											
	PANEL	SOURCE		RATINGS	(AMPS)	PHASE/ WIRE		VOL	TAGE	MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEM.	
	LS-L	LS-H		ICB	М	LO	301	14W	208	/120	SURFACE	22 KAIC	NQ430L1C	1
	LJ L	30KVA	10	00A		•	511			JONIACE	ZZ IVAIC	NQ-SOLIC		
CKT	DESCRIPTION	BREAKER		VAL	OAD			VAL	OAD		BREAKER	DESCRIPTION		CKT
NO.			MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC				NO.
1	GARAGE EM LIGHTS	20A/1P	980.0							1920.0	20A/1P		RMPANEL	2
3	EXIT LTGS & EM. NL LTGS	20A/1P	341.4							139.0	20A/1P	PUMP HOUSE LTGS		4
5	EXTERIOR EM LTGS	20A/1P	429.0						720.0		20A/1P	PUMP HOUSE RCPTS		6
7										1440.0	20A/1P	GRAP		8
9	GENERATOR PANEL	60A/3P	14410.7								20A/1P	SP	ARE	10
11											20A/1P	SP	ARE	12
13	SPARE	20A/1P									20A/1P	SPARE		14
15	SPARE	20A/1P									20A/1P	SP	ARE	16
17	SPARE	20A/1P									20A/1P	SP	ARE	18
19	SPARE	20A/1P									20A/1P	SP	ARE	20
21	SPARE	20A/1P									20A/1P	SP	ARE	22
23	SPARE	20A/1P									20A/1P	SP	ARE	24
25	SPARE	20A/1P												26
27	SPARE	20A/1P									30A/3P	SPD -	NOTE 1	28
29	SPARE	20A/1P												30
LEFT	SIDE SUB-TOTAL		16161.1	0.0	0.0	0.0	0.0	0.0	720.0	3499.0	RIGHT SID	E SUB-TOTAL		
TOTA	AL CONNECTED LOAD		19660.1	720.0	0.0	0.0	API	HASE	B PH	HASE	C PHASE	TOTAL 00		B
DEMAND FACTOR		1.0	10k,50%	0.7	0.7						TOTAL CONNI	ECTED LOAD PER	PHASE	
ESTIN	MATED DEMAND		19660.1	720.0	0.0	0.0	NOTE 1:	COORDINA	ATE BREAK	KER SIZE V	VITH SPD SELE	CTED.		
TOTA	AL ESTIMATED DEMAND (VA			2038	0.06									
TOTA	ALAMPS			56.	57									

D	ANELBOARD SO	HEDILLE				NOTES: P	ANEL SH	ALL BE FUL	LY RATED								
	ANLLDOAND 30	JILDULL	•														
	PANEL	SOURCE		RATINGS (AMPS)			PHASE/ WIRE		VOLTAGE		MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEMA			
	NLS-H	MDP VIA ATS-NLS		CB OA		LO -	3PI	H4W	480)/277	SURFACE	35 KAIC	NF442L4C	1			
CKT			VA LOAD					VAL	LOAD					CKT			
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCH	RIPTION	NO.			
1	T-3 XFMR [75KVA]													2			
3	NLS-L1 & L2	125A/3P	16401.4	43060.0	64751.2	25768.0					20A/3P	SP	ARE	4			
5	1110 22 02 22													6			
7	DOMESTIC WATER PUMP													8			
9	DWP-1[3 HP]	15A/3P			3824.4						20A/3P	SP	ARE	10			
11														12			
13 15	DOMESTIC WATER PUMP	15A/3P			3824.4						20A/3P	CD	ARE	14 16			
17	DWP-2[3 HP]	13/7/31			3024.4						ZUA/ SP	31	ANE	18			
19														20			
21	GRINDER PUMP	15A/3P	15A/3P	15A/3P	15A/3P			3824.4							SP	ACE	22
23	GP-1 [3 HP]													24			
25	COUNTRED DUINAD													26			
27	GRINDER PUMP	15A/3P			3824.4							SP	ACE	28			
29	GP-2 [3 HP]													30			
31														32			
33	P-1 [2.5 HP]	15A/3P			3266.6							SP	ACE	34			
35														36			
37	P-2 [2.5 HP]	45.405												38			
39 41	[REDUNDANT]	15A/3P										SP	ACE	40			
_	CIDE CUR TOTAL		16401.4	42060.0	02215.2	25769.0	0.0	0.0	0.0	0.0	DICUTOR	T CLID TOTAL		42			
	SIDE SUB-TOTAL AL CONNECTED LOAD		16401.4 16401.4	43060.0	83315.3 83315.3		0.0	0.0 HASE	0.0	0.0 HASE	C PHASE	E SUB-TOTA	-				
	IAND FACTOR		1.0	43060.0 10k,50%	0.7	0.7	AP	IIAJE	DPI	IMSE	CPHASE	TOTAL CONN	ECTED LOAD PER	PHASE			
	MATED DEMAND			-	(200)	(5.00)	NOTES: 0	COORDINA	TE WITH	MECH CC	NTRACTOR F	OR CR SIZE W	ΊΤΗ ΜΔΧ ΔΙΙΟ)WFD			
	AL ESTIMATED DEMAND (V)	4)	10-101.4	1192		TED EQUIP				ON CD SIZE W	THE WAY ALL	JVVLD					
	AL AMPS	-1		143			DI SELEC	LQOII	,,,,,,,,	, tor onen	<u>.</u>						

	NELDO 400 6		_			NOTES: P	ANEL SHA	LL BE FUL	LY RATED.					
PA	NELBOARD S	CHEDULI	=											
	PANEL	SOURCE [NOTE 2]		RATINGS (AMPS)		PHASE/ WIRE		VOLTAGE		MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEM/	
	MDP-H	UTILITY	MCB MLO 600A [NOTE 3] -		3DL	14W	480	/277	SURFACE	65 KAIC	HCM23734M	1		
	IVIDI -II	OTILITI					400/2//		JOIN ACE	05 KAIC	TICIVI23734IVI	-		
CKT	DESCRIPTION	BREAKER		VAL	OAD		VA LOAD				BREAKER	DECC	UPTION	CKT
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCI	DESCRIPTION	
1	T-1 XFMR [112.5]													2
3	MDP-L	175A/3P	6982.5	36256.0	37096.4	0.0	0.0	1274.8	720.0	19660.1	200A/3P	PANEL LS-I	IVIA ATS-LS	4
5	IVIDI													6
7														8
9	SPACE						25768.0	83315.3	43060.0	16401.4	400A/3P			
11														12
13		SPACE										SPARE		14
15	SPACE										200A/3P			16
17														18
19											224 (22			20
21	SPACE										30A/3P	SPD -	NOTE 1	22
23	IDECLID TOTAL		5000 5	20250.0	27006 1	0.0	25760.0	04500 1	42700.2	20004 5	DIGUTOS	E CUID TOTAL		24
	IDE SUB-TOTAL		6982.5		37096.4	0.0		84590.1		36061.5		E SUB-TOTAL	-	
	CONNECTED LOAD		43044.0		121686.5		A PI	HASE	BPI	HASE	C PHASE	TOTAL CONN	ECTED LOAD PER	PHASE
	ND FACTOR		1.0	10k,50%		0.7								
	ATED DEMAND	(4.)	43044.0			18037.6					VITH SPD SELI			
	ESTIMATED DEMAND (V	AJ		1912	NOTE 2: FIRE PUMP IS TIED INTO SERVICE BEFORE ANY DISCONNECTING MEANS.									
TOTAL	AMPS			230	0.07		NOTE 3: I	PROVIDE (500AF, 400	AT WITH	LSI SETTINGS			

						NOTES: P	ANEL SHA	LL BE FULI	Y RATED.	•						
PAI	NELBOARD S	SCHEDULI	E													
	PANEL	SOURCE		RATINGS (AMPS)			PHASE/ WIRE		VOLTAGE		MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEMA TYPE		
	MDP-L	MDP-H	M	ICB	M	LO	201	14W	209	/120	SURFACE	25 KAIC	HCM23734M	1		
	WIDP-L	112.5KVA	40	00A	16	-	SPF	1 400	200	/ 120	SURFACE	25 KAIC	HCIVIZ3734IVI	1		
CKT	DESCRIPTION	BREAKER		VA L	OAD			VA L	OAD		BREAKER	DECC	RIPTION	CKT		
NO.	DESCRIPTION	BREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	BREAKER	DESCR	RIPTION	NO.		
1									2							
3	PANEL PP-1	225A/3P	0.0	36256.0	37096.4	0.0					-	SP	ACE	4		
5														6		
7														8		
9	PANEL LP-1	125A/3P	125A/3P	125A/3P	6982.5	0.0	0.0	0.0					-	SPACE		10
11														12		
13														14		
15	SPARE	125A/3P									-	SP.	ACE	16		
17														18		
19														20		
21	SPARE	125A/3P									30A/3P	SP.	ARE	22		
23														24		
	DE SUB-TOTAL		6982.5	36256.0	37096.4	0.0	0.0	0.0	0.0	0.0	RIGHT SID	E SUB-TOTAL	_			
TOTAL (CONNECTED LOAD		6982.5	36256.0	37096.4	0.0	A PI	HASE	BPH	HASE	C PHASE	TOTAL CONNI	ECTED LOAD PER	PHASE		
DEMAN	D FACTOR		1.0	10k,50%	0.7	0.8						TOTAL COMM	LOAD FER	IIIAJE		
	TED DEMAND		6982.5	23128.0		0.0										
TOTAL	ESTIMATED DEMAND ((VA)		5607	7.96											
TOTAL	A A ADC			455												

_			_			NOTES:	PANEL SH	ALL BE FULI	LY RATED.					
P	ANELBOARD SC	HEDULE												
	PANEL	SOURCE		RATINGS (AMPS)		PHASE/ WIRE		VOLTAGE		MOUNTING	UL LISTING INT. RATING (RMS SYM. AMPS)	DESIGN MAKE SQ-D	NEM.	
	PP-1	MDP-L		CB 5A	ML -		3PI	H 4W	208	120	SURFACE	10 KAIC	10 KAIC NQ472L2C	
CKT	DESCRIPTION	BREAKER		VA L	OAD			VA L	OAD		BREAKER	D.F.C.C.	IPTION	CKT
NO.	DESCRIPTION	DREAKER	MISC	RCPT	MOTOR	HTG	HTG	MOTOR	RCPT	MISC	DREAKER	DESCR	IFIION	NO.
1	WATER COOLER	20A/1P		1920.0					540.0		20A/1P	CORD/R	EEL RCPT	2
3	BREAK RM RCPTS	20A/1P		1080.0					540.0		20A/1P	SOUTH WES	T EXT RCPTS	4
5	BREAK RM RCPTS	20A/1P		720.0					540.0		20A/1P	SOUTH EAS	T EXT RCPTS	6
7	NORTH WEST EXT RCPTS	20A/1P		720.0					540.0		20A/1P	RCPTLOG	KERS/JAN	8
9	NORTH EAST EXT RCPTS	20A/1P		720.0					1260.0		20A/1P	RCPTS -	101&104	10
11	BREAK RM RCPT	20A/1P		180.0					900		20A/1P	EXT	RCPTS	12
13	BREAK RM TV	20A/1P		600.0										14
15								2424.9			15A/3P	AHU-1		16
17	ACCU-1	80A/3P			21477.4									18
19	-													20
21	CORD/REEL RCPT	20A/1P		540.0				1593.5			15A/3P	R	F-1	22
23	SPARE	20A/1P		5 10.0				155515			157 1, 51		_	24
25	SPARE	20A/1P												26
27	SPARE	20A/1P						11600.6			60A/3P	AIR COMPRESSOR		28
29	SPARE	20A/1P						11000.0			OUA/SI	AIN COMI NESSON		30
31	SPARE	20A/1P							540.0		20A/1P	CORD/R	EEL RCPT	32
33	SPARE	20A/1P							540.0		20A/1P		EEL RCPT	34
35	SPARE	20A/1P							540.0				EEL RCPT	36
									540.0		20A/1P			-
37	SPARE	20A/1P									20A/1P		ARE	38
39	SPARE	20A/1P		600.0							20A/1P		ARE	40
41	OFFICE TV	20A/1P		600.0							20A/1P		ARE	42
43	CORD/REEL RCPT	20A/1P		540.0							20A/1P		ARE	44
45 47	CORD/REEL RCPT CORD/REEL RCPT	20A/1P 20A/1P		540.0 540.0							20A/1P 20A/1P		ARE ARE	48
49	COND/ NEEL NCP I	20A/1P		540.0							20A/1P		ARE	50
51	CAR CHARGING STATION	40A/3P		10808.0							20A/1P		ARE	52
53	(FUTURE)	40A/3F		10000.0							20A/1P		ARE	54
55											20A/1P		ARE	56
57	CAR CHARGING STATION	40A/3P		10808.0							20A/1P		ARE	58
59	(FUTURE)	40/1/31		10000.0							20A/1P		ARE	60
61	SPARE	20A/1P									20A/1P		ARE	62
63	SPARE	20A/1P									20A/1P		ARE	64
65	SPARE	20A/1P									20A/1P		ARE	66
67	SPARE	20A/1P									20A/1P		ARE	68
69	SPARE	20A/1P									20A/1P		ARE	70
71	SPARE	20A/1P									20A/1P		ARE	72
	SIDE SUB-TOTAL	LUI () 11	0.0	30316.0	21477.4	0.0	0.0	15618.9	5940.0	0.0		E SUB-TOTAL		12
	AL CONNECTED LOAD		0.0	36256.0		0.0		HASE	3340.0 B PF		C PHASE	LUGO TOTAL	-	
	AND FACTOR		1.0	10k,50%	0.7	0.0	Α.Γ	IIAAL	ויים	IAJL	CFRASE	TOTAL CONNI	CTED LOAD PER	PHASE
	MATED DEMAND		0.0		25967.5	0.7	NOTES							
	VIAILU ULIVIAINU		U.U	23120.0	23301.3	U.U	NOTES:							

GENERAL NOTES:

A. ENGINEER SHALL VERIFY THE KAIC RATINGS ONCE CHG&E PROVIDES THE TRANSFORMER IMPEDANCE.

9.	IEET

MDP-L

PANELBOARD KEY

NLS-L1 LP-1 MDP-H

F1 LS-L PP-1
- NLS-H -

NLS-L2 LS-H

PANEL SCHEDULES

E-203

PLOT SI

NEW YORK STATE OF GENERAL Services

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CONTRACT: ELECTRICAL

IIILE.

PROVIDE SUB-HEADQUARTERS BUILDING

TION:

DOT REGION 8, DUTCHESS COUNTY

205 LIME KILN RD.

EAST FISHKILL, NEW YORK 12533

NT: NEW YORK STATE DEPARTMENT OF

Revised
Drawing

TRANSPORTATION

11/15/2021

11/15/2021 ADDENDUM #2
09/15/2021 REBID
DATE DESCRIPTION
45552-E

Y: AH

DESIGNED BY: AH

DRAWN BY: JM

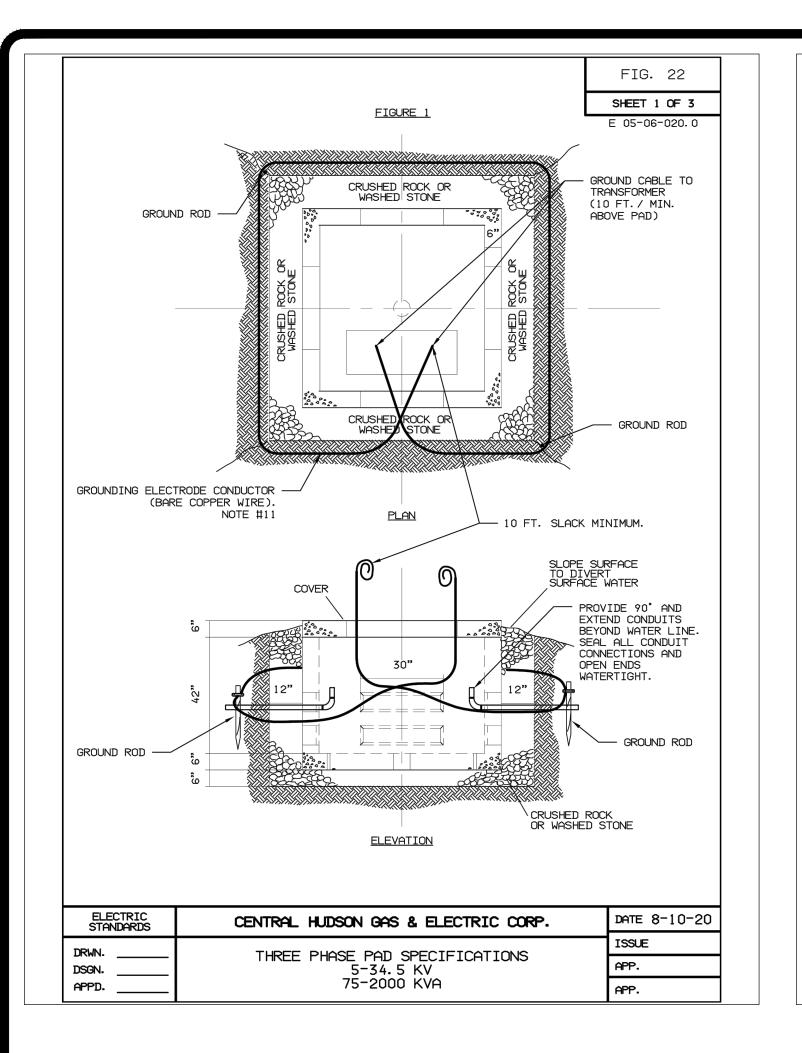
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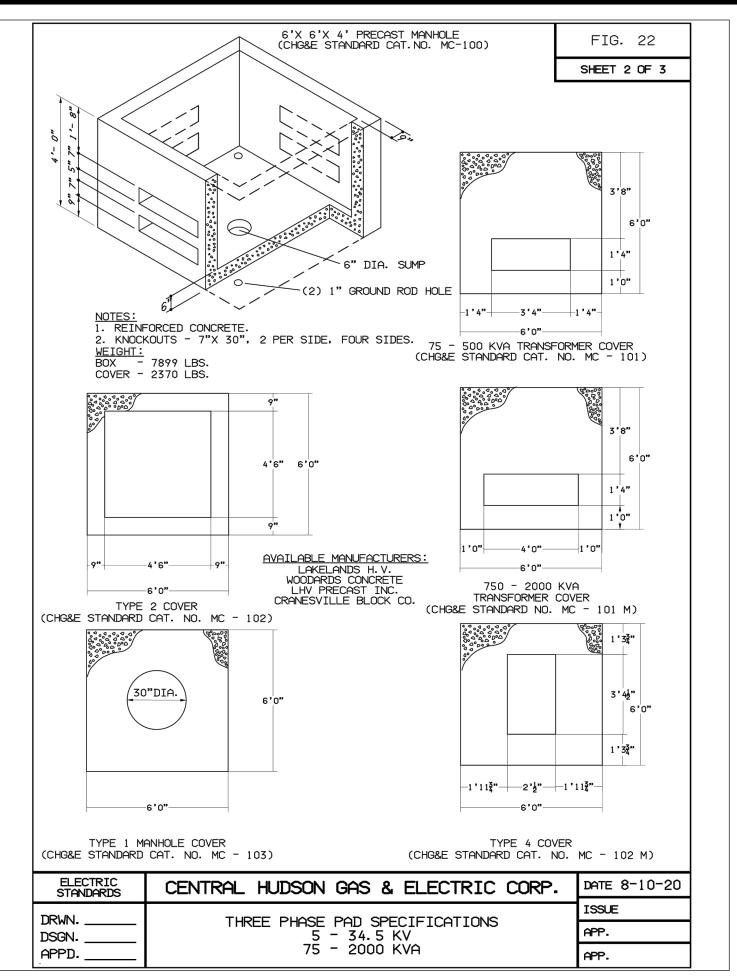
NUMBER:

APPROVED: MH

SHEET TITLE:

DRAWING NI IMBER





NOTES:

. THE CUSTOMER WILL NORMALLY PROVIDE THE PAD FOR THREE PHASE PAD-MOUNTED TRANSFORMERS, THE STANDARD IS INTENDED AS A GUIDE FOR PROVIDING THE SPECIFICATIONS FOR PAD INSTALLATIONS APPLICABLE TO PAD-MOUNTED TRANSFORMERS OF VARIOUS KVA SIZE AND DIMENSIONS. THE STANDARD INSTALLATION USES A PRE-CAST CONCRETE BASE AND COVER, THE CONCRETE BASE IS OF UNIFORM SIZE AND UTILIZES COVERS WITH DIFFERENT SIZED WINDOW OPENINGS TO ACCOMMODATE THE KVA SIZE OF THE PAD-MOUNTED TRANSFORMER, DETAILED SPECIFICATIONS AND INSTALLATION REQUIREMENTS ARE PROVIDED IN PAGES 1 TO 3 OF THIS STANDARD.

FIG. 22

SHEET 3 OF 3

- . THE SIDES AND REAR OF THE PAD SHALL BE A MINIMUM OF TEN (10) FEET FROM THE WINDOWS AND FIRE ESCAPES AND A MINIMUM OF THREE (3) FEET (TEN (10) FEET PREFERRED) FROM ALL BUILDINGS, FENCES, OR OTHER OBSTRUCTIONS WHICH WILL IMPEDE THE FREE FLOW OF COOLING AIR AROUND THE TRANSFORMER, THE FRONT OF THE PAD (WINDOW SIDE) SHALL HAVE A MINIMUM OF TEN (10) FEET OF UNOBSTRUCTED WORKING SPACE.
- . ACCESS TO PAD AREA BY VEHICLE MUST BE POSSIBLE AT ALL TIMES TO INSURE PROPER OPERATION AND MAINTENANCE FUNCTIONS.
- . STONE FOR BASE AND SIDES OF THE BOX PAD SHALL BE 3/4" MINIMUM TO 1-1/2" MAXIMUM CRUSHED ROCK OR WASHED STONE. 1/2" CRUSHED ROCK OR WASHED STONE MAY BE USED FOR TOP 6" IN LOCATIONS WHERE WINDOW BREAKAGE MAY BE A PROBLEM, FOR THE BASE, STONE SHALL BE PLACED ON UNDISTURBED OR WELL TAMPED EARTH.
- . AREA AROUND THE BOX PAD SHALL BE GRADED SO THAT SURFACE WATER WILL DRAIN AWAY FROM CRUSHED STONE OIL CONTAINMENT.
- 6. THE BOX PAD SHALL BE INSTALLED SUCH THAT THE TOP SURFACE IS LEVEL TO WITHIN 1/4" HIGH TO
- . IN GENERAL, 5" CONDUIT SHOULD BE USED FOR BOTH PRIMARY AND SECONDARY CONDUCTORS. HOWEVER, THE SECONDARY CONDUIT SHOULD BE SIZED ACCORDING TO THE SECONDARY CONDUCTORS BEING INSTALLED.
- . PERMANENT SUPPORT SHALL BE PROVIDED FOR THE SECONDARY CONDUCTORS SUCH THAT THE TOTAL WEIGHT SUPPORTED BY EACH TRANSFORMER BUSHING SHALL NOT EXCEED TEN POUNDS. THUS SINGLE RUNS OF 500 MCM COPPER AND LARGER, 1000 MCM AL AND LARGER AND PRACTICALLY ALL MULTIPLE CONDUCTOR RUNS NEED TO BE SUPPORTED TO LIMIT THE STRESS ON THE BUSHINGS.
- . CENTRAL HUDSON RESERVES THE RIGHT TO REQUIRE SUITABLE BARRIERS IN TRAFFIC AREAS TO REDUCE THE PROBABILITY OF DAMAGE DUE TO TRUCKS, AUTOMOBILES, CONSTRUCTION EQUIPMENT, AND THE LIKE, SUITABLE BARRIERS MIGHT BE 4" (MINIMUM) STEEL PIPE, FILLED WITH CONCRETE, SET 4 FT. DEEP AND EXTENDING 3 TO 4 FEET ABOVE GROUND, BARRIERS SHOULD BE SET BEYOND THE OIL CONTAINMENT IN LOCATIONS WHICH WILL INTERCEPT VEHICLES YET NOT INTERFERE WITH THE INSTALLATION OR REMOVAL OF THE TRANSFORMER.
- 10. ALL GROUNDING MUST BE IN ACCORDANCE WITH COMPANY SPECIFICATIONS.
- 11. SIZE THE GROUNDING ELECTRODE CONDUCTOR AS FOLLOWS:
- A. 200A AND SMALLER SECONDARY SERVICES: #4 AWG COPPER
- B. 400A SECONDARY SERVICES: #1/0 AWG COPPER C. LARGER THAN 400A SECONDARY SERVICES: #3/0 AWG COPPER

STANDARDS	CENTRAL HUDSON GAS & ELECTRIC CORP.	DATE 8-10-20	J
DRWN.	TUDES DUACE DAD ODECTETOATIONS	ISSUE	
DSGN.	THREE PHASE PAD SPECIFICATIONS 5-34.5 KV	APP.	
APPD.	75-2000 KVA	APP.]

KEYED NOTES

- 1. (2) 4" RIGID STEEL CONDUIT FOR POWER UP 10' FROM BASE OF POLE. PROVIDE 90 DEGREE RIGID STEEL ELBOW AT THE BASE OF THE POLE. RUN 4" CONDUIT UNDERGROUND. REFER TO SITE PLAN E-100.
- (2.) (2) 4" SCHEDULE 80 PVC ONLY WITH PULL STRING FOR TELEPHONE UP 10' FROM BASE OF POLE. CAP IN DATA ROOM 106, 6" AFF FOR FUTURE USE.
- (3.) #1/0 GROUND CONDUCTOR TO BUILDING STEEL. REFER TO DETAIL #2/E-401. 4.) RUN 4" CONDUIT WITH PULL STRING FOR FUTURE USE. CAP OUTSIDE OF
- (5.) STUB UP IN TEL/DATA ROOM.

BUILDING 12" ABOVE FINISHED GRADE.

- 6. ATS-LS: 200A, 480 / 277V, 3 PHASE, 4P, 4W, 65KAIC, 2 SETS OF AUXILIARY
- 7. ATS-NLS: 400A, 480 / 277V, 3 PHASE, 4P, 4W, 65KAIC, 2 SETS OF AUXILIARY
- 8.) CONNECT TO GROUND ELECTRODE GRID. SEE DETAIL #2/E-403.

- 9. PROVIDE A 2" C. WITH PULLROPE FOR FIRE PUMP FIRE ALARM MONITORING. WHICH SHALL INCLUDE, BUT NOT LIMITED TO:
- 9.1. MONITOR THE EMERGENCY POWER SOURCE
- 9.2. MONITOR THE PHASE REVERSAL 9.3. MONITOR PUMP OPERATING
- 9.4. MONITOR POWER / PHASE FAILURE
- 9.5. TRANSFER SWITCH POSITION 9.6. PARALLEL CONTACT WITH THE LIFE SAFETY TRANSFER SWITCH, ATS-LS. 15. PROVIDE (3)#10, (1)#10G. IN 1" CONDUIT.
- 10. PROVIDE TERMINATION KIT FOR 500 KCMIL WIRE.
- 11.) 15KV, #2 AWG ALUMINUM CONDUCTORS, 7-WIRE COMPRESSED OR CONCENTRIC ROUND STRANDING, WITH 15 MILS CONDUCTOR SHIELD, 220 MILS CROSS LINKED POLYETHYLENE INSULATION, 30 MILS INSULATION SHIELD AND 10#14 AWG TINNED COPPER CONCENTRIC NEUTRAL APPLIED SPIRALLY AROUND THE CABLE WITH A 50 MILS SEMI-CONDUCTING CABLE JACKET APPLIED OVER THE NEUTRAL CONDUCTOR IN 4"C.

12. PROVIDE (4)#500 KCMILS, (1)#2G. IN 4"C.

- (13.) FIRE PUMP CONTROLLER SHALL HAVE A PLACARD ON THE FIRE PUMP CONTROLLER OR ADJACENT TO THE CONTROLLER STATING THAT: THE CONTROLLER IS THE SERVICE ENTRANCE RATED DISCONNECTING MEANS FOR THE NORMAL & EMERGENCY POWER. [PER NEC 695]
- 14.) MDP-H SHALL HAVE A PLACARD ON THE COVER STATING THAT: THIS BOARD IS THE SITE NORMAL SERVICE ENTRANCE RATED DISCONNECTING MEANS. THE SITE GENERATOR HAS THE EMERGENCY DISCONNECTING MEANS FOR THE LIFE SAFETY TRANSFER SWITCH; ATS-LS, NON-LIFE SAFETY TRANSFER SWITCH; ATS-NLS, AND THE FIRE AND JOCKEY PUMPS; FP-1 & JP-1. [PER NEC
- 16.) REFER TO DETAIL #6/E-404.

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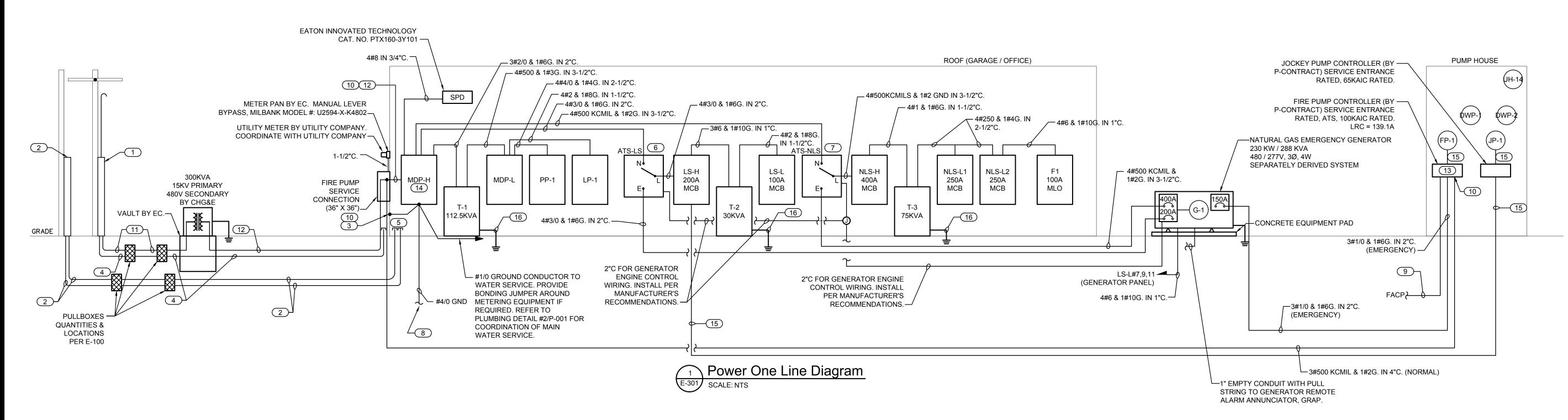


11/15/2021 ADDENDUM #2 09/15/2021 REBID DESCRIPTION DATE 45552-E NUMBER: DESIGNED BY: DRAWN BY: FIELD CHECK: APPROVED:

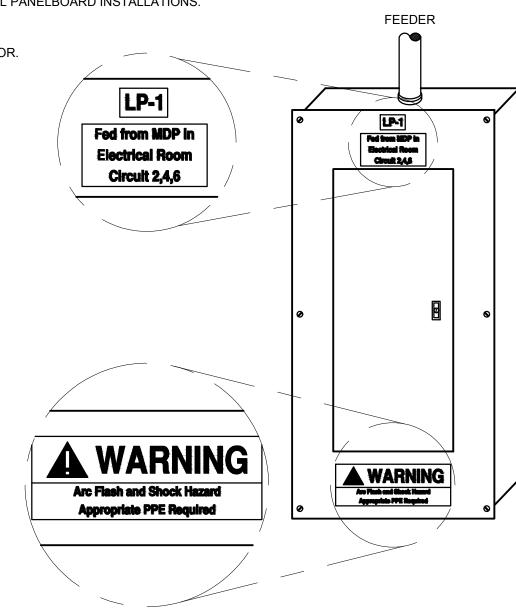
ONE LINE DIAGRAM

E-301

SHEET TITLE:



- A. PANELBOARDS SUPPLIED BY A FEEDER SHALL BE MARKED TO INDICATE WHERE THE POWER SUPPLY ORIGINATES PER NEC SECTION 408.4(B).
- B. PROVIDE ARC FLASH PROTECTION LABEL PER NEC SECTION 110.16, AND SPECIFICATION SECTION 260573.
- C. REFER TO ELECTRICAL IDENTIFICATION SECTION 262416 FOR ADDITIONAL INFORMATION.
- D. PROVIDE IDENTIFICATION FOR ALL PANELBOARD INSTALLATIONS.
- E. 'LS' LIFE SAFETY INDICATOR.
- F. 'NLS' NON-LIFE SAFETY INDICATOR.



PROVIDE #6 AWG GREEN INSULATED GROUNDING WIRE TO BUILDING MDP GROUND BUS BAR, IN ELECTRICAL ROOM. COMMUNICATIONS **GROUND BAR** - PROVIDE #6 AWG GREEN INSULATED **GROUNDING WIRE** BACKBOARD — CATV DISTRIBUTION EQUIPMENT, BY OTHERS 5/8-11 X 1" HHCS BOLT (TYPICAL) -PROVIDE WITH (4) COMPRESSION LUG 5/8" LOCK WASHERS (TYPICAL) ----FITTINGS. PROVIDE ADDITIONAL AS REQUIRED.

COPPER GROUND BAR, NOMINAL

0030580010

- NEWTON INSTRUMENT COMPANY

DIMENSIONS 0.25" x 4" x 24". DESIGN MAKE

NOTES: FOR EMERGENCY SHUT-DOWN STATION(S), PROVIDE NC CONTACT BLOCKS AS REQUIRED PER QUANTITIES OF EQUIPMENT. 2 PER E-104. B. PROVIDE CONTACTOR OR CONTACTORS
WITH NUMBER OF POLES AS REQUIRED
TO HANDLE THE REQUIRED LOADS; CONTROL CIRCUIT -BOILER #1 CONTROL CIRCUIT — BOILER #2 CONTROL CIRCUIT-BOILER #3 CONTROL CIRCUIT-BOILER #4 CONTROL CIRCUIT— WH-1

Panelboard Identification Detail

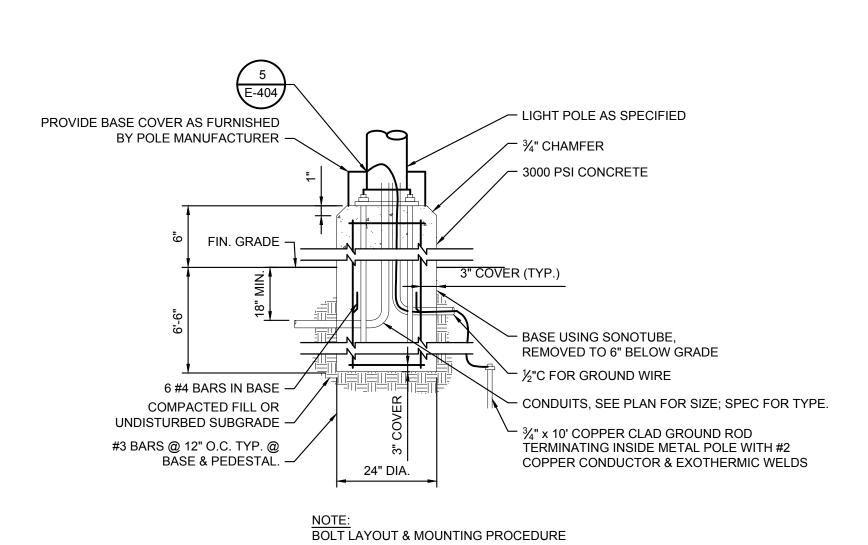
SCALE: NTS

Telecom Ground Bus Detail

SCALE: NTS

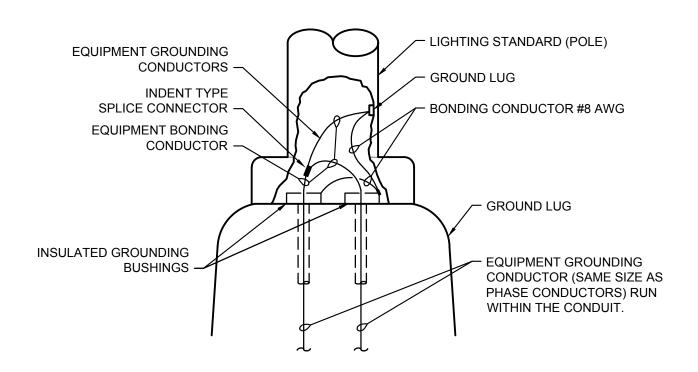
WALL MOUNTING BRACKET -

3 Emergency Shut-Down Wiring Schematic
SCALE: NTS



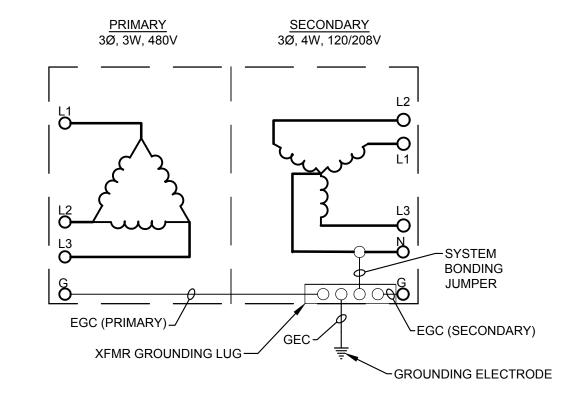
Site Lighting Pole Detail

AS PER MFG. SPECS.



Grounding + Bonding Detail for Lighting Standard

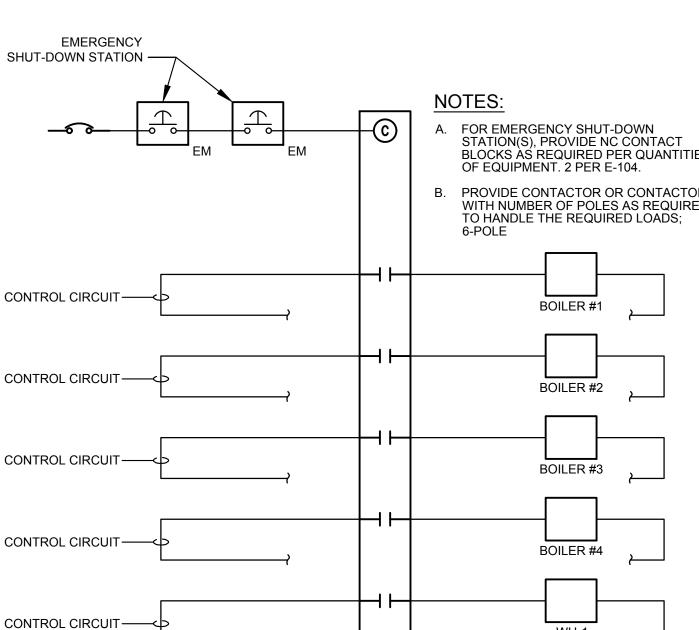
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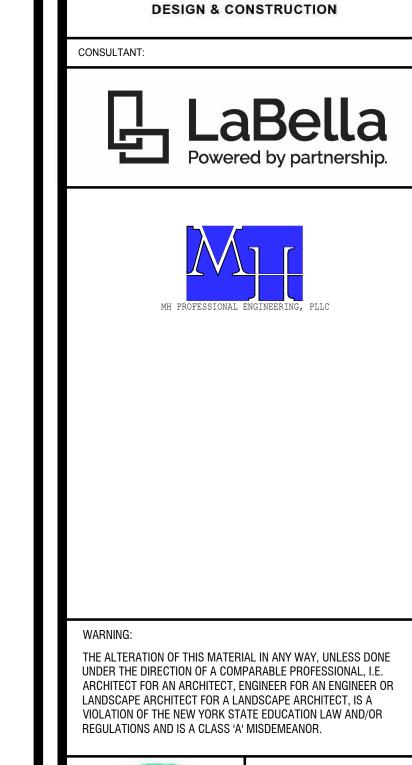


	TRANSFORMER CONDUCTOR SIZES													
XFMR LABEL	XFMR SIZE	PHASE (PRIMARY)	PHASE (SECONDARY)	EGC (PRIMARY)	EGC (SECONDARY)	GEC	BONDING JUMPER							
T-1	112.5 KVA	#2/0	500 KCMIL	#6	#3	#4	#4							
T-2	30 KVA	#6	#2	#10	#8	#8	#8							
T-3	75 KVA	#1	250 KCMIL	#6	#4	#8	#8							

2. REFER TO SPECIFICATION 260526 FOR ACCEPTABLE GROUNDING ELECTRODES

6 Dry- Type Transformer Connection & Grounding Detail
E-404 SCALE: NTS





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ELECTRICAL DETAILS