

SECTION 00 41 26PC – PLUMBING CONSTRUCTION PROPOSAL

All amounts shall be written out in full and also stated in figures.

Original proposal forms provided herein MUST be utilized for the bid. All signatures MUST be originals and in ink. No substitutions, photo copies, or fax copies are permitted.

The Purchasing Department will keep a record of all prospective bidders obtaining bid documents. Any bidder not on record as having received bid documents from Purchasing will not be considered for award.

THE INTERPOLATION OR ALTERING OF PROPOSAL BY WHICH THE TERMS OF THE SPECIFICATIONS ARE CHANGED SHALL CAUSE REJECTION OF THE PROPOSAL.

The Broome Community College Finance and Facilities or the Vice-President for Administration and Financial Affairs reserves the right to reject any or all bids.

Persons or Firms submitting bids shall be engaged in the lines of work required and shall be able to refer to work of similar character performed by them.

CORPORATION(S) MUST BE AUTHORIZED TO DO BUSINESS IN THE STATE OF NEW YORK.

NOTE: **Sealed Bids** covering:

Plumbing Construction – Culinary Arts Center - Renovation and Addition
SUNY Broome Community College
78 Exchange Street
Broome County
Binghamton, New York

In accordance with Contract Documents, will be received by the Broome Community College, Purchasing Department, Room 120, Campus Services Building, Upper Front Street Campus, Binghamton, New York until 10:00 am local time, February 13, 2018 and will be publicly opened and read at 11:00 a.m. in the 1st floor Conference Room at the Ice Center Building. Physical Address being 907 Front Street, Binghamton, NY 13905 or PO Box 1017 Binghamton, NY 13902.

Bids must be submitted in a **Sealed Envelope**, clearly marked with the Words **“Broome Community College Purchasing Office”**, the **Project Title** and the **Contract Type**, (ref: Supplementary General Conditions – 1.A.), on the outside of the **Envelope** containing the **Bid**.

EACH PROPOSAL SHALL BE ACCOMPANIED BY A DEPOSIT IN THE SUM OF 5% OF THE BID AMOUNT. SAID DEPOSIT SHALL BE CONSIDERED A GUARANTEE THAT THE BIDDER WILL ENTER THE CONTRACT IF AWARDED SAME. THE DEPOSIT SHALL CONSIST OF CERTIFIED CHECK DRAWN UPON SOME LEGALLY INCORPORATED BANK OF THIS STATE AND MADE PAYABLE TO THE *Broome Community College Treasurer*, or a Bid Bond for not less than 5% of the bid.

CONTRACTOR'S QUALIFICATION STATEMENT MUST BE SUBMITTED WITH THE PROPOSAL

ENVELOPE SHALL BE SEALED AND PLAINLY MARKED:

PLUMBING CONSTRUCTION – CULINARY ARTS CENTER - RENOVATION AND ADDITION

Broome Community College
907 Front Street
Town of Dickinson
County of Broome
State of New York

Bidder Must use the original qualification statement provided herein. No substitutions, photo copies, or fax copies are permitted. "The low bidder, upon notice, will be required within 24 hours of being notified to submit its most recent audited financial statement. Such statement shall be kept confidential consistent with the provisions of the Public Officers Law.

FORM OF PROPOSAL

PLUMBING CONSTRUCTION – CULINARY ARTS CENTER - RENOVATION AND ADDITION

The following proposal is hereby respectfully submitted to: The Broome Community College Board of Trustees by:

CONTRACTOR

BY TITLE

BUSINESS ADDRESS

CITY STATE

DATE FEDERAL ID. NO.

SIGNATURE

STIPULATED AMOUNTS: The above signed hereby proposes and agrees to perform all the work and furnish all things required for:

Culinary Arts Center - Renovation and Addition
Broome Community College
907 Front Street
Town of Dickinson
County of Broome
State of New York

all in accordance with the Drawings, Specifications and other Contract Documents prepared by Broome Community College for the following stipulated amounts:

BASE BID

Cost for Labor, equipment and materials

_____ \$ _____
Written Figures

ALTERNATES: (If NO Change, write in ZERO – 0 or NO CHANGE)

ALTERNATES	FIGURE
PC 1 - Omit the new central stair	
Written Amount:	\$
PC 2 - Omit the built-in bar	
Written Amount:	\$

UNIT PRICES:

There are no Unit Prices under this contract.

Bidders must bid on all parts to constitute a valid bid.

METHOD OF AWARD: Contract Award will be to the Lowest Qualified Bidder determined by the combination of Base Bid and Selected Alternates desired by Broome Community College.

KNOWLEDGE OF LOCAL CONDITIONS AND CONTRACT DOCUMENTS: The above signed has examined the location of the proposed Work, Drawings, Specifications and other Contract Documents and is familiar with local conditions at the place where the work is to be performed.

PROPOSAL PERIOD: The above signed agrees to hold bid open for a forty-five (45) day period following the scheduled time for the opening of bids.

EXECUTION OF AGREEMENT AND FURNISHING BOND: Within ten (10) days after being awarded the Contract, the above signed agrees to execute the Form of Agreement and to furnish Performance and Payment Bonds in an amount equal to 100 percent of the contract amount.

ADDENDA: The above signed hereby acknowledges receipt of the following addenda:

<u>ADDENDUM NO.</u>	<u>DATE</u>
_____	_____
_____	_____
_____	_____
_____	_____

CONTRACT TIME: To be determined

BROOME COMMUNITY COLLEGE'S RIGHTS RESERVED: The above signed understands that Broome Community College reserves the right to reject any or all proposals or to waive any formality or technicality in any proposal.

Accompanying this proposal is cash, draft, certified check or a bid bond for \$_____. In case this proposal shall be accepted by the Broome Community College Board of Trustees, and the undersigned shall fail to execute the contract and in all respects comply with the provisions of Article 5 A, Section 102 of the General Municipal Law, as amended, the monies represented by such cash, draft, certified check or bid bond shall be regarded as liquidated damages and shall be forfeited and become the property of SUNY Broome; otherwise to be returned to the depositor in accordance with the provisions of said Article A 5, Section 102 of the General Municipal Law, as amended.

On acceptance of this proposal for said work, the undersigned does or do hereby bind himself or themselves to enter into written contract, within ten (10) days of Notice of Award, with Broome Community College, and to comply in all respects with Article 5 A, Section 102 of the General Municipal Law, as amended, in relation to security for the faithful performance of the terms of said contract.

DATED _____ 20_____

Legal Name of Person, Firm or Corporation

By _____

The P.O. address of the bidder is:

_____ Street

_____ City and State

IF A CORPORATION

NAME		ADDRESS
_____	President	_____
_____	Secretary	_____
_____	Treasurer	_____

IF A FIRM

NAME OF MEMBERS	ADDRESS
_____	_____
_____	_____
_____	_____

SECTION 01 12 00 - MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.
- B. Specific requirements for work of each contract are also indicated in individual Specification Sections and on Drawings.

1.2 Definitions

- A. CM: Construction Manager.
- B. Permanent Enclosure: As determined by CM, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary enclosures

1.3 CONTRACTS

- A. Project will be constructed under multiple contracts.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract GC General Trades
 - 2. Contract EC Electrical
 - 3. Contract MC HVAC
 - 4. Contract PC Plumbing & Fire Protection

1.4 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
 - 1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 - 2. All Prime Contractors should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 - 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 - 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 - 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract GC General Trades.

6. Equipment pads for the work of each contract shall be the work of each Contract for its own work.
7. Roof-mounted equipment curbs and associated caps for the work of each contract shall be the work of each Contract for its own work.
8. Painting for the work of each contract shall be the work of each Contract for its own work.
9. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
10. Through-penetration fire-stopping for the work of each contract shall be provided by each Contract for its own work.
11. Contractors' Startup Construction Schedule: Within fifteen (15) working days Notice to Proceed, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
12. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.
13. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
14. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the CM for review. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.
15. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
16. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
17. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, Spectrum/Time Warner, NYSEG Gas, NYSEG Electric, Level 3 Communications, Fiber Technologies, City of Binghamton Department of Water and Sewer traffic, labor, transportation, environmental, and education shall be adhered to.
18. All Prime Contractors will be responsible to maintain a master set of red line drawings on a monthly basis. This master set will be kept in the CM's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
19. Within five (5) business days of intent to award notification, each and every Prime Contractor will submit to the Architect and Construction Manager a detailed Construction Schedule for the work of each appropriate trade based

- on the listed milestone dates. These schedules will then be reviewed and implemented into a Master Construction Schedule by the General Contractor to be reviewed and approved by ALL Prime Contractors. If a bidder does not believe they can meet the above listed milestone dates, they must submit a letter prior to the final day for questions indicating what items cannot be met, and should indicate what the revised schedule should be. Unless a bidder submits a letter and a revised schedule, the Owner will assume the successful contractor(s) agree with the schedule and will meet it.
- B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section "Temporary Facilities and Controls," each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service.
 4. Its own storage and fabrication sheds, in a location approved by the CM.
 5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities.
 8. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion.
 9. Secure lockup of its own tools, materials, and equipment.
 10. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 11. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- D. Temporary Heating, Cooling, and Ventilation: Each Contract for its own work is responsible for temporary heating, cooling, and ventilation, including utility use charges, temporary meters, and temporary connections.
- E. Temporary Heating, Cooling, and Ventilation: Each Contract for its own work is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. **Contract MC HVAC** is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and will pay utility use charges.
- F. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by Contract PC - Plumbing.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by Contract EC - Electric.

1.5 CONTRACT GC – GENERAL TRADES

- A. Work in the General Trades Contract includes, but is not limited to, the following:
- B. **Contract GC – General Trades**, shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract GC is generally described as General Trades, but more specifically described in this Scope of Work.
1. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 2. Specification Section 02 41 19 Selective Site Demolition
 3. Specification Section 03 30 00 Cast-In-Place Concrete
 4. Specification Section 03 45 00 Precast Architectural Concrete
 5. Specification Section 04 20 00 Unit Masonry
 6. Specification Section 04 50 00 Stone and Masonry Restoration and Cleaning
 7. Specification Section 05 12 00 Structural Steel Framing
 8. Specification Section 05 31 00 Steel Decking
 9. Specification Section 05 40 00 Cold Formed Metal Framing
 10. Specification Section 05 50 00 Metal Fabrications
 11. Specification Section 05 51 33 Alternating Tread Aluminum Stair
 12. Specification Section 05 52 13 Pipe and Tube Railings
 13. Specification Section 05 75 00 Ornamental Metal Fabrications
 14. Specification Section 06 10 53 Miscellaneous Rough Carpentry
 15. Specification Section 06 16 00 Sheathing
 16. Specification Section 06 40 23 Interior Architectural Woodwork
 17. Specification Section 07 21 19 Foamed in Place Insulation
 18. Specification Section 07 24 19 Exterior Insulation and Finish System
 19. Specification Section 07 27 26 Fluid Applied Membrane Air & Vapor Barriers
 20. Specification Section 07 53 23 EPDM Roofing System
 21. Specification Section 07 62 00 Sheet Metal Flashing and Trim
 22. Specification Section 07 72 00 Roof Accessories
 23. Specification Section 07 72 33 Roof Hatches
 24. Specification Section 07 92 00 Joint Sealants
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract GC General Trades.
 25. Specification Section 07 95 13 Expansion Joint Cover Assemblies
 26. Specification Section 08 11 13 Hollow Metal Doors and Frames
 27. Specification Section 08 14 33 Stile and Rail Wood Doors
 28. Specification Section 08 41 13 Aluminum Framed Entrances and Storefronts
 29. Specification Section 08 42 29 Automatic Sliding Doors
 30. Specification Section 08 44 13 Glazed Aluminum Curtain Walls
 31. Specification Section 08 52 13 Aluminum Clad Wood Windows
 32. Specification Section 08 63 00 Metal Framed Skylights
 33. Specification Section 08 71 00 Door Hardware and Schedule
 34. Specification Section 08 71 00 Door Hardware Schedule Reference
 35. Specification Section 08 80 00 Glazing
 36. Specification Section 08 83 00 Mirrors
 37. Specification Section 09 00 00 Finish Selections
 38. Specification Section 09 01 69 Terrazzo Restoration

39. Specification Section 09 21 50 Gypsum Veneer Plaster – Alternate GC-4
40. Specification Section 09 22 16 Non-Structural Metal Framing
41. Specification Section 09 23 00 Interior Plaster Patching
42. Specification Section 09 29 00 Gypsum Board
43. Specification Section 09 29 00 Reattaching Delaminated Plaster to Masonry and Wire Lath Substrates
44. Specification Section 09 29 00 Removing Paint from Plaster Surfaces
45. Specification Section 09 30 00 Tiling
46. Specification Section 09 51 13 Acoustic Panel Ceiling
47. Specification Section 09 65 00 Resilient Flooring
48. Specification Section 09 65 13 Resilient Wall Base
49. Specification Section 09 65 15 Resilient Rubber Stair Tread
50. Specification Section 09 67 23 Resinous Flooring
51. Specification Section 09 68 01 Carpet Tile
52. Specification Section 09 72 00 Wood Paneling
53. Specification Section 09 91 00 Painting
54. Specification Section 10 14 01 Interior Signage
55. Specification Section 10 14 02 Exterior Signage
56. Specification Section 10 21 13 Toilet Compartments
57. Specification Section 10 26 13 Stainless Steel Flush Mount Corner Guards
58. Specification Section 10 28 00 Toilet, Bath and Laundry Accessories
59. Specification Section 10 28 38 Operable Panel Partitions
60. Specification Section 10 44 00 Fire Protection Specialties
61. Specification Section 11 40 00 Kitchen Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract GC General Trades.
62. Specification Section 12 26 00 Horizontal Louver Blinds
63. Specification Section 12 48 13 Entrance Floor Mats and Frames
64. Specification Section 12 49 20 Roller Shades
65. Specification Section 14 21 23 Electric Traction Passenger Elevator
66. Specification Section 28 13 00 Access Control
 - a. This Contractor shall provide mechanical installation.
67. Specification Section 31 23 23 - Fill
68. Specification Section 31 23 33 Trenching and Backfilling
69. Specification Section 31 25 13 Erosion Control
70. Specification Section 31 62 23.13 - Drilled-In Displacement Micropiles
71. Specification Section 32 11 00 Base Courses
72. Specification Section 32 12 16 Asphalt Paving
73. Specification Section 32 13 13 Concrete Paving
74. Specification Section 32 16 40 Stone Curb
75. Specification Section 32 17 26 Pavement Markings
76. Specification Section 32 30 00 Site Furnishings
77. Specification Section 32 31 00 Fences and Gates
78. Specification Section 32 92 00 Turf Grasses
79. Specification Section 32 93 00 Trees, Plants, and Groundcover
80. Specification Section 33 05 13 Manholes and Structures
81. Specification Section 33 05 13.13 Utility Grade Adjustment
82. Specification Section 33 10 00 Water Utilities
83. Specification Section 33 31 00 Sanitary Utility Sewage Piping
84. Specification Section 33 39 00 Sanitary Utility Sewage Structures
85. Specification Section 33 41 00 Storm Utility Drainage Piping

86. Specification Section 33 44.13 Catchbasins
87. Specification Section 33 46 00 Subdrainage
88. Specification Section 34 01 13 Work Zone Traffic Control
89. Specification Section 34 41 16 Traffic Control Equipment
90. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 00 01 Table of Contents
91. Other Documents List:
 - a. Geotechnical Report and Addendums to Geotechnical Report.
 - b. Original Building Blueprints
 - c. Photographic Report
 - d. Limited Asbestos Sampling/Testing Survey
 - e. Limited Lead Sampling/Testing Survey
 - f. Limited Heavy Metal Sampling/ Testing Survey
 - g. Kitchen Equipment Specifications
 - h. Captive Air Drawings
 - i. Topographic Survey
92. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
93. Contractor must comply with all applicable OSHA standards.
94. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
95. Contractor is responsible for submitting to the CM, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
96. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
97. Construction Layout, Contract GC - General Trades, shall be responsible for all Construction Layout & Stakeout to be performed by a NYS Licensed Professional Surveyor as required for the performance of their own Work.
98. Test Pits, perform hand, or machine Test Pits as required to locate existing Utilities prior to Excavation, and Protect said existing Utilities, as required for the performance of Contract GC- General Trades.
99. Site Clearing; Strip & Stockpile existing Topsoil at an offsite location approved by the Construction Manager. All existing Topsoil material is to become property of the owner for their own use. Import new Topsoil materials as per the Contract Documents to a min. thickness of not less than 4" in Depth. Spread & Rough Grade imported Topsoil to + or - 1", and machine rake to remove all inorganic materials. Final Grade Topsoil to + or - ½" immediately prior to planting permanent Lawns.
100. Earth Moving, Contract GC- General Trades shall provide all required Excavation & Backfilling associated with the Foundations as indicated in the Contract Documents. Include protection, and/or repairing existing Subgrades following 3rd Party Geotechnical Testing Agency approval & also any additional Undercutting of existing Subgrades with #2 Crusher Run Stone Structural Fill if directed. Any Dewatering is to be included by this Contractor, as required for

- the performance of Contract GC- General Trades. Backfilling Materials to be used for the Foundations shall be #2 Crusher Run Stone Structural Fill at the inside of the Building Footprint, and at any locations outside of the Building Footprint other than the Green Spaces which can be Backfilled with Suitable Common Fill, or Excavated onsite Material if prior approved by the Geotechnical Testing Agency.
101. Any Dewatering is to be included by this Contractor, as required for the performance of this contract.
 102. Earth Moving Spoils, all associated Excavated Spoils generated directly from the performance of Contract GC- General Trades are to be Loaded, Hauled & Stockpiled off site, and to remain real Property of the owner.
 103. Cast-In-Place Concrete, including but not limited to Footings, Piers & Foundation Walls complete, shall be included for the performance of Contract GC- General Trades.
 104. Concrete Pavement, Sidewalks, and Curbing; includes all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the Civil Plans unless otherwise indicated on the Structural or MEP Plans with a higher level of Detail which are to be provided by the applicable Prime Contractor.
 105. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Binghamton, and incorporated directly under Contract GC- General Trades. All Utilities specified to be included within Contract GC General Trades Scope of Work are to be properly terminated including any necessary Fittings required for Final Connection, within 5'-0" of the Building Footprint to be continued by the applicable Prime Contractor.
 106. Metals, Anchor Bolts, Column Base & Bearing Plates are to be provided and installed by Contract GC - General Trades, as per the Contract Documents and Approved Structural Steel Shop Drawings. Installation of the Column Base & Bearing Plates by Contract GC- General Trades also includes the necessary associated Non-Shrink Grouting Work. Contract GC- General Trades, shall be responsible for hiring a registered professional surveyor to survey and certify the locations and elevations of all column base plates, bearing plates, and anchor bolts. The registered professional surveyor's report shall be submitted to the CM prior to the start of the steel erection. This Contractor shall also provide notification of repair, replacement and modifications of anchor bolts and bearing plates from the contract documents.
 107. Cutting and Patching, to match existing in kind, as required for the performance of Contract GC - General Trades.
 108. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract GC - General Trades, at the CM's discretion.
 109. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract GC - General Trades.
 110. Contract GC - General Trades is responsible to hire a professional cleaning company, preapproved by the CM, to perform bi-weekly cleaning services in the CM's field office at the CM's discretion.
 111. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract GC - General Trades.
 112. Submit Design Calculations, Shop Drawings and other Structural Data for Cold Formed Metal Framing Stamped/Sealed by a NYS Licensed Professional Engineer for Review & Approval prior to the start of the Exterior Framing Activities.
 113. Submit a Crane Lifting Plan Stamped/Sealed by a Professional Engineer for Review & Approval prior to the start of the Structural Steel Erection Activities.

114. Miscellaneous Metals; Anchor Bolts, Column Base/Leveling/Bearing Plates are to be provided by this Contract, as per the Contract Documents and Approved Structural Steel Shop Drawings. Installation of the Column Base/Leveling/Bearing Plates also includes the necessary associated Non-Shrink Grouting Work.
 115. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract GC – General Trades prior to any necessary welding activities on site.
 116. Coordination and associated drawings for Contract GC – General Trades interfaced with all other MEP Prime Contractors Work.
 117. Earth Moving at Building Footprint, Fine Grade Subbase to +/- ½” for the Concrete Slab on Grade Construction within the Building Footprint.
 118. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers with the associated necessary Signage is the responsibility of Contract GC – General Trades.
 119. Install all sleeves & embedment’s provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
 120. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract GC – General Trades for the Work of Contract GC – General Trades.
- C. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls":
1. Temporary Hoists, as required for the performance of Contract GC-General Trades.
 2. Traffic Control, as required for the performance Contract GC-General Trades.
 3. Contract GC - General Trades, shall provide the OSHA Temporary Perimeter Fall Protection, Temporary Cable Safety Railing, Cable, Eyebolts, Turnbuckles, Thimbles-1 Strand 1-1/4" Cable & Accessories including Top, Middle & Bottom Rails as per OSHA Standards typical at the 2nd Floor & Roof Levels as required.
 4. Temporary Stairs, Contract GC – General Trades is responsible for providing OSHA compliant temporary stairs for all Prime Contractors to access the 2nd Floor and Roof levels until permanent stairs are available.
 5. Temporary Enclosures is the responsibility of Contract GC – General Trades for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures
 6. Temporary Tree & Plant Protection, for all existing Landscaping items to remain.
 7. Temporary Erosion & Sediment Control, shall be provided by Contract A-Site Work complete, as per the Contract Documents, also including, but not limited to all associated specific Details indicated on Civil Plans.

1.6 CONTRACT EC - ELECTRICAL

- A. Work in the Electrical Contract includes, but is not limited to, the following:
- B. **Contract EC - Electrical**, shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract EC is generally described as Electrical, but more specifically described in this Scope of Work.
 1. Wiring and temporary power provisions for temporary heat unit as outlined in Contract MC - HVAC.

2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Specification Section 03 30 00 Cast-in-Place Concrete
 - a. This Contractor shall provide all necessary Equipment Pads and the Foundations for all Site Electric Work complete, as specified in the Specification Section, as required for the performance of Contract EC-Electrical.
4. Specification Section 07 92 00 Joint Sealants
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC-Electrical.
5. Specification Section 08 42 29 Automatic Sliding Doors
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
6. Specification Section 08 71 00 Door Hardware
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC-Electrical.
7. Specification Section 09 91 00 Painting
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
8. Specification Section 11 40 00 Kitchen Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
9. Specification Section 14 24 00 Electric Traction Elevator
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
10. Specification Section 22 05 13 Common Motor Requirements for Plumbing Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC-Electrical.
11. Specification Section 23 05 13 Common Motor Requirements for HVAC Piping and Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
12. Specification Section 26 05 01 - Minor Electrical Demolition
13. Specification Section 26 05 19 - Low-Voltage Electrical Power Conductors And Cables
14. Specification Section 26 05 26 - Grounding And Bonding For Electrical Systems
15. Specification Section 26 05 29 - Hangers And Supports For Electrical Systems
16. Specification Section 26 05 34 - Conduit
17. Specification Section 26 05 36 - Cable Trays For Electrical Systems
18. Specification Section 26 05 37 - Boxes
19. Specification Section 26 05 53 - Identification For Electrical Systems
20. Specification Section 26 05 73 - Power System Studies

21. Specification Section 26 09 00 - Wired Control System – Instrumentation And Control For Electrical System
22. Specification Section 26 09 19 - Enclosed Contactors
23. Specification Section 26 09 23 - Lighting Control Devices
24. Specification Section 26 09 43 - Distributed Digital Lighting Control System
25. Specification Section 26 21 00 - Low-Voltage Electrical Service Entrance
26. Specification Section 26 24 13 - Switchboards
27. Specification Section 26 24 16 - Panelboards
28. Specification Section 26 27 17 - Equipment Wiring
29. Specification Section 26 27 26 - Wiring Devices
30. Specification Section 26 28 13 - Fuses
31. Specification Section 26 28 18 - Enclosed Switches
32. Specification Section 26 29 13 - Enclosed Controllers
33. Specification Section 26 29 23 - Variable Frequency Motor Controllers
34. Specification Section 26 32 13 - Engine Generators
35. Specification Section 26 36 00 - Transfer Switches
36. Specification Section 26 43 00 - Surge Protective Devices
37. Specification Section 26 51 00 - Interior Lighting
38. Specification Section 26 56 00 - Exterior Lighting
39. Specification Section 27 10 05 – Structured Cabling For Voice And Data – Inside Plant
40. Specification Section 28 13 00 – Access Control
41. Specification Section 28 23 00 – Video Surveillance
42. Specification Section 28 31 00 – Fire Detection And Alarm
43. Specification Section 31 23 33 Trenching and Backfilling
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
44. Specification Section 32 11 00 Base Courses
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract EC Electrical.
45. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 00 01 Table of Contents
46. Other Documents List:
 - a. Geotechnical Report and Addendums to Geotechnical Report.
 - b. Original Building Blueprints
 - c. Photographic Report
 - d. Limited Asbestos Sampling/Testing Survey
 - e. Limited Lead Sampling/Testing Survey
 - f. Limited Heavy Metal Sampling/ Testing Survey
 - g. Kitchen Equipment Specifications
 - h. Captive Air Drawings
 - i. Topographic Survey
47. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements.
48. Provide all required Permits, Licenses & associated Fees.
49. Contractor must comply with all applicable OSHA standards.
50. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
51. Contractor is responsible for submitting to the CM, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required

- to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
52. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
 53. Construction Layout, Contract EC-Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a NYS Licensed Professional Surveyor as required for the performance of their own Work.
 54. Cutting and Patching, to match existing in kind, as required for the performance of Contract EC-Electrical.
 55. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract EC-Electrical, at the CM's discretion.
 56. Coordination Drawings:
 - a. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawings by reference to sheet number and detail, or room number of contract documents. Minimum drawing scale: $\frac{1}{4}'' = 1'-0''$.
 - b. Each Engineering Prime Contractor is to prepare coordination drawings to coordinate installations for efficient use of available space, for proper sequence of installation, and to resolve conflicts prior to any purchasing or fabrication of any equipment. Coordinate with work specified in other sections and other divisions of the specifications, including Mechanical, Electrical, & Plumbing (Fire Protection). The mechanical contractor (MC) shall be responsible to generate shop drawings, locating all ductwork, piping, and equipment.
 - c. These drawings shall be used as the basis for coordination drawings for all other contractors. All other contractors are responsible to overlay their respective systems, including all equipment, piping, conduit, lighting, sprinkler heads and communications cabling.
 - d. All Conflicts shall be identified and resolved prior to the start of work. Identify field dimensions. Show relation to adjacent or critical features of work or products.
 57. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract EC-Electrical.
 58. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract EC-Electrical.
 59. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving Area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract EC-Electrical. (Direct Load all Excavated Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off Site Location)
 60. Any Dewatering is to be included by this Contractor, as required for the performance of Contract EC-Electrical.
 61. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract EC-Electrical.
 62. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract EC - Electrical for the Work of Contract EC - Electrical.

63. ~~Coordination, Contract MC - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract MC - HVAC for all trades to build by upon acceptance & sign off by the Mechanical Engineer on Record.~~
64. Furnish along with locations to the Contract GC - General Trades Contractor all Sleeves & Embedment's for Contract EC - Electrical that penetrates Concrete & Masonry Walls. Contract EC - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract EC - Electrical. All Electrical Service Work is to be as per NYSEG's standard practices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
- C. Temporary facilities and controls in the Electrical Contract include the following, and Division 015000 Section "Temporary Facilities and Controls":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract EC - Electrical. All Temporary Electrical Service Work is to be as per NYSEG's standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract EC - Electrical.
 3. Traffic Control, as required for the performance Contract EC - Electrical.

1.7 CONTRACT MC - HVAC

- A. Work in the HVAC Contract includes, but is not limited to, the following:
- B. **Contract MC - HVAC**, shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract MC is generally described as HVAC, but more specifically described in this Scope of Work.
1. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Specification Section 03 30 00 Cast-in-Place Concrete
 - a. This Contractor shall provide all Equipment Pad Work complete, as specified in the Specification Section, as required for the performance of Contract MC HVAC.
 4. Specification Section 07 92 00 Joint Sealants

- a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract MC HVAC.
5. Specification Section 09 91 00 Painting
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract MC HVAC.
6. Specification Section 11 40 00 Kitchen Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract MC HVAC.
7. Specification Section 23 05 13 - Common Motor Requirements For HVAC Equipment
8. Specification Section 23 05 19 - Meters And Gages For HVAC Piping
9. Specification Section 23 05 48 - Vibration And Seismic Controls For HVAC Piping And Equipment
10. Specification Section 23 05 53 - Identification For HVAC Piping And Equipment
11. Specification Section 23 05 93 - Testing, Adjusting And Balancing For HVAC
12. Specification Section 23 07 13 - Duct Insulation
13. Specification Section 23 07 19 - HVAC Piping Insulation
14. Specification Section 23 08 00 - Commissioning of HVAC
15. Specification Section 23 09 13 - Instrumentation And Control Devices For HVAC
16. Specification Section 23 09 23 - Direct-Digital Control System For HVAC And Other Building Systems
17. Specification Section 23 21 13 - Hydronic Piping
18. Specification Section 23 21 14 - Hydronic Specialties
19. Specification Section 23 21 23 - Hydronic Pumps
20. Specification Section 23 23 00 - Refrigerant Piping
21. Specification Section 23 25 00 - HVAC Water Treatment
22. Specification Section 23 31 00 - HVAC Ducts And Casings
23. Specification Section 23 33 00 - Air Duct Accessories
24. Specification Section 23 34 16 - Centrifugal HVAC Fans
25. Specification Section 23 34 23 - Power Ventilators
26. Specification Section 23 34 33 - Air Curtains
27. Specification Section 23 37 00 - Air Outlets And Inlets
28. Specification Section 23 38 13 - Commercial Kitchen Hoods
29. Specification Section 23 51 00 - Breechings, Chimneys, and Stacks
30. Specification Section 23 52 16 - Condensing Boilers
31. Specification Section 23 73 13 - Modular Central-Station Air-Handling Units
32. Specification Section 23 74 33 - Packaged Outdoor Heating and Cooling Make-up Air Units
33. Specification Section 23 81 01 - Terminal Heat Transfer Units
34. Specification Section 23 81 29 - Variable Refrigerant Volume (VRV) HVAC System
35. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 00 01 Table of Contents
36. Other Documents List:
 - a. Geotechnical Report and Addendums to Geotechnical Report.
 - b. Original Building Blueprints
 - c. Photographic Report
 - d. Limited Asbestos Sampling/Testing Survey
 - e. Limited Lead Sampling/Testing Survey

- f. Limited Heavy Metal Sampling/ Testing Survey
 - g. Kitchen Equipment Specifications
 - h. Captive Air Drawings
 - i. Topographic Survey
37. Other Work of this Contract:
- a. per all Federal, State, County & Local Code Requirements.
38. Provide all required Permits, Licenses & associated Fees.
39. Contractor must comply with all applicable OSHA standards.
40. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
41. Contractor is responsible for submitting to the CM, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
42. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
43. Construction Layout, Contract MC-HVAC Work, shall be responsible for all Construction Layout & Stakeout to be performed by a NYS Licensed Professional Surveyor as required for the performance of their own Work.
44. Cutting and Patching, to match existing in kind, as required for the performance of Contract MC-HVAC.
45. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract MC-HVAC, at the CM's discretion.
46. Coordination Drawings:
- a. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawings by reference to sheet number and detail, or room number of contract documents. Minimum drawing scale: 1/4" = 1'-0".
 - b. Each Engineering Prime Contractor is to prepare coordination drawings to coordinate installations for efficient use of available space, for proper sequence of installation, and to resolve conflicts prior to any purchasing or fabrication of any equipment. Coordinate with work specified in other sections and other divisions of the specifications, including Mechanical, Electrical, & Plumbing (Fire Protection). The mechanical contractor (MC) shall be responsible to generate shop drawings, locating all ductwork, piping, and equipment.
 - c. These drawings shall be used as the basis for coordination drawings for all other contractors. All other contractors are responsible to overlay their respective systems, including all equipment, piping, conduit, lighting, sprinkler heads and communications cabling.
 - d. All Conflicts shall be identified and resolved prior to the start of work. Identify field dimensions. Show relation to adjacent or critical features of work or products.
47. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract MC-HVAC.
48. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract MC-HVAC

49. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract MC – HVAC for the Work of Contract MC – HVAC.
 50. Furnish along with locations to the Contract GC – General Trades Contractor all Sleeves & Embedment's for Contract MC - HVAC that penetrates Concrete & Masonry Walls. Contract MC - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
- C. Temporary facilities and controls in the HVAC Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" :
1. Temporary Hoists, as required for the performance of Contract MC - HVAC.
 2. Traffic Control, as required for the performance Contract MC - HVAC.
Contract MC HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract MC HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.

1.8 CONTRACT PC – PLUMBING & FIRE PROTECTION

- A. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
- B. **Contract PC – Plumbing & Fire Protection**, shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract PC is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
1. Piping and temporary gas provisions for temporary heat unit as outlined in Contract MC - HVAC.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Specification Section 03 30 00 Cast-in-Place Concrete
 - a. This Contractor shall provide all necessary Equipment Pad Work complete, as specified in the Specification Section, as required for the performance of Contract PC Plumbing & Fire Protection.
 4. Specification Section 07 92 00 Joint Sealants
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract PC Plumbing & Fire Protection.
 5. Specification Section 09 91 00 Painting
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract PC Plumbing & Fire Protection.
 6. Specification Section 11 40 00 Kitchen Equipment
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract GC General Trades.
 7. Specification Section 21 05 00 - Common Work Results For Fire Suppression
 8. Specification Section 21 05 23 - General-Duty Valves For Water-Based Fire-Suppression Piping

9. Specification Section 21 05 48 - Vibration And Seismic Controls For Fire Suppression Piping And Equipment
10. Specification Section 21 05 53 - Identification For Fire Suppression Piping And Equipment
11. Specification Section 21 13 00 - Fire Suppression Sprinklers
12. Specification Section 22 05 13 - Common Motor Requirements For Plumbing Equipment
13. Specification Section 22 05 19 - Meters And Gages For Plumbing Piping
14. Specification Section 22 05 53 - Identification For Plumbing Piping And Equipment
15. Specification Section 22 07 19 - Plumbing Piping Insulation
16. Specification Section 22 10 05 - Plumbing Piping
17. Specification Section 22 10 06 - Plumbing Piping Specialties
18. Specification Section 22 30 00 - Plumbing Equipment
19. Specification Section 22 40 00 - Plumbing Fixtures
20. Specification Section 31 23 33 Trenching and Backfilling
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract PC Plumbing & Fire Protection.
21. Specification Section 32 11 00 Base Courses
 - a. This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract PC Plumbing & Fire Protection.
22. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 00 01 Table of Contents
23. Other Documents List:
 - a. Geotechnical Report and Addendums to Geotechnical Report.
 - b. Original Building Blueprints
 - c. Photographic Report
 - d. Limited Asbestos Sampling/Testing Survey
 - e. Limited Lead Sampling/Testing Survey
 - f. Limited Heavy Metal Sampling/ Testing Survey
 - g. Kitchen Equipment Specifications
 - h. Captive Air Drawings
 - i. Topographic Survey
24. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
25. Contractor must comply with all applicable OSHA standards.
26. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
27. Contractor is responsible for submitting to the CM, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
28. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.

29. Construction Layout, Contract PC-Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a NYS Licensed Professional Surveyor as required for the performance of their own Work.
30. Cutting and Patching, to match existing in kind, as required for the performance of Contract PC-Plumbing & Fire Protection.
31. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract PC-Plumbing & Fire Protection, at the CM's discretion.
32. Contract PC – Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
33. Coordination Drawings:
 - a. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawings by reference to sheet number and detail, or room number of contract documents. Minimum drawing scale: ¼" = 1'-0".
 - b. Each Engineering Prime Contractor is to prepare coordination drawings to coordinate installations for efficient use of available space, for proper sequence of installation, and to resolve conflicts prior to any purchasing or fabrication of any equipment. Coordinate with work specified in other sections and other divisions of the specifications, including Mechanical, Electrical, & Plumbing (Fire Protection). The mechanical contractor (MC) shall be responsible to generate shop drawings, locating all ductwork, piping, and equipment.
 - c. These drawings shall be used as the basis for coordination drawings for all other contractors. All other contractors are responsible to overlay their respective systems, including all equipment, piping, conduit, lighting, sprinkler heads and communications cabling.
 - d. All Conflicts shall be identified and resolved prior to the start of work. Identify field dimensions. Show relation to adjacent or critical features of work or products.
34. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract PC – Plumbing & Fire Protection.
35. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract PC – Plumbing & Fire Protection.
36. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving Area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract PC – Plumbing & Fire Protection. (Direct Load all Excavated Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off Site Location)
37. Any Dewatering is to be included by this Contractor, as required for the performance of Contract PC – Plumbing & Fire Protection.
38. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract PC – Plumbing & Fire Protection for the Work of Contract PC – Plumbing & Fire Protection.
39. Furnish along with locations to the Contract GC – General Trades Contractor all Sleeves & Embedment's for Contract PC – Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract PC – Plumbing & Fire Protection

shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.

40. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard surfaced ceilings.
- C. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls,":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract PC – Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract PC – Plumbing & Fire Protection
 3. Traffic Control, as required for the performance Contract PC – Plumbing & Fire Protection.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 12 00

SECTION 081433- STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior stile and rail wood doors.
 - 2. Interior fire-rated stile and rail wood doors.
 - 3. Factory finishing stile and rail wood doors.
 - 4. Factory fitting wood doors to frames and factory machining for hardware.
 - 5. Light frames and glazing installed in stile and rail wood doors.
- B. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames" for wood doors in steel frames.
 - 2. Division 08 Section "Glazing" for glass view panels in stile and rail wood doors.
 - 3. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware for stile and rail wood doors and wood frames.
- C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
 - 2. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
 - 3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
 - 4. Scientific Certification Systems (SCS) - Certified Products Standards.
 - 5. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
 - 6. Window and Door Manufacturers Association - WDMA I.S.6-A Industry Standard for Architectural Stile and Rail Doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.6-A classifications. Include factory finishing specifications as applicable.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.

- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire protection ratings for fire rated doors.

 - D. Samples for Initial Selection: For each species and finish required.
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
 - 2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Finish veneer faced door samples with same materials proposed for factory finished doors.
 - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.

 - E. Informational Submittals:
 - 1. Submit manufacturer's health product declaration (HPD) for products of this section.

 - F. Warranty: Sample of special warranties.
- 1.4 QUALITY ASSURANCE
- A. Source Limitations: Obtain stile and rail wood doors through one source from a single manufacturer wherever possible.
 - B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.6-A, latest edition, "Industry Standard for Architectural Wood Flush Doors".
 - C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).
 - 1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.

2. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
 3. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.
- D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Comply with requirements of referenced standard and manufacturer's written instructions.
 - B. Mark each door on top rail with opening number used on Shop Drawings.
- 1.6 PROJECT CONDITIONS
- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 1. Temperature and Relative Humidity Requirements: Relative humidity to be 25 to 55 percent; temperature 60 to 80 degrees F (15.6 to 27.7 degrees C). Maintain required temperature and relative humidity in spaces where products will be installed for a minimum of 24 hours before, during, and after installation as recommended by manufacturer.
- 1.7 WARRANTY
- A. Special Warranty: Manufacturer's standard form signed by manufacturer, installer, and contractor in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 2. Warranty Period for Interior Stile and Rail Doors: Five (5) years according to manufacturer's written warranty from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXTERIOR STILE AND RAIL WOOD DOORS

1. WDMA Design Group: 2 ¼" Front Entrance Doors (Exterior)
 - a. Panel Design: Match existing
2. Finish and Grade: Select and Standard.
3. Wood Species: Stain grade South American Mahogany.
4. Stile and Rail Construction: Edge-glued solid lumber
5. Panel Construction: Edge-glued solid lumber. See Evaluations.

6. Raised-Panel Thickness: To match the door
 7. Molding Profile (Sticking): To match existing
 8. Glass: Uncoated, clear, insulating-glass units made from two lites of 3.0-mm-thick, fully tempered glass with 1/4-inch (6.4-mm) interspace] complying with Section 088000 "Glazing."
 9. Field Finished: To be stained with transparent finish in the field as directed by architect to match existing wood surround
- B. Manufacturers Basis of Design: Subject to compliance with requirements, provide products by one of the following:
1. Rochester Colonial Manufacturing
- C. Door Construction – Wood Stile and Rail Doors
1. Description:
 - a. Type: TruStile WTS Series Wood veneered doors
 - b. Veneer: Veneers can be specified to be 1/16" or 1/8" in thickness for interior. Exterior shall be 1/16" with a phenolic backer to resist moisture.
 - c. White oak.
 - d. Grade to match existing.
 - e. Cut
 - f. Thickness
 2. Size and Panel Types: See Drawings and specifications
 3. Stile Thickness: 1-3/4" Interior; 2-1/4" Exterior
 4. Profiles and dimensions shall be TruStile standards unless otherwise noted in the drawings and elevations.
 5. Stile and Rail (Sticking) Type:
 - a. Reverse Roman Sticking (OG).
 6. Panel Type:
 - a. Beveled Panel Double Hip Panel
 - b. Panels shall be constructed of solid wood panels laminated both sides or solid wood to match profile specified. Panels shall float inside the sticking in true stile and rail construction. Panels shall be held in place by the sticking and flexible bumper shall be installed inside sticking to keep panel centered.
 7. Door Top Type:
 - a. Square Top
 8. Stile Construction:
 - a. Core material to be constructed of engineered wood to resist moisture, warping, checking and improved screw pull.
 - b. Stiles are to be constructed for improved screw holding by use of solid wood edges. Hardwood stiles to match face veneers.
- 2.2 INTERIOR STILE AND RAIL DOOR CONSTRUCTION - GENERAL
- A. WDMA I.S.6-A Grade for Transparent Finish: Premium. Assemble doors, including components, with minimum WDMA Type II adhesives.

- B. Fire Rated Doors: Provide construction and core specified above as needed to provide fire ratings indicated. Doors must be "true" stile and rail construction. "Simulated" or "sketch-faced" veneer faces are not acceptable.
1. Interior Fire Rated Doors (20-Minute Rating): Fire rated doors with 1-3/4-inch (44-mm) thick stiles and rails complying with requirements indicated for interior doors.
 2. Interior Fire Rated Doors (45 and 60 Minute Ratings): Fire rated doors with 1-3/4-inch (44-mm) thick, edged and veneered non-combustible core stiles and rails complying with requirements indicated for interior doors.
 3. Interior Fire-Rated Doors (90 Minute Rating): Fire rated doors with 2-1/4-inch (57-mm) thick, edged and veneered non-combustible core stiles and rails complying with requirements indicated for interior doors.
 - a. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- C. Raised-Panel Thickness: Manufacturer's standard, but not less than 1-5/8 inches (41 mm) for 2- 1/4 inch (57 mm) thick doors, 1-1/8 inches (29 mm) for 1-3/4 inch (44 mm) thick doors, and 3/4 inches (19 mm) for 1-3/8 inch (35 mm) thick doors.
- D. Flat-Panel Thickness: Manufacturer's standard, but not less than 1-1/8 inches (29 mm) for 2-1/4 inch (57 mm) thick doors, 5/8 inches (16 mm) for 1-3/4 inch (44 mm) thick doors, and 1/4 inch (6 mm) for 1-3/8 inch (35 mm) thick doors.
- 2.3 STILE AND RAIL DOORS FOR TRANSPARENT FINISH – INTERIOR AND EXTERIOR
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eggers Industries.
 2. The Maiman Company.
 3. Marshfield
- B. Interior Solid Core Doors:
1. Stile and Rail Construction: Veneered, minimum 1/16" before sanding; structural engineered core; edgebands same species as face veneer.
 2. Raised-Panel Construction:
 - a. Veneered, shaped, wood-based panel product with veneer conforming to raised- panel shape (3-ply veneer).
 - b. Veneered, wood-based panel product with mitered, raised rims made from matching clear lumber (rim-banded).
 3. Flat-Panel Construction: Veneered, wood-based panel product.
 4. Wood Species for Transparent Finish: African Mahogany
 - a. Cut:
 - 1) Plain sawn.
 5. Size, Layout and Thickness: As indicated on Drawings.
- 2.4 INTERIOR WOOD FRAMES
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Algoma Hardwoods, Inc.
 2. The Maiman Company.
 3. Marshfield
- B. Non-Rated and 20 Minute Fire Rated Wood Door Frames: Frames, complete with transom and sidelite frames, fabricated from veneered structural composite lumber for transparent finish or solid lumber close grained hardwood for opaque finish.
- C. Fire Rated (45, 60 and 90 Minute) Wood Door Frames: Frames, fabricated from veneered high density composite fire resistant board, with fire rating duration indicated.
- D. Wood Species for Transparent Finishes: African Mahogany.
1. Cut:
 - a. Plain sliced (flat sliced).
- E. Frame Profiles: As indicated on drawings.
- F. Drawings. Factory prefinished to match doors

2.5 FABRICATION

- A. Fabricate stile and rail wood doors in sizes indicated.
- B. Fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with requirements in NFPA 80 for fire rated doors.
- C. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- D. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
- E. Openings: Trim openings indicated for glazing with solid wood moldings (non-rated and 20 minute fire-rated), with one side removable. For 45, 60, and 90-minute fire rated glazed openings, provide veneered metal for transparent finish doors (primed metal for opaque finish) for glazed openings

1. Solid Wood Moldings: Trim openings with material and profile indicated.
 2. Field Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
 3. Louvers: Factory install louvers in prepared openings.
- F. Electrical Raceways: Provide stile and rail wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

2.6 FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including machining for hardware that is not surface applied, before finishing.
- B. Doors and frames for Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
1. Grade: Premium.
 2. Finish: Meet or exceed WDMA TR6 Catalyzed Polyurethane finish performance requirements.
 3. Staining: Custom Match existing doors
 4. Exterior Doors to be field painted as directed by architect

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.
- C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated. Do not trim stiles and rails in excess of limits set by manufacturer or as permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold. Bevel non-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
 2. Comply with NFPA 80 for fire rated doors.
- E. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 33

Door Number	Hardware Set	Door Number	Hardware Set
002	2.0	105	15.0
003A	3.0	108A	25.0
003B	2.0	108B	5.0
004	2.0	109	25.0
005	4.0	110A	21.0
006	5.0	110B	26.0
009	6.0	111A	11.0
010A	4.0	111B	27.0
010B	6.0	114	19.0
011	4.0	115	19.0
012	8.0	116A	25.0
013A	9.0	116B	25.0
013B	9.0	117B	28.0
013C	10.0	202	24.0
014	11.0	203A	29.0
016	12.0	203B	5.0
017A	13.0	203C	30.0
017B	14.0	204A	5.0
018	16.0	204B	5.0
019	16.0	205	24.0
020	16.0	206A	7.0
021	16.0	206B	5.0
022	16.0	207	4.0
023	17.0	208	31.0
025	17.0	209	32.0
026	18.0	210	7.0
027	2.0	211	7.0
028	18.0	212	11.0
099A	20.0	214	14.0
099B	20.0	215	33.0
099C	21.0	216A	5.1
099D	20.0	216B	5.1
100	22.0	217	19.0
101	23.0	218	19.0
103	24.0	220	15.0
104A	15.0	E-007	1.0
104B	14.0	MISC	34.0
104D	21.0		
104E	21.0		

FINISH CODE	DESCRIPTION	BASIS OF DESIGN PRODUCT
All products listed below are Basis of Design Product. Substitutions can be submitted according to Section 01 25 00 Substitution Procedures and must meet the criteria set forth in this section, in particular visual effect and ability to maintain specified tile patterns and sizes.		
ACT-1	Acoustical Ceiling Tile General Use	Armstrong Ceilings Pattern: Utima Fine Line Size: 24" x 24" x 5/8" Grid: Prelude 15/16" Color: Grid and tiel to be White
ACT-2	Acoustical Ceiling Tile - 2x2 Kitchens	Armstrong Ceilings Pattern: Kitchen Zone Item# 673 Size: 24" x 24" x 5/8" Grid: Prelude 15/16" Color: Grid and Tile to be White
ACT-3	Wood Acoustical Ceiling	Armstrong Ceilings Item #646OW1 Pattern: Woodworks Linear Veneered Planks Size: 72" x 5-1/4" x 3/4" with 3/4" reveal Species: Maple Natural Variations Color: Custom to match Architect's sample With Black Fiberglass Infill Panel #8200100 Provide for accessible panels as needed
ART-1	Custom Mural	Design intent is a custom chalkboard mural. Owner to work with art students at the college. Coordinate with Owner.
CPT-1	Carpet Tile - Dark Tiered Demo Kitchen 2nd Floor Conference	Shaw Contract Pattern: Renew Tile; Color: Coexist Size: 9" x 36" plank Content: 100% solution dyed eco solution q nylon Treatment: Shaw Soil Protection Installation Method: Ashlar; refer to drawings for plank direction
CPT-2	Carpet Tile Student Breakout/Dining Lab	Desso Hospitality Pattern: B14475A-7B01 Color: Custom colored with 9 colors Architect to select colors Type: Woven Axminster cut pile Dye Method: Hank dyed Size: 36" x 36" With attached cushion back Content: 80% virgin wool/ 20% nylon Total Thickness: 0.6 inch Rated for commercial heavy use

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CPT-3	Carpet Tile - Light Option	Shaw Contract Pattern: Renew Tile; Color: Breeze Size: 9" x 36" plank Content: 100% solution dyed eco solution q nylon Treatment: Shaw Soil Protection Installation Method: Ashlar; refer to drawings for plank direction
CPT-5	Carpet Tile	Interface Pattern: Monochrome, Color: 25% of each color listed Colors: Wineberry, Mauve, Flannel, Seal Content: 100% Recycled Content Type 6 Nylon Size: 19.69 x 19.69" Dye Method: 100% Solution Dyed Treatment: Protekt Soil Stain Protection Tufted Yarn Weight: 24 oz/ square yard Gauge: 1/12 Refer to drawings for pattern
CT-1	Ceramic Tile - White Kitchen Wall Tile	Dal Tile Pattern: Elevare Glazed Ceramic; Color: Lunar EL40 Size: 4"H x 16"W x 5/16" thick Recommended Grout Joint: 1/16" Grout: To be selected by Architect
CT-2	Ceramic Tile - Gray Small Demo Kitchen	Dal Tile Pattern: Elevare Glazed Ceramic; Color: Element #EL43 Size: 4"H x 16"W x 5/16" thick Recommended Grout Joint: 1/16" Grout: To be selected by Architect
CT-3	Ceramic Tile - Copper	Tau Ceramica Pattern: Metallica; Color: Corten A Size: 12" H x 24" W Recommended Grout Joint: 1/8" Grout: To be selected by Architect
CT-4	Thin Brick Beverage Lab Backsplash	Glen-Gery Color: Silverbrook Thin Brick 1/2" Size: 2.-1/4"H x 7-5/8"L x 1/2" thick Mortar: To be selected by Architect
FRP	FRP Wall Panels	Crane Composites Product: Glasbord; Color: Embossed White Size: 4' x 8' or 4' x 10' available Thickness: 0.09" Use color matching trim pieces for seams and edges as needed.

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MAT-1	Safety/ Anti-Fatigue Floor Mat	Notrax by Superior Manufacturing Group Product: 755 Niru Versa Runner Color: Black Roll Size: 4'-0" x 60'-0" cut to fit Thickness: 3/8"
MAT-2	Entry Mat	Stainless Steel ribbed mat Pawling Corporation Model # RG-700
PCT-1	Porcelain Tile	Ceramiche Keope Pattern: Moov; Color: Anthracite Size: 20x120 (approx. 8" x 48") Thickness: 10mm (approx. 0.39") Finish: Natural Rectified Recommended Grout Joint: 2-3mm (5/64" - 1/8") Grout: To be selected by Architect
PCT-2	Porcelain Tile	Ceramiche Keope Pattern: Moov; Color: Anthracite Size: 60x120 (approx. 24" x 48") Thickness: 10mm (approx. 0.39") Finish: Natural Rectified Recommended Grout Joint: 2-3mm (5/64" - 1/8") Grout: To be selected by Architect
PCT-3	Porcelain Tile Restrooms	Dal Tile Pattern: Octagon & Dot Mosaic; Color: Matte White with 44 Gray Gloss Dot #6501 Size: Mosaic, 1/4" thick Recommended Grout Joint: 1/16" Grout: To be selected by Architect
PCT-4	Porcelain Tile	Ceramiche Keope Pattern: Moov; Color: Anthracite Size: 60x60 (approx. 24" x 24") Thickness: 9.5mm (approx. 3/8") Finish: Natural Rectified Recommended Grout Joint: 2-3mm (5/64" - 1/8") Grout: To be selected by Architect
PCT-5	Porcelain Tile Tiered Demo Wall Tile New Stair Cladding	Caesar Ceramics Pattern: Trace; Color: Corten Size: 75x150 cm (29-17/32" x 59-1/16" actual size) Thickness: 10mm (approx. 13/32") Finish: Matte Recommended Grout Joint: Grout: To be selected by Architect

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PCT-6	Porcelain Tile Panels Tiered Demo Wall Tile	Laminam by Crossville Pattern: Filo 3; Color: Brina Size: 1m x 3m x 3mm thick (approx 39.4" x 118.1") Recommended Grout Joint: Grout: To be selected by Architect
PCT-7	Porcelain Tile Tiered Demo Island Front	Crossville Tile Pattern: Retroactive; Color: Ebony A890 Size: *23.75"W x 3.75"H x 5/16" thick (Actual size) Finish: Unpolished (UPS) Recommended Grout Joint: 3/16" Grout: To be selected by Architect * Crossville custom cut program - allow 2-4 weeks for delivery depending on Crossville's production schedule
PCT-8	Porcelain Tile Tiered Demo Island Front	Crossville Tile Pattern: Retroactive; Color: Ebony A890 Size: *23.75"W x 3.75"H x 5/16" thick (Actual size) Finish: Polished (PO) Recommended Grout Joint: 3/16" Grout: To be selected by Architect * Crossville custom cut program - allow 2-4 weeks for delivery depending on Crossville's production schedule
PCTB-1	Porcelain Tile Base	Ceramiche Keope Pattern: Moov; Color: Anthracite Size: 9.7x60 (approx. 3-7/8" x 24") Thickness: 9.5mm (approx. 3/8") Finish: Natural Rectified Recommended Grout Joint: 2-3mm (5/64" - 1/8") Grout: To be selected by Architect With metal edge strip at top of tile to cover bare edge. Refer to drawing #7/A613 for detail.
PCTB-2	Porcelain Tile Bullnose Base	Ceramiche Keope Pattern: Moov; Color: Anthracite Size: 7.2x60 Battiscopa RT (approx. 2.8"H x 24"L) Finish: Natural Rectified Recommended Grout Joint: 2-3mm (5/64" - 1/8") Grout: To be selected by Architect
PLAM-1	Plastic Laminate Beverage Lab Floating Shelves	Laminart Color: #2412-T Etruscan Bronze Finish: Textured
PLAM-2	Plastic Laminate - White	Formica ColorCore 2 Color: #949C-58 White
PLAM-3	Plastic Laminate - Gray	Arborite Color: #P-325MX Brushed Pewter
PLAM-4	Plastic Laminate - Interiors	Formica Color: #949-58 White

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PT-1	Field Paint	Architect to Select Sheen: Eggshell
PT-2	Field Paint - Epoxy	Use as indicated on Finish Schedule and Drawings Sherwin Williams Pro Industrial Water Based Catalyzed Epoxy Sheen: Epoxy Eggshell Color to be selected by architect ASTM D2486 Scrub Test Cycles: 500-60 VOC: <147 g/L
PT-3	Tiered Demo Door Frame	Architect to Select Will match color of adjacent PCT-5 Sheen: Semi-Gloss
PT-4	Beverage Lab below mural	Architect to Select and coordinate with Owner mural Assuming a chalkboard mural, to be black paint to match (not chalkboard paint) Sheen: Eggshell
PT-5	Chalkboard Paint	Benjamin Moore Chalkboard Paint Color: Black
PT-6	Ceilings and Soffits	Architect to Select color Sheen: Flat
QZ-1	Quartz Countertop Beverage Lab Back Counter Beverage Lab Drink Rail Small Demo Back Counter	Wilsonart Color: Grey Lake #Q1009 Sheet Size: 120" x 55" Thickness: 2cm (0.78125") Edge: Eased at all countertops, side splashes and back splashes
QZ-2	Quartz Countertop Tiered Demo Kitchen Small Demo Bar	Dekton by Cosentino Pattern: XGloss Solid; Color: Halo Sheet Size: 3200mm x 1400mm (max size) Thickness: 20mm (0.78125") Edge: Eased at all countertops, side splashes and back splashes
QZ-3	Quartz Countertop Beverage Lab Bar Counter	Dekton by Cosentino Pattern: Trillium Sheet Size: 3200mm x 1400mm (max size) Thickness: 20mm (0.78125") Edge: Eased at all countertops, side splashes and back splashes

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All products listed below are Basis of Design Product. Substitutions can be submitted according to Section 01 25 00 Substitution Procedures and must meet the criteria set forth in this section, in particular visual effect and ability to maintain specified tile patterns and sizes.		
RES-1	Epoxy Floor	Dex-O-Tex Product: Cheminert CFS Color: DFS-B-05 Integral Cove Base: 6" high unless otherwise noted with metal cap strip
RES-2	Urethane Floor	Dex-O-Tex Product: Tek-Crete SL CQ Color: DFS-B-05 with Quick Glaze Clear Integral Cove Base: 6" high unless otherwise noted with metal cap strip
RES-3	Stair Tread, Riser, and Landings	Johnsonite Inc. Product: Defiant Oil & Grease Resistant Rubber Tile Flooring Pattern: Raised Round Color: To be selected by Architect
SDT-1	Static Dissipative Tile	Armstrong Flooring Product: Excelon SDT Color: To be selected by Architect Size: 12" x 12" Thickness: 1/8"
VCT-1	Vinyl Composition Tile	Armstrong Flooring Product: Standard Excelon Imperial Texture Color: To be selected by Architect Size: 12" x 12" Thickness: 1/8"
WB-1	Wall Base - Cove At Resilient Flooring	Johnsonite Traditional Wall Base Size: 4"H x 1/8" thick; 100' coiled lengths Vinyl; Type TV, Group 1 solid Color: To be selected by Architect
WB-2	Wall Base - Straight At Carpet	Johnsonite Traditional Wall Base Size: 4"H x 1/8" thick; 100' coiled lengths Vinyl; Type TV, Group 1 solid Color: To be selected by Architect
WB-3	Wall Base - Straight Tiered Demo Kitchen Platforms	Johnsonite Traditional Wall Base Custom height Size: 10"H x 1/8" thick Rubber: Type TP, Group 1 solid Color: To be selected by Architect
WB-2	Wall Base - Straight Tiered Demo Kitchen	Johnsonite Traditional Wall Base Size: 4"H x 1/8" thick; 100' coiled lengths Rubber: Type TP, Group 1 solid Color: To be selected by Architect

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All products listed below are Basis of Design Product. Substitutions can be submitted according to Section 01 25 00 Substitution Procedures and must meet the criteria set forth in this section, in particular visual effect and ability to maintain specified tile patterns and sizes.		
WD-1	Reclaimed Wood Beverage Lab Bar Front	Custom reclaimed wood wrapped bar front 1/2" x 5" Tongue and Groove Reclaimed Antique or Old Growth Pine (or other locally reclaimed wood species that is durable enough for this location) Lightly distress wood. These effects may include some of the following options: faux insect damage, holes from previous fastening, scratches and nicks, and/or chain beaten against the board. Architect to work with successful bidder to achieve final design
WD-2	Wood Bar Front Small Demo Kitchen	Wood Veneer - refer to Drawing A607 Species: Anigre Plain Sliced Color: Stained to match existing wood finish in building (WS-1) Submit sample to Architect for approval
WD-3	Wood Panel Elevator	Construction Specialties, Inc. Product: Renaissance Finish: To be selected by Architect
WD-4	Wood Flooring	Quarter Sawn White Oak
WP-1	Corner Guard - Stainless	INPRO CORPORATION Series: Stainless Steel Flush Mounted Corner Guards Type: 16 gauge type 304 stainless steel alloy Finish: #4 Satin Size: 3" legs x 60" high Application: Install per manufacturer recommendations
WS-1	Wood Stain	Match existing, Contractor to provide sample for approval.

END OF SECTION 09 00 00

SECTION 10 26 13 – STAINLESS STEEL FLUSH MOUNT CORNER GUARD

PART 1 – GENERAL

1.1 SUMMARY

- A. Flush mount corner guard system for wall protection
- B. Work in this section shall include, but is not limited to:
 - 1. Flush mount corner guard system
- C. Related work specified elsewhere shall include accessories and anchorage/blocking for attachment of partitions.

1.2 SUBMITTALS

- A. Product data for each type of corner guard specified.
- B. Detail drawings indicating mounting details with the appropriate fasteners for specific project substrates.
- C. Samples for verification purposes of stainless steel, of each type indicated.
- D. Cleaning and maintenance instructions for door and wall protection systems.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging to the jobsite and store in original packaging in a climate controlled location away from direct sunlight.
- B. Products must be installed in an interior climate controlled environment.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- B. Installer's Qualifications: A Company or Individual, regularly engaged in installation of products specified in this Section, with a minimum of 3 years' experience.

1.5 WARRANTY

- A. STANDARD IPC Limited Lifetime Warranty against material and manufacturing defects.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: IPC Door and Wall Protection Systems, InPro Corporation, (PO Box 406 Muskego, WI 53150 USA), or approved equal.

- B. Recommended to provide all stainless-steel corner guard and wall protection from a single source.

2.2 MATERIALS

- A. Flush mount corner guard
 - 1. Flush Mount Stainless Steel Corner Guard
 - 2. Corner Radius: 1/8"
 - 3. Height: 5'0" or as indicated on Drawings
 - 4. Stainless Steel: Corner guard shall be manufactured from Type 430 16-gauge stainless steel, options: Type 304 (meets NSF standard 51, 16 ga).
 - 5. Attachment – Fasteners. Pre-Drilled beveled holes and Phillips head screws.
 - 6. Finish: No.4 Satin Finish.

PART 3 - EXECUTION

3.1 EXAMINATION / PREPARATION

- A. Examine areas and conditions which the corner guard systems will be installed.
 - a. Complete all finishing operations, including painting before beginning installation of corner guards.
 - b. Wall surface shall be dry and free from dirt, grease, and loose paint.
 - c. Report any discrepancies to the architect.
- B. Prior to installation, clean substrate to remove dust, debris, and loose particles.

3.2 INSTALLATION

- A. General: Locate the corner guard as indicated on the approved detail drawing for the appropriate substrate and in compliance with the IPC installation instructions. Install Corner guard level and plumb at the height indicated on the drawings.
- B. Installation of Stainless steel corner guard:
 - a. Surface must be clean, dry, and properly sealed.
 - b. Screw on: Position the corner guard on the wall and attach it using the supplied screws
 - c. Remove the protective plastic covering from the exposed surface of the corner guard.
- D. Finished surfaces shall be cleaned after installation in accordance to IPC clean up and Maintenance instructions. Surface shall be left free of all imperfections.

END OF SECTION 10 26 13

SECTION 26 05 36 - CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal cable tray systems:
 - 1. Metal ladder cable tray.
 - 2. Metal wire mesh/basket cable tray.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- C. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 27 10 05 - Structured Cabling for Voice and Data - Inside-Plant.

1.3 REFERENCE STANDARDS

- A. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NEMA VE 1 - Metal Cable Tray Systems; 2009.
- D. NEMA VE 2 - Cable Tray Installation Guidelines; 2013.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the arrangement of cable tray with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others. Coordinate the work with other trades to avoid installation of obstructions within cable tray required clearances.
 - 2. Coordinate arrangement of cable tray with the dimensions and clearance requirements of the actual products to be installed.
 - 3. Coordinate the work with placement of supports, anchors, etc. required for mounting.
 - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Convene one week prior to commencing work of this section; require attendance of all affected installers. Review proposed routing, sequence of installation, and protection requirements for installed cable tray.

- C. Sequencing:
 - 1. Do not begin installation of cables until installation of associated cable tray run is complete.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cable tray system components and accessories. Include dimensions, materials, fabrication details, finishes, and span/load ratings.
- C. Shop Drawings: Include dimensioned plan views and sections indicating proposed cable tray routing, required clearances, and locations and details of supports, fittings, building element penetrations, and equipment connections.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual routing of cable tray and locations of supports.

1.6 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions and NEMA VE 2, except do not store cable tray outdoors without cover as permitted in NEMA VE 2.
- B. Handle products carefully to avoid damage to finish.

PART 2 PRODUCTS

2.1 CABLE TRAY SYSTEM - GENERAL REQUIREMENTS

- A. Provide new cable tray system consisting of all required components, fittings, supports, accessories, etc. as necessary for a complete system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use cable tray for applications other than as permitted by NFPA 70 and product listing/classification.
- D. Provide cable tray system and associated components suitable for use at indicated span/load ratings under the service conditions at the installed location.

- E. Unless otherwise indicated, specified span/load ratings are according to NEMA VE 1 (metal cable tray systems) or NEMA FG 1 (fiberglass cable tray systems) with safety factor of 1.5 and working load only (no additional concentrated static load).
- F. Unless otherwise indicated, specified load/fill depths and inside widths are nominal values according to NEMA VE 1 (metal cable tray systems) or NEMA FG 1 (fiberglass cable tray systems) with applicable allowable tolerances.

2.2 METAL CABLE TRAY SYSTEMS

A. Manufacturers:

- 1. Metal Cable Tray System:
 - a. Cablofil, a brand of Legrand North America, Inc: www.legrand.us/cablofil.
 - b. Cope, a brand of Atkore International Inc: www.copecabletray.com.
 - c. Thomas & Betts Corporation: www.tnb.com.
- 2. Source Limitations: Furnish cable tray system and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

B. Comply with NEMA VE 1.

C. Finishes:

- 1. Zinc Electroplated Steel: Comply with ASTM B633.

D. Metal Ladder Cable Tray:

- 1. Material: Aluminum.
- 2. Load/Fill Depth: 3 inches.
- 3. Span/Load Rating: NEMA VE 1 Class 16C.
- 4. Rung Spacing: 9 inches on center for straight lengths.
- 5. Inside Width: 18 inches.
- 6. Inside Radius of Fittings: 12 inches.

~~7. Products:~~

~~a. _____~~

7. Applications:

- a. Ladder Type Cable Tray shall be installed in IT/AV Room 010B and IT/AV Room 207 on 2nd floor above all network data racks.

E. Metal Wire Mesh/Basket Cable Tray:

- 1. Material: Zinc electroplated steel.
- 2. Tray Depth: 2 inches.
- 3. Mesh Spacing: 2 by 4 inches.
- 4. Tray Width: 12 inches.
- 5. Products:
 - a. Legrand Cablofil Wire Mesh Cable Tray Model: CF 54.
- 6. Applications:
 - a. Wire Mesh Cable Tray shall be installed above accessible ceilings. ~~and in open ceilings where shown.~~
 - 1. Provide 70lf in Admin. 017.
 - 2. Provide 60lf in Dry Storage 106.
 - 3. Provide 20lf in Prep. 206.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage cable tray system has been completed.
- B. Verify that field measurements are as shown on drawings.
- C. Verify that the dimensions and span/load ratings of cable tray system components are consistent with the indicated requirements.
- D. Verify that mounting surfaces are ready to receive cable tray and associated supports.
- E. Verify that conditions are satisfactory for installation prior to starting work.
- F. Provide a cable tray layout drawing for coordination with Engineer and Owner before installation.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install cable tray in accordance with NECA 1 (general workmanship), and NEMA VE 2.
- C. Unless otherwise indicated, arrange cable tray to be parallel or perpendicular to building lines.
- D. Arrange cable tray to provide required clearances and maintain cable access.
- E. Install cable tray plumb and level, with sections aligned and with horizontal runs at the proper elevation.
- F. Metal Wire Mesh/Basket Cable Tray: Field fabricate fittings in accordance with manufacturer's instructions, using only manufacturer-approved connectors classified for bonding.
 - 1. Inside Radius of Fittings: 12 inches.
- G. Cable Tray Movement Provisions:
 - 1. Provide suitable expansion fittings where cable tray is subject to movement, including but not limited to:
 - a. Where cable tray crosses structural joints intended for expansion.
 - b. Long straight cable tray runs in accordance with NEMA VE 2.
 - 2. Use expansion guides in lieu of hold-down clamps where prescribed in NEMA VE 2.
 - 3. Set gaps for expansion fittings in accordance with NEMA VE 2.
- H. Cable Provisions:
 - 1. Use suitable fixed barrier strips to maintain separation of cables as indicated and as required by NFPA 70.
 - 2. Use suitable drop-out fittings or bushings where cables exit cable tray as required to maintain minimum cable bending radius.
 - 3. Use suitable cable support fittings for long vertical cable tray runs with heavy cables.

- I. Provide end closures at unconnected ends of cable tray runs.
- J. Cable Tray Support:
 - 1. Use manufacturer's recommended hangers and supports, located in accordance with NEMA VE 2 and manufacturer's requirements, but not exceeding specified span unless otherwise approved by Engineer. Provide required support and attachment components in accordance with Section 26 05 29, where not furnished by cable tray manufacturer.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- K. Grounding and Bonding Requirements, in Addition to Requirements of Section 26 05 26:
 - 1. Comply with grounding and bonding requirements of NEMA VE 2.
 - 2. Metal Cable Tray Systems: Use suitable bonding jumpers or classified connectors to provide electrical continuity.
 - 3. Provide suitable equipment grounding conductor in each cable tray, except where cable tray contains only multiconductor cables with integral equipment grounding conductors. Do not use metal cable tray system as sole equipment grounding conductor.
 - a. Equipment Grounding Conductor for Aluminum Cable Tray: Use insulated copper conductor only; do not use bare copper conductor.
 - b. Minimum Equipment Grounding Conductor Size: 6 AWG copper.
 - c. Bond equipment grounding conductor to each cable tray section using suitable listed ground clamps. Separate bonding jumpers are not required where properly bonded equipment grounding conductor provides equivalent continuity.
- L. Cable Installation:
 - 1. Comply with cable installation requirements of NEMA VE 2.
 - 2. Use appropriate cable pulling tools, applied to prevent excessive force on cable tray system and maintain minimum cable bending radius.
 - 3. Use cable clamps or cable ties to fasten conductors/cables to vertical and horizontal runs of cable tray.
 - a. Distance Between Fastening Points for Vertical Runs: 18 inches.
 - b. Distance Between Fastening Points for Horizontal Runs: As required to maintain spacing and confine conductor/cable within the cable fill area.
- M. Penetrations: Install firestopping to preserve fire resistance rating of building elements, using materials and methods specified in Section 07 84 00.
- N. Identification Requirements, in Addition to Those Specified in Section 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect cable tray system for damage and defects.
- C. Correct deficiencies and replace damaged or defective cable tray system components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical connections to manufacturer's recommended torque settings.

3.5 CLEANING

- A. Remove dirt and debris from cable tray.
- B. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.6 PROTECTION

- A. Protect cable tray system from subsequent construction operations.

END OF SECTION 26 05 36

SECTION 26 29 23 - VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Variable frequency controllers.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- B. Section 26 28 13 - Fuses.

1.3 REFERENCE STANDARDS

- A. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems; 2014.
- B. NEMA ICS 7 - Industrial Control and Systems: Adjustable-Speed Drives; 2014.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- C. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles of Project.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Reliance Electric/Rockwell Automation: www.reliance.com.
- B. Siemens Energy & Automation: www.sea.siemens.com.
- C. Schneider Electric; Square D Products: www.schneider-electric.us.

2.2 DESCRIPTION

- A. Variable Frequency Controllers: Enclosed controllers suitable for operating the indicated loads, in conformance with requirements of NEMA ICS 7. Select unspecified features and options in accordance with NEMA ICS 3.1.
 - 1. Employ pulse-width-modulated inverter system.
 - 2. Design for ability to operate controller with motor disconnected from output.
- B. Enclosures: NEMA 250, Type 1, suitable for equipment application in places regularly open to the public.
- C. Finish: Manufacturer's standard enamel.

2.3 OPERATING REQUIREMENTS

- A. Rated Input Voltage: 208 volts, three phase, 60 Hertz.
- B. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
- C. Operating Ambient: 0 degrees C to 40 degrees C.

- D. Volts Per Hertz Adjustment: Plus or minus 10 percent.
- E. Current Limit Adjustment: 60 to 110 percent of rated.
- F. Acceleration Rate Adjustment: 0.5 to 30 seconds.
- G. Deceleration Rate Adjustment: 1 to 30 seconds.
- H. Input Signal: 4 to 20 mA DC.

2.4 COMPONENTS

- A. Display: Provide integral digital display to indicate output voltage, output frequency, and output current.
- B. Status Indicators: Separate indicators for overcurrent, overvoltage, ground fault, overtemperature, and input power ON.
- C. Furnish HAND-OFF-AUTOMATIC selector switch and manual speed control.
- D. Include undervoltage release.
- E. Control Power Source: Separate circuit.
- F. Door Interlocks: Furnish mechanical means to prevent opening of equipment with power connected, or to disconnect power if door is opened; include means for defeating interlock by qualified persons.
- G. Safety Interlocks: Furnish terminals for remote contact to inhibit starting under both manual and automatic mode.
- H. Manual Bypass: Furnish contactor, motor running overload protection, and short circuit protection for full voltage, non-reversing operation of the motor. Include isolation switch to allow maintenance of inverter during bypass operation.
- I. Disconnecting Means: Include integral fused disconnect switch on the line side of each controller.
- J. Wiring Terminations: Match conductor materials and sizes indicated.

2.5 SOURCE QUALITY CONTROL

- A. Shop inspect and perform standard production tests for each controller.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surface is suitable for controller installation.
- B. Do not install controller until building environment can be maintained within the service conditions required by the manufacturer.

3.2 INSTALLATION

- A. Install in accordance with NEMA ICS 7.1 and manufacturer's instructions.

- B. Tighten accessible connections and mechanical fasteners after placing controller.
- C. Provide fuses in fusible switches; refer to Section 26 28 13 for product requirements.
- D. Select and install overload heater elements in motor controllers to match installed motor characteristics.
- E. Identify variable frequency controllers in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 40 00.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.17.

3.4 ADJUSTING

- A. Make final adjustments to installed controller to assure proper operation of load system. Obtain performance requirements from installer of driven loads.

3.5 CLOSEOUT ACTIVITIES

- A. Demonstrate operation of controllers in automatic and manual modes.

3.6 MAINTENANCE

- A. Provide service and maintenance of controllers for one year from Date of Substantial Completion.

END OF SECTION

SECTION 26 32 13 - ENGINE GENERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged engine generator system and associated components and accessories:
 - 1. Engine and engine accessory equipment.
 - 2. Alternator (generator).
 - 3. Generator set control system.
 - 4. Generator set enclosure.

1.2 RELATED REQUIREMENTS

- A. Section 23 11 23 - Facility Natural-Gas Piping.
- B. Section 23 51 00 - Breechings, Chimneys, and Stacks: Engine exhaust piping.
- C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- D. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 36 00 - Transfer Switches.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA/EGSA 404 - Standard for Installing Generator Sets; 2014.
- C. NEMA MG 1 - Motors and Generators; 2014.
- D. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines; 2015.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 99 - Health Care Facilities Code; 2015.
- G. NFPA 110 - Standard for Emergency and Standby Power Systems; 2013.
- H. UL 1236 - Battery Chargers for Charging Engine-Starter Batteries; Current Edition, Including All Revisions.
- I. UL 2200 - Stationary Engine Generator Assemblies; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.

- a. Transfer Switches: See Section 26 36 00.
 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.
 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Convene one week before starting work of this section; require attendance of all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.
1. Include generator set sound level test data.
- C. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.
- D. Specimen Warranty: Submit sample of manufacturer's warranty.
- E. Evidence of qualifications for installer.
- F. Evidence of qualifications for maintenance contractor (if different entity from installer).
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.
- H. Manufacturer's factory emissions certification.
- I. Manufacturer's certification that products meet or exceed specified requirements.
- J. Source quality control test reports.
- K. Provide NFPA 110 required documentation from manufacturer where requested by authorities having jurisdiction, including but not limited to:
1. Certified prototype tests.
 2. Torsional vibration compatibility certification.
 3. NFPA 110 compliance certification.
 4. Certified rated load test at rated power factor.
- L. Manufacturer's detailed field testing procedures.

- M. Field quality control test reports.
- N. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
 - 1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.
- O. Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- P. Maintenance contracts.
- Q. Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.
- R. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Fuses: One of each type and size.

1.6 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70 (National Electrical Code).
 - 2. NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
 - 1. Authorized service facilities located within 200 miles of project site.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with engine generator systems of similar size, type, and complexity; manufacturer's authorized installer.
- D. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.
 - 1. Contract maintenance office located within 200 miles of project site.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store generator sets in accordance with manufacturer's instructions and NECA/EGSA 404.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's instructions to avoid damage to generator set components, enclosure, and finish.

1.8 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

- A. See Section 01 77 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum five year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Packaged Engine Generator Set - Basis of Design: Generac Power Systems as indicated under product description below; www.generac.com/industrial.
- B. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
- D. Source Limitations: Furnish engine generator sets and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

2.2 PACKAGED ENGINE GENERATOR SYSTEM

- A. Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. System Description:
 - 1. Application: Emergency/standby.
 - 2. Configuration: Single packaged engine generator set operated independently (not in parallel).
 - 3. Total System Power Rating: 60 kW, standby.
- D. Packaged Engine Generator Set:
 - 1. Type: Gaseous (spark ignition).
 - 2. Basis of Design: Generac Power Systems; www.generac.com/industrial.
 - a. Industrial Gaseous Generator Set; Model SG060 - Standby Power Rating of 60kW..
 - 3. Voltage: 208Y/120 V, 3 phase, 60 Hz.
 - 4. Main Line Circuit Breaker:
 - a. Type: Thermal magnetic.
 - b. Trip Rating: Select according to generator set rating.

- c. Features:
 - 1) Auxiliary contacts.

 - E. Generator Set General Requirements:
 - 1. Prototype tested in accordance with NFPA 110 for Level 1 systems.
 - 2. Factory-assembled, with components mounted on suitable base.
 - 3. List and label engine generator assembly as complying with UL 2200.
 - 4. Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.
 - 5. Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.
 - 6. Main Line Circuit Breakers: Provide factory-installed line side connections with suitable lugs for load side connections.

 - F. Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.

 - G. Starting and Load Acceptance Requirements:
 - 1. Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.
 - 2. Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.
 - 3. Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).
 - 4. Maximum Load Step: Supports 100 percent of rated load in one step.

 - H. Exhaust Emissions Requirements:
 - 1. Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.
 - 2. Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.

 - I. Sound Level Requirements:
 - 1. Provide Level 2 Sound Attenuation Enclosure. Do not exceed 71.7 Avg. dBA when measured at 23 feet from generator set in free field (no sound barriers) while operating at full load; include manufacturer's sound data with submittals.
 - 2. Comply with applicable noise level regulations.

 - J. Interface with building automation system.
- 2.3 ENGINE AND ENGINE ACCESSORY EQUIPMENT
- A. Provide engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.

 - B. Engine Fuel System - Gaseous (Spark Ignition):
 - 1. Fuel Source: Natural gas.
 - 2. Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.

3. Provide components/features indicated and as necessary for operation and/or required by applicable codes, including but not limited to:
 - a. Carburetor.
 - b. Gas pressure regulators.
 - c. Fuel shutoff control valves.
 - d. Low gas pressure switches.
- C. Engine Starting System:
1. System Type: Electric, with DC solenoid-activated starting motor(s).
 2. Battery(s):
 - a. Battery Type: Lead-acid.
 - b. Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.
 - c. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.
 3. Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.
 4. Battery Charger:
 - a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full charge without manual intervention.
 - b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.
 - c. Recognized as complying with UL 1236.
 - d. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.
 - e. Provide integral DC output ammeter and voltmeter with five percent accuracy.
 - f. Provide alarm output contacts as necessary for alarm indications.
- D. Engine Speed Control System (Governor):
1. Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.
 2. Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.
- E. Engine Lubrication System:
1. System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.
- F. Engine Cooling System:
1. System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.
 2. Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.

G. Engine Air Intake and Exhaust System:

1. Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.
2. Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.

2.4 ALTERNATOR (GENERATOR)

A. Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.

B. Exciter:

1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.
2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.
3. Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.

C. Temperature Rise: Comply with UL 2200.

D. Insulation System: NEMA MG 1, Class H; suitable for alternator temperature rise.

E. Enclosure: NEMA MG 1, drip-proof.

F. Total Harmonic Distortion: Not greater than five percent.

2.5 GENERATOR SET CONTROL SYSTEM

A. Provide microprocessor-based control system for automatic control, monitoring, and protection of generator set. Include sensors, wiring, and connections necessary for functions/indications specified.

B. Control Panel:

1. Control Panel Mounting: Unit-mounted unless otherwise indicated; vibration isolated.
2. Generator Set Control Functions:
 - a. Automatic Mode: Initiates generator set start/shutdown upon receiving corresponding signal from remote device (e.g. automatic transfer switch).
 - b. Manual Mode: Initiates generator set start/shutdown upon direction from operator.
 - c. Reset Mode: Clears all faults, allowing generator set restart after a shutdown.
 - d. Emergency Stop: Immediately shuts down generator set (without time delay) and prevents automatic restarting until manually reset.
 - e. Cycle Cranking: Programmable crank time, rest time, and number of cycles.
 - f. Time Delay: Programmable for shutdown (engine cooldown) and start (engine warmup).
 - g. Voltage Adjustment: Adjustable through range of plus/minus 5 percent.
3. Generator Set Status Indications:
 - a. Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
 - b. Current (Amps): For each phase.

- c. Frequency (Hz).
 - d. Real power (W/kW).
 - e. Reactive power (VAR/kVAR).
 - f. Apparent power (VA/kVA).
 - g. Power factor.
 - h. Duty Level: Actual load as percentage of rated power.
 - i. Engine speed (RPM).
 - j. Battery voltage (Volts DC).
 - k. Engine oil pressure.
 - l. Engine coolant temperature.
 - m. Engine run time.
 - n. Generator powering load (position signal from transfer switch).
4. Generator Set Protection and Warning/Shutdown Indications:
- a. Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following protections/indications:
 - 1) Overcrank (shutdown).
 - 2) Low coolant temperature (warning).
 - 3) High coolant temperature (warning).
 - 4) High coolant temperature (shutdown).
 - 5) Low oil pressure (shutdown).
 - 6) Overspeed (shutdown).
 - 7) Low fuel level (warning).
 - 8) Low coolant level (warning/shutdown).
 - 9) Generator control not in automatic mode (warning).
 - 10) High battery voltage (warning).
 - 11) Low cranking voltage (warning).
 - 12) Low battery voltage (warning).
 - 13) Battery charger failure (warning).
 - b. In addition to NFPA 110 requirements, provide the following protections/indications:
 - 1) High AC voltage (shutdown).
 - 2) Low AC voltage (shutdown).
 - 3) High frequency (shutdown).
 - 4) Low frequency (shutdown).
 - 5) Overcurrent (shutdown).
 - c. Provide contacts for local and remote common alarm.
 - d. Provide lamp test function that illuminates all indicator lamps.
5. Other Control Panel Features:
- a. Event log.
 - b. Communications Capability: BACnet BMS Integration. Provide all accessories necessary for proper interface.
 - c. Remote monitoring capability via PC.

C. Remote Annunciator:

- 1. Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
- 2. Generator Set Status Indications:
 - a. Generator powering load (via position signal from transfer switch).

- b. Communication functional.
- 3. Generator Set Warning/Shutdown Indications:
 - a. Comply with NFPA 110 for Level 1 systems including but not limited to the following indications:
 - 1) Overcrank (shutdown).
 - 2) Low coolant temperature (warning).
 - 3) High coolant temperature (warning).
 - 4) High coolant temperature (shutdown).
 - 5) Low oil pressure (shutdown).
 - 6) Overspeed (shutdown).
 - 7) Low fuel level (warning).
 - 8) Low coolant level (warning/shutdown).
 - 9) Generator control not in automatic mode (warning).
 - 10) High battery voltage (warning).
 - 11) Low cranking voltage (warning).
 - 12) Low battery voltage (warning).
 - 13) Battery charger failure (warning).
 - b. Provide audible alarm with silence function.
 - c. Provide lamp test function that illuminates all indicator lamps.

2.6 GENERATOR SET ENCLOSURE

- A. Enclosure Type: Sound attenuating, weather protective.
- B. Enclosure Material: Steel or aluminum.
- C. Hardware Material: Stainless steel.
- D. Color: Manufacturer's standard.
- E. Access Doors: Lockable, with all locks keyed alike.
- F. Openings: Designed to prevent bird/rodent entry.
- G. External Drains: Extend oil and coolant drain lines to exterior of enclosure for maintenance service.
- H. Sound Attenuating Enclosures: Line enclosure with non-hydroscopic, self-extinguishing sound-attenuating material.

2.7 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Perform production tests on generator sets at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.
- C. Generator Set production testing to include, at a minimum:
 - 1. Operation at rated load and rated power factor.
 - 2. Single step load pick-up.
 - 3. Transient and steady state voltage and frequency performance.
 - 4. Operation of safety shutdowns.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.
- C. Verify that rough-ins for field connections are in the proper locations.
- D. Verify that mounting surfaces are ready to receive equipment.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1.
- B. Install products in accordance with manufacturer's instructions.
- C. Install generator sets and associated accessories in accordance with NECA/EGSA 404.
- D. Arrange equipment to provide minimum clearances and required maintenance access.
- E. Unless otherwise indicated, mount generator set on properly sized 6 inch high concrete pad constructed in accordance with Section 03 30 00. Provide suitable vibration isolators, where not factory installed.
- F. Provide required support and attachment in accordance with Section 26 05 29.
- G. Use manufacturer's recommended oil and coolant, suitable for the worst case ambient temperatures.
- H. Provide engine exhaust piping in accordance with Section 23 51 00, where not factory installed.
 - 1. Include piping expansion joints, piping insulation, thimble, condensation trap/drain, rain cap, hangers/supports, etc. as indicated or as required.
 - 2. Do not exceed manufacturer's maximum back pressure requirements.
- I. Provide grounding and bonding in accordance with Section 26 05 26.
- J. Identify system wiring and components in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Provide services of a manufacturer's authorized representative to prepare and start systems and perform inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- C. Notify Owner and Architect at least two weeks prior to scheduled inspections and tests.

- D. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- E. Provide all equipment, tools, and supplies required to accomplish inspection and testing, including load bank and fuel.
- F. Preliminary inspection and testing to include, at a minimum:
 - 1. Inspect each system component for damage and defects.
 - 2. Verify tightness of mechanical and electrical connections are according to manufacturer's recommended torque settings.
 - 3. Check for proper oil and coolant levels.
- G. Prepare and start system in accordance with manufacturer's instructions.
- H. Perform acceptance test in accordance with NFPA 110.
- I. Inspection and testing to include, at a minimum:
 - 1. Verify compliance with starting and load acceptance requirements.
 - 2. Verify voltage and frequency; make required adjustments as necessary.
 - 3. Verify phase sequence.
 - 4. Verify control system operation, including safety shutdowns.
 - 5. Verify operation of auxiliary equipment and accessories (e.g. battery charger, heaters, etc.).
 - 6. Perform load tests in accordance with NFPA 110 (1.5 hour building load test followed by 2 hour full load test).
- J. Provide field emissions testing where necessary for certification.
- K. Sound Level Tests: Measure sound levels for compliance with specified requirements. Identify and report ambient noise conditions.
- L. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
- M. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.4 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 77 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- D. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

2. Provide minimum of four hours of training.
 3. Instructor: Manufacturer's authorized representative.
 4. Location: At project site.
- E. After successful acceptance test and just prior to Substantial Completion, replace air, oil, and fuel filters.

3.6 PROTECTION

- A. Protect installed engine generator system from subsequent construction operations.

3.7 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide to Owner a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of engine generator system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, inspection, and testing, with a detailed schedule.
- C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance. Submit report to Owner indicating maintenance performed along with evaluations and recommendations.
- D. Provide trouble call-back service upon notification by Owner:
1. Provide on-site response within 4 hours of notification.
 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
 3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.
- E. Maintain an on-site log listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced.

END OF SECTION

SECTION 27 10 05 - STRUCTURED CABLING FOR VOICE AND DATA - INSIDE-PLANT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements per SUNY Broome IT/Security.
- B. Communications pathways.
- C. Fiber Optic (multi-mode) and Copper cable and terminations.
- D. Procurement and installation of the following data equipment room fittings and equipment:
 - 1. Data Racks (4-post)
 - 2. Sliding Keyboard Shelf w/Mouse Extension (Rack Accessory – 1/rack)
 - 3. Patch Panels
 - 4. Wire Management (vertical and horizontal)
 - 5. Network Switches (ARUBA)
 - 6. UPS Units w/Network Cards
 - 7. Wireless Access Points
 - 8. IP Telephone Handsets
 - 9. IP PAD line card for NEC phone system
 - 10. Indoor Emergency Phone (1/floor)
 - 11. Outdoor Emergency Phone and Tower
- E. Communications outlets.
- F. Communications grounding and bonding.
- G. Communications identification.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
 - 1. Includes intersystem bonding termination.
 - 2. Includes bonding jumpers for bonding of communications systems and electrical system grounding.
- C. Section 26 05 34 - Conduit.
- D. Section 26 05 36 - Cable Trays for Electrical Systems.
- E. Section 26 05 37 - Boxes.
- F. Section 26 05 53 - Identification for Electrical Systems: Identification products.
- G. Section 26 27 26 - Wiring Devices.

1.3 REFERENCE STANDARDS

- A. BICSI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition

- B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Electronic Industries Alliance/Electrical Components Association; Revision E, 2005.
- C. ICEA S-90-661 - Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without An Overall Shield) For Use in General Purpose and LAN Communications Wiring Systems Technical Requirements; 2012.
- D. NECA/BICSI 568 - Standard for Installing Building Telecommunications Cabling; National Electrical Contractors Association; 2006.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2015.
- G. TIA-568-C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; Rev C, 2009 (with Addenda; 2014).
- H. TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces; Rev C, 2012 (with Addenda; 2013).
- I. TIA-606-B - Administration Standard for the Telecommunications Infrastructure; Rev B, 2012.
- J. TIA-607-B - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; Rev B, 2012 (with Addenda; 2013).
- K. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider **and Campus IT Personnel.**
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify **Architect or Engineer** of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Coordinate with Communications Service Provider for service entrance installation schedule. Communications Service Entrance installation by others.
- C. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service and network system requirements and installation details with Communications Service Provider representative, SUNY Broome IT personnel, and the Engineer.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, with specific catalog numbers highlighted.
 - 1. Cabling, Data Racks, Patch Panels, Sliding Shelves, & Emergency Phones – Approved equals will be accepted upon acceptance by SUNY Broome IT personnel.
 - 2. All other data equipment provided under this specification must be provided as specified so that it matches what is currently being utilized on Campus.
- C. Shop Drawings: Show compliance with requirements of network layout, by showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance location, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- D. Evidence of qualifications for installer.
- E. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.
- F. Field Test Reports.
- G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 - 1. Record actual locations of outlet boxes and distribution frames.
 - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
 - 3. Identify distribution frames and equipment rooms by room number on contract drawings.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
 - 1. ~~Employing a BICSI Registered Communications Distribution Designer (RCDD).~~
 - 2. Supervisors and installers factory certified by manufacturers of products to be installed.
 - 3. Employing BICSI Registered Cabling Installation Technicians (RCIT) **or equivalent** for supervision of all work.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.
- C. Owner will coordinate delivery of Owner provided equipment to job site. Assist Owner's IT personnel with delivery and unloading of Owner provided equipment.

1.8 WARRANTY

- A. See Section 01 77 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cabling:
 - 1. 3M Communications Technologies: solutions.3m.com.
 - 2. PANDUIT: www.panduit.com.
 - 3. Siemon Company: www.siemon.com.
 - 4. TE Connectivity: www.te.com.
 - 5. Mohawk Cable: www.mohawk-cable.com

B. Equipment:

- 1. Aruba – Switches and switch accessories
- 2. Eaton – UPS units and Network Interface Cards
- 3. NEC – Telephone Handsets and IP PAD Card and associated licenses for IP phones.

2.2 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 - 1. Comply with TIA-568 (SET) (cabling) and TIA-569-C (pathways), latest editions (commercial standards).
 - 2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607-B and are UL listed or third party independent testing laboratory certified.
 - 3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 - 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. System Description:
 - 1. Building Entrance Cable: By others.
 - 2. Backbones - Within Building: Copper, 4-pair & multi-mode fiber optic cable.
 - 3. Offices and Work Areas: Provide number of data drops as shown on the plans in each work area.
 - 4. Classrooms: Provide number of data drops as shown on the plans.
 - 5. Computer Lab: Provide number of data drops as shown on the plans.

6. Provide additional outlets where indicated on drawings.
 7. Coordinate final counts with SUNY Broome IT personnel and Engineer before ordering and installation.
- C. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
1. Locate main distribution frame in **Electrical IT/AV** Room 010B.
 2. Capacity: As required to terminate all cables required by design criteria plus minimum 25 percent spare space.
- D. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets.
1. Locate intermediate distribution frames in **AV IT/AV** Room 207.
- E. Backbone Cabling: Cabling, pathways, and terminal hardware connecting intermediate distribution frames (IDF's) with main distribution frame (MDF), wired in star topology with main distribution frame at center hub of star.
- F. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.3 PATHWAYS

- A. Conduit: As specified in Section 26 05 34; provide pull cords in all conduit.
- B. Cable Trays: As specified in Section 26 05 36.

2.4 COPPER CABLE AND TERMINATIONS

A. Copper Backbone Cable:

1. Description: 100 ohm, balanced, twisted pair cable complying with TIA-568-C.2, ICEA S-90-661, and listed and labeled as complying with UL 444.
2. Cable Type: TIA-568-C.2 Category 6 plenum rated, SF/UTP for Video Surveillance systems.
3. Cable Type: TIA-568-C.2 Category 6, plenum rated, UTP for all other networking systems.
4. Cable Capacity: 4-pair.
5. Cable Applications:
 - a. Plenum Applications: Use listed NFPA 70 Type CMP plenum cable.
 - b. Riser Applications: Use listed NFPA 70 Type CMP plenum cable.
6. Product(s):
 - a. Basis-of-Design is Mohawk Cable
 1. Part No.: M582821 (Blue)
 - b. Provide two runs of copper cable between IT/AV closets.

B. Copper Horizontal Cable:

1. Description: 100 ohm, balanced, twisted pair cable complying with TIA-568-C.2 and listed and labeled as complying with UL 444.
2. Cable Type - Voice and Data: TIA-568-C.2 Category 6, plenum rated, UTP (unshielded twisted pair); 23 AWG..
 - a. Basis-of-Design: Mohawk Part No.'s: M58281 (Data & IP Phones-Blue) & M58280 (Pots Lines – White).

3. Cable Type - Video Surveillance System: TIA-568-C.2 Category 6, plenum rated, SF/UTP (screened twisted pair)
 - a. Basis-of-Design: Mohawk Part No.: M58182 (Orange)
4. Cable Type – Audio/Video System: Provide plenum rated XTP DTP 24Shielded Twisted Pair cable and shielded terminations for XTP and DTP Systems where shown on the plans.
 - a. Basis-of-Design: Extron Model No.: 22-235-03
5. Cable Capacity: 4-pair.
6. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
7. Cable Jacket & Jack Color -Data Cable: As specified below
 - a. WHITE: IP phones/POTS lines
 - b. ORANGE: IP cameras
 - c. BLUE: Data/IP Phones
8. Product(s):
 - a. Mohawk Cable: www.mohawk-cable.com
 1. Part No.: M582821 (Blue)
 2. Part No.: M58280 (White)
 3. Part No.: M58288 (Orange)
9. Speaker Cabling: SPK Series Cable from Extron
 - a. One twisted pair, plenum rated
 - b. Basis-of Design: Extron Part No.: 22-154-03 (SPK16P)
10. Coaxial Cable – plenum rated RG6 with compression type terminations.
 - a. Basis-of-Design: Mohawk Part No.: M71002

C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.

D. Fiber Optic Cable:

1. 12-strand, OM3 Laser Optimized, 50/125µm, multi-mode fiber
2. Terminations: Type ST (all strands)
3. Basis-of-Design: Mohawk Part No.: M9C204

E. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.

1. Performance: 2500 mating cycles.
2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.
 - a. Campus IT personnel prefers to utilize the T568B wiring configuration.
3. Product(s):
 - a. Panduit: www.panduit.com or Extron brand as noted below.
 - 1) RJ45 Jacks:
 - (a) Data - Panduit Mini-Com TX6 PLUS UTP Jack Modules: Part Number: CJ688TG Standard Straight Jack, COLOR: Blue
 - (b) Video Surveillance - Panduit Mini-Com TX6 PLUS Shielded TP Jack Modules: Part Number: CJS688TG Shielded Straight Jack, COLOR: ORANGE
 - (c) XTP –Extron brand, Shielded jacks
 - 2) RJ45 Plugs:

- (a) Data - Panduit TX6 PLUS CAT6 UTP Modular Plug; Part Number: SP688-C
- (b) Video Surveillance - Panduit TX6 PLUS CAT6 Shielded UTP Modular Plug; Part Number: SPS688-C
- (c) XTP – Extron brand, Shielded Plugs

F. Copper Patch Cords:

- 1. Description: Factory-fabricated 4-pair, CAT6 cable assemblies with 8-position modular connectors terminated at each end.
- 2. Patch Cords for Patch Panels:
 - a. Quantity, Length, & Color as follows:
 - 1) Location: Data Closets
 - (a) (40) - 5ft YELLOW for DATA
 - (b) (60) - 7ft YELLOW for DATA
 - (c) (10) - 5ft WHITE for IP Phones (VOICE)
 - (d) (20) - 7ft WHITE for IP Phones (VOICE)
 - (e) (10) - 5ft GREEN for PRINTER/COPIER
 - (f) (20) - 7ft GREEN for PRINTER COPIER
 - (g) (20) - 25ft GRAY
 - 2) Location: Offices/HVAC & Electric Rooms/Digital Signage/Other Spaces
 - (a) (30) - 7ft BLUE
 - (b) (30) - 10ft BLACK
 - (c) (30) - 14ft GREEN

2.5 IT Equipment and IT/AV Room Fittings

- A. Backboards: Interior grade plywood without voids, 3/4 inch thick; UL-labeled fire-retardant.
 - 1. Size: 48 by 96 inches.
 - 2. Cover four walls of each IT/AV Room. Coordinate with Engineer and Owner before installation.
 - 3. Do not paint over UL label.
 - 4. Paint: White
- B. IT Equipment Cabinet: EIA/ECA-310 standard 19 inch wide component racks.
 - 1. Freestanding Cabinet: Constructed of steel with front and rear doors with locks; removable side panels with locks; vented top and rear door; adjustable leveling feet; cable access in roof and base; grounding bar; horizontal and vertical cable management (three horizontal and two vertical per each cabinet provided).
 - a. UL Load Rating: 2,500 pounds.
 - 2. Cabinet: Steel construction with corrosion resistant finish.
 - 3. Locks: Front and Back doors keyed alike.
 - a. IT and A/V cabinets shall be keyed differently.
 - 4. Sliding Keyboard Shelf w/ Mouse Extension
 - a. Basis-of-Design: Black Box Network Services Model No.: RM382-R2
 - b. Quantity: 2 (one per IT cabinet)
 - 5. Cabinet Basis-of-Design: Legrand, Middle Atlantic Products Model No.: MRK-4436
 - 6. Quantity: 2 IT Cabinets (one per IT/AV Room (010B & 207) & 4 A/V Cabinets (one in IT/AV 010B & three in IT/AV 207).
 - 7. All the above items: Or approved equal.
- C. 48-Port Patch Panel
 - 1. Mini-Com M6 Style Modular Faceplate Patch Panel

2. Basis-of-Design: Panduit Part Number CPPL48M6BLY or approved equal.
3. Quantity: 6 (three per IT cabinet)

D. Switches

1. Provide IT cabinet switches and accessories as specified. No equals will be accepted as the equipment must match what is currently in use on Campus.
 - a. Aruba 2930M 40G 8 HPE Smart Rate PoE+ 1-slot Switch
 1. Part No.: JL323A
 2. Quantity: 2 (one per IT cabinet)
 - b. Aruba 2930M 48G PoE+ 1-slot Switch
 1. Part No.: JL322A
 2. Quantity: 4 (2 per IT cabinet)
 - c. Aruba 2930M Switch Modules
 1. Aruba 2930M 2-port Stacking Module (Part No.: JL325A)
 - a. Quantity: 6
 2. Aruba 3810M/2930M 4SFP+ MACsec Module (Part No.: JL083A)
 - a. Quantity: 2
 - d. ARUBA 2930M Transceiver
 1. Aruba HPE X132 10G SFP+ LC LR Transceiver (Part No.: J9151A)
 2. Quantity: 4
 - e. ARUBA 2930M Stacking Cables
 1. Aruba 2920/2930M .5m Stacking Cable (Part No.: J9734A)
 - a. Quantity: 4
 2. Aruba 2920/2930M 1m Stacking Cable (Part No.: J9735A)
 - a. Quantity: 2
 - f. ARUBA 2930M Power Supplies
 1. Aruba X372 54VDC 1050W 110-240VAC Power Supply (Part No.: JL087A)
 2. Quantity: 6

E. UPS Unit

1. Provide UPS Units as specified below. No equals will be accepted as equipment must match what is currently in use on Campus.
 - a. Eaton 5P Rackmount UPS (Part No.: 5P3000RT)
 - b. Quantity: 2 (one per IT cabinet)
 - c. Provide Eaton Network Interface Card for UPS Unit (Part No.: NETWORK-MS)
 1. Quantity: 2

F. Wireless Access Point

1. Provide wireless access points as specified below. No equals will be accepted as equipment must match what is currently in use on Campus.
 - a. Aruba AP-335 802.11n/ac Access Point (Part No.: JW801A)
 - b. Quantity: 11
 - c. Provide Aruba Part No.: JW047A Mount Accessory for each Wireless Access Point.

G. Telephone Handset

1. Provide telephone handset as specified below. No equals will be accepted as equipment must match what is currently in use on Campus.
 - a. NEC DT800 Series Desktop IP Telephone (Part No.: DT830:ITZ-12D)
 1. Quantity: 24
 - b. NEC IP PAD card and associated licenses for IP phones (Part No.: Q24-UW000000108024 SCH-IPDA-A PA KIT)
 1. Quantity: 1

H. Interior Emergency Phone

1. Basis-of-Design: TALK A PHONE ETP-100MB – Surface Mounted Emergency Phone

a. Quantity: 3

I. Exterior Emergency Phone

1. Basis-of-Design: TALK A PHONE ETP-400 –Single Button Emergency Phone

a. Quantity: 1

2. Provide ETP-MT/R Radius Emergency Phone Tower in standard Blue color.

a. Exact location to be determined in field.

2.6 COMMUNICATIONS OUTLET

A. Outlet Boxes: Comply with Section 26 05 37.

1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
2. Minimum Size, Unless Otherwise Indicated:
 - a. Voice Only Outlets: 4 inch by 2 inch by 2-1/8 inch deep (100 by 50 by 54 mm) trade size.
 - b. Data, Combination Voice/Data, all other Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.

B. Wall Plates:

1. Comply with system design standards and UL 514C.
2. Accepts modular jacks/inserts.
3. Capacity:
 - a. Voice Only Outlets: 1 ports.
 - b. Data or Combination Voice/Data Outlets: 4 ports.
4. Wall Plate Material/Finish - Flush-Mounted Outlets: High impact thermoplastic, White.
5. Product(s):
 - a. PANDUIT: www.panduit.com
 - 1) Flush-Mounted Faceplates:
 - (a) PANDUIT : Mini-Com multi- port faceplates, white plastic, USA style of 2.75 x 4.5 inches.
 - (b) Provide blank covers in unused ports.
 - (c) Port colors shall match cabling terminated on back-side (Blue, White, Orange).

2.7 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607-B.

B. Provide a 1/4"x4"x12" ground bar adjacent to the data rack locations for grounding purposes. Bond ground bars to building ground system. Follow latest edition of the Telecommunications Distribution Methods Manual (TDMM), Bonding and Grounding (Earthing) chapter for grounding cable and installation requirements. Provide grounding for all IT/AV racks, equipment, and cable trays.

2.8 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569-C (pathways), TIA-607-B (grounding and bonding), NECA/BICSI 568, NFPA 70, and SYSTEM

DESIGN as specified in PART 2.

- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607-B and NFPA 70.
- D. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- E. Installation shall comply with the latest edition of the BICSI Telecommunications Distribution Methods Manual (TDMM).

3.2 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 - 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 - 2. 12 inches from power conduits and cables and panelboards.
 - 3. 6 inches from flues, hot water pipes, and steam pipes.
- B. Conduit, in Addition to Requirements of Section 26 05 34:
 - 1. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.
 - 2. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.
 - 3. Arrange conduit to provide no more than 100 feet between pull points.
 - 4. Provide (2)-3" EMT conduits (approx. 80lf) from Admin 017, through Student Lounge 015 to IT/AV Room 010B. Paint conduit. Provide two pull-strings in conduit along with cable installation.
 - 5. Provide (2)-3" EMT conduits above inaccessible ceiling in Lobby 201, from elevator to above Room 206 ceiling. Provide two pull-strings in conduit along with data cabling.
- C. Outlet Boxes:
 - 1. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: Unless otherwise indicated, as follows:
 - 1) Telephone and Data Outlets: 18 inches above finished floor.
 - b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - c. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
 - d. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
 - e. Locate outlet boxes so that wall plate does not span different building finishes.
 - f. Locate outlet boxes so that wall plate does not cross masonry joints.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 - 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 - 2. Do not over-cinch or crush cables.
 - 3. Do not exceed manufacturer's recommended cable pull tension.

4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
 5. Contractor is responsible for installing, terminating, and testing all cabling.
 6. Use T568B wiring configuration (Campus Standard). Verify before terminating.
 7. Utilize wide base j-hooks suitable for cable installation where cable is not called out to be installed in cable tray or conduit. J-hooks shall be spaced a maximum of 5' apart.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames:
 - a. IT cabling: 120 inches.
 - b. A/V cabling (XTP type): 240" in IT/AV Room 207; 120" in IT/AV Room 010B.
 - c. Coordinate horizontal cable entrance locations and cabinet to be terminated in before installation to ensure adequate cable length is provided for cabinet equipment connectivity.
 2. At Outlets - Copper: 12 inches.
- C. Riser Applications: Use listed NFPA 70 Type CMP plenum cable.
1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
 3. Use T568B wiring configuration.
- D. Floor-Mounted Racks and Enclosures: Permanently anchor to floor in accordance with manufacturer's recommendations.
- E. Identification:
1. Use wire and cable markers to identify cables at each end.
 2. Provide a 1/4"x4"x12" ground bar adjacent to the data rack locations for grounding purposes. Bond ground bars to building ground system. Follow latest edition of the Telecommunications Distribution Methods Manual (TDMM), Bonding and Grounding (Earthing) chapter for grounding cable and installation requirements. Provide grounding for data racks, equipment, conduit, and cable tray.
 3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Comply with inspection and testing requirements of specified installation standards.
- C. Visual Inspection:
1. Inspect cable jackets for certification markings.
 2. Inspect cable terminations for color coded labels of proper type.
 3. Inspect outlet plates and patch panels for complete labels.
- D. Testing - Copper Cabling and Associated Equipment:
1. Test backbone cables after termination but before cross-connection.
 2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
 3. Category 5e and Above Backbone: Perform near end cross talk (NEXT) and

- attenuation tests.
4. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.
 5. Replace cabling not passing tests.
- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and incoming telecommunications service is active, test each jack and provide test report for each length of cable tested.

END OF SECTION

SECTION 28 13 00 - ACCESS CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Installation requirements for Access Control Equipment and low voltage cabling provided by others.
- B. Providing and installing 120v power for power supplies and control panels located in IT/AV room 010B and IT/AV room 207.
- C. Providing and installing conduit and junction boxes for all cabling.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 34 - Conduit.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 101 - Life Safety Code; 2015.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the installation of access control equipment power supplies, control panels, and cabling with other installers as required for both functionality and code compliance.
 - 2. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meetings:
 - 1. Conduct an access control installation coordination meeting with Engineer and facility representative to review equipment locations and cable routing.
 - 2. Conduct a meeting with Engineer, CBORD representative, facility representative and other related equipment manufacturers (fire alarm, etc.) to discuss access control system interface requirements.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Evidence of qualifications for installer.
- C. Manufacturer's detailed cable field testing procedures.

- D. Field quality control test reports.
- E. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.
- F. ~~Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.~~
 - 1. ~~Include contact information for entity that will be providing contract maintenance and trouble call-back service.~~
- G. ~~Maintenance Materials: Furnish the following for Owner's use in maintenance of project.~~

1.6 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70.
 - 2. NFPA 101 (Life Safety Code).
 - 3. The requirements of the local authorities having jurisdiction.
 - 4. Applicable TIA/EIA standards.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with access control systems of similar size, type, and complexity. .

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.8 WARRANTY

- A. See Section 01 77 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum one year manufacturer warranty covering repair or replacement due to workmanship.

PART 2 PRODUCTS

2.1 ACCESSORIES

- A. Provide and install power circuitry and conduit to power supplies, control panels, and door hardware provided by others. Power cable and conduit is specified in Division 26 specifications. Low voltage cabling for access control will be provided by others and installed under this section.

~~1. Basis-of-Design for cable to be installed by this contract is WINDY CITY WIRE Part No. 002352. Verify exact cable to be installed with vendor supplying the cable.~~

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- B. Verify that mounting surfaces are ready to receive system components.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install access control system components (power supplies and control panels) and cabling in accordance with NECA 1 (general workmanship). Power supply and control panel locations are indicated on the drawings. Coordinate wiring connection to integrated and stand alone access control door hardware and components with door hardware installer. Contractor shall wire from door locations (shown on plans) to power supply and control panel locations shown on plans.
- B. Install products in accordance with manufacturer's instructions.
- C. Wiring Method: Unless otherwise indicated, use wiring in EMT conduit.
 - 1. Do not exceed manufacturer's recommended maximum cable length between components.
- D. Provide grounding and bonding in accordance with Section 26 05 26.
- E. Identify system wiring and components in accordance with Section 26 05 53.
- F. Coordinate location and installation of power supplies and control panels with Construction Manager, Access Control installer/vendor and Engineer.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- C. Programming and starting of the system will be by CBORD. This Contractor shall assist with troubleshooting of wiring, access control power supplies and control panels, and door hardware control connections.
- D. Test for proper interface with other systems.
- E. Work with CBORD to correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.4 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 77 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstration: Work with CBORD, the proper operation of the access control system to Owner, and to correct deficiencies or make adjustments as directed.

3.6 PROTECTION

- A. Protect installed system components from subsequent construction operations.

END OF SECTION 28 13 00